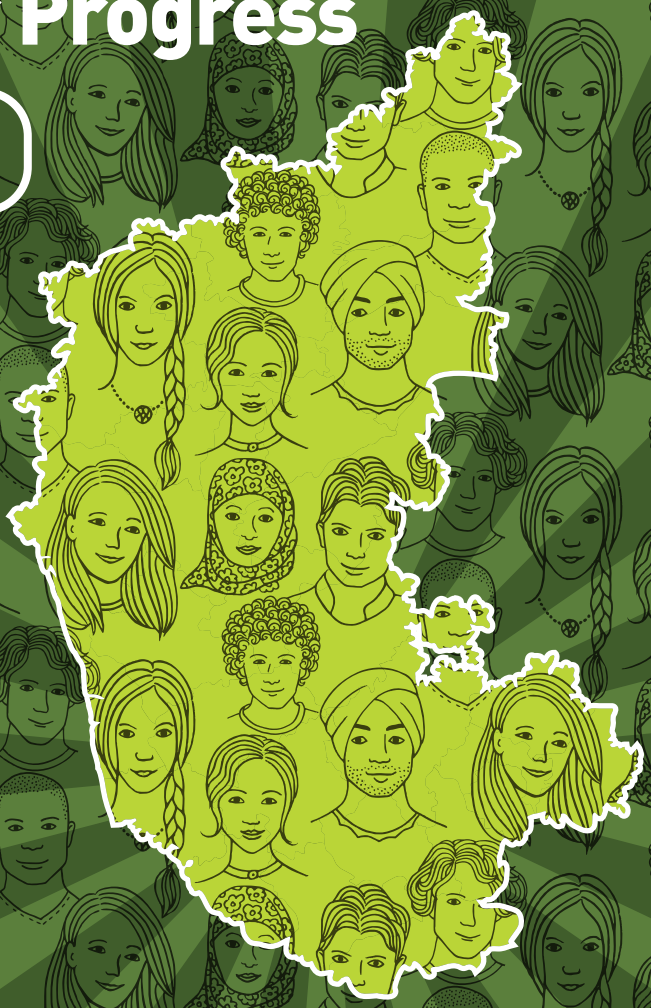
Advancing People's Health in Karnataka: Vision for Progress

SUMMARY

see pp 106-107
for tribal health



INTERVENTION
INTEGRATION
IMPLEMENTATION
INNOVATION
INVESTMENT

REPORT SUBMITTED TO

Departments of Health & Family Welfare and Medical Education

Government of Karnataka

VISION GROUP

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Advancing People's Health in Karnataka: Vision for Progress

REPORT SUBMITTED TO

Departments of Health & Family Welfare and Medical Education

Government of Karnataka

By

Karnataka Health Vision group

VISION GROUP

BASAVARAJ BOMMAI
CHIEF MINISTER

No: CM/MS/ 15 /2021

VIDHANA SOUDHA
BENGALURU-560 001

Date: 19-08-2021

MESSAGE

I am pleased to note that Karnataka Health Vision Group is bringing out the vision document with a roadmap to improve the health care system in the State.

The Vision Group has done a commendable effort by bringing together nearly 250 experts from various health and health related departments/ disciplines and charting this roadmap for improving the health sector.

Articulating the vision for Arogya Karnataka, the document provides a framework to obtain the highest returns from health sector activities and improve citizens' health.

The several innovative strategies and recommendations are towards delivering comprehensive and integrated healthcare services at primary, secondary, and tertiary levels and make care available, accessible, and affordable. We should be able to manage the problems of the yesteryears along with the issues that are likely to emerge in future.

Indeed, health and wellness should be a resource in our societies and ought to impact across the life course.

I take this opportunity to congratulate my colleague Dr.K. Sudhakar, Minister for Health and Medical Education, Prof. G. Gururaj, Chairperson, Karnataka Health Vision Group and all the members of the group for bringing out this valuable vision document. Despite the challenges posed by the COVID-19 pandemic, the effort has been diligent, done with utmost care and concern, and of high quality.

Government of Karnataka will examine the recommendations and proposals of the vision group and actively facilitate health sector reforms. Collectively, we will strive and make Karnataka a model state for health care in the country.

(BASAVARAJ BOMMAI)

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Dr. K. SUDHAKAR

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ಕರ್ನಾಟಕ ಸರ್ಕಾರ
Minister for Health & Family Welfare,
Medical Education
and Chikkaballapur District In-Charge
Government of Karnataka

Ref: HFW&MEM/ 99 /2021

Date: 17-08-2021

: MESSAGE :

In health and development circles, it is well acknowledged that political will and commitment are essential prerequisites for improving people's health and providing efficient and quality services. The state has the responsibility to deliver comprehensive, integrated and coordinated health care services. Based on the framework of Universal Health Coverage and Primary Healthcare, Karnataka has been making continuous progress in its commitment to deliver health for its people. The pace of implementation and steps that are taken to address the health problems of today and tomorrow needs continuous scrutiny and evaluation. Amidst our progressive reforms and policies, the Covid-19 pandemic informed us that our health systems should be more robust and strong as well as resilient. During 2020 – 21, responding to the epidemic was an immediate necessity, but the government's vision was beyond that as well.

Health care delivery is always a continuous process and social determinants of health throws up several vulnerabilities and challenges. Both urban and rural people need efficient and effective health services. Irrespective of services being available in the public or private sector, rising costs of health care merely compound the issue. The ethical obligation is not just affordability but also accessibility. It is the duty and responsibility of the government to deliver services for its citizens. The Constitution of the vision group – Arogya Karnataka is an initiative to understand the present and future health care needs and identify solutions that would be sustainable in the coming years.

The Health Vision group was entrusted with developing a roadmap for strengthening health systems in our state and further health sector reforms well into the future. The group led by Prof. G Gururaj, Former Director and Senior Professor of Epidemiology and Public Health at NIMHANS, Bangalore, engaged with nearly 250 professionals; public health experts, policymakers, healthcare providers, administrators and NGOs from across the state.

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The report of the vision group based on reviews, discussions and detailed deliberations has made substantive efforts to identify remedial solutions for improving existing and current scenarios. This is critical at this juncture, as we transform from managing traditional problems to addressing emerging situations which requires a reorientation of our systems and changing paradigms of care. The Vision document is quite comprehensive: it addresses improvements needed in public health services, makes health systems resourceful, suggests for better implementation of national and state programmes and schemes, including managing emerging concerns of today and tomorrow. Most significantly, underscoring 'One health', the report places health central to growth and development and emphasises strengthening health systems based on public health principles and practices. We need to be conscious that developing one program or including another component to an existing programme is very different from building resilient health systems. This requires a different insight, and we have termed it the 5 'I's for healthcare: Interventions, Integration, Implementation, Innovation and Investment.

The Vision group has made several new recommendations and proposes solutions that merit serious consideration. Building on learning from managing the Covid pandemic it provides a roadmap to reform and reorient our health systems. The real strength of the report is in its broader vision and a strong public health focus, and advocating an eco-system for health and wellbeing. We will examine the recommendations/proposals of the Vision group report and facilitate an action plan to implement its recommendations. In this context, I look forward to continued dialogue and feedback to make this vision a reality. Let's renew and pledge to improve our health care systems and strive further to make our state a leading model at the national and global levels in the coming days.

(DR. K. SUDHAKAR)

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MESSAGE

Over the years, Government of Karnataka and the Department of Health and Family Welfare has strived continuously to address the health issues and concerns of the population. Government has invested significantly on the public health infrastructure and consequently health care services across the state are available, affordable and accessible for the vast majority of the population. Several national health programs covering major diseases like Tuberculosis, HIV-AIDS, Vector Borne Diseases and others are being fruitfully implemented in the state. Mother and Child Health programs have always been of specific focus to the Government. Karnataka's own assurance based health initiatives have benefitted thousands of poor households. All these efforts have resulted in decreasing birth rate, death rate and increasing life expectancy. Karnataka is also one of the states in India ranking high on Human Development Index.

As we progress and achieve our targets and goals towards improving health of the population, new challenges are emerging. The health burden in the state is now gradually shifting towards Non-Communicable Diseases like diabetes, hypertension, cardiovascular diseases, cancer, mental disorders, and injuries. Due to effects of climate change, the frequency and severity of natural disasters has increased taking the lives of several hundreds of individuals every year. Emerging infectious diseases like, the ongoing Covid-19 pandemic challenged health systemsand its resiliency. In addition, our efforts in reducing maternal and infant mortality have slowed down in the recent years.

The COVID-19 pandemic provided us an opportune time to take stock of the health situation in the state and also rework our strategies for improving health of the population. In this context, the Vision Group report brought out by the Karnataka Health Vision Group under the chairmanship of Dr.Gururaj. G, former Director of NIMHANS and Senior Professor of Epidemiology is a first step in the right direction. Several subject experts belonging to varied disciplines from across the state have provided inputs and contributed for the report. Their inputs based on ground realities, undoubtedly provides strategic focus and direction for the

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MESSAGE

Health Department. Most importantly, the report is very comprehensive and addresses all health issues, all health programs and all aspects of the health system.

I take this opportunity to congratulate everyone who has been part of this report. I am very confident that the Government of Karnataka and the Department of Health and Family Welfare would consider and implement the recommendations of Vision Group and continuously strive to help every citizen in the state to achieve and enjoy highest possible level of health.

(Jawaid Akhtar)
Additional Chief Secretary to Government
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MESSAGE

Health is a fundamental right of every citizen. Constitutionally health is a State subject and thus the State government has a vital role to play in protecting and promoting health of its citizens. Over the years the Government of Karnataka has implemented several policies, programmes and schemes for improving health status of the population. The State has also pioneered various health initiatives (health insurance schemes, telemedicine and others) that served as models for other States in the country. Government's policy of having a medical college in every district of the State has not only increased health work force but has also rendered secondary and tertiary health services to be accessible and affordable to the population. During Covid-19 pandemic, our efforts were accelerated to meet the demand for healthcare.

Despite achieving significant improvement in health status, we still need to focus on emerging health issues like non-communicable diseases, mental health and injuries along with consolidating our gains in communicable diseases and maternal and child programme related control efforts. Health impact of climate change needs serious attention. We also have realized that health and other departments need to come together to protect and promote health of the population, since health determinants are to be addressed jointly by many sectors.

To address the above concerns and to move forward there is a need for providing a strategic vision and direction to the State efforts. Recognizing this, the State Government has constituted the Karnataka Health Vision Group under the chairmanship of Dr G Gururaj, former Director of NIMHANS and Senior Professor of Epidemiology to develop a roadmap for strengthening health systems, programmes and services in the State. The report brought out by the Karnataka Health Vision Group, with the efforts and contribution of several subject experts belonging to varied disciplines from across the State, is very comprehensive and provides strategic focus and direction to the efforts taken up by the State in the sector.

I take this opportunity to congratulate everyone who has directly and indirectly contributed to the development of this report. The Health department will take appropriate steps to take this report forward. I also strongly urge all departments to consider health in all their policies and work in coordination with the Health department to ensure best possible health for all individuals in the State.

(T.K. Anil Kumar)

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COMMISSIONERATE
Health &Family Welfare Services

No: COM/HFW/PS/ 59 / 2021-22 **Date: 19.08.2021.**

Message

The Department of Health and Family Welfare is dedicated and determined to improve health and wellbeing of the citizens of Karnataka. The strong network of health facilities including sub- centers, primary health centers, taluka hospitals and district hospital managed by qualified and skilled health workers is positioned itself to deliver good quality care to the population. Health and wellness center, flagship initiative by Government of India, is also being established across the state by strengthening the existing health centers. The department is focused on providing comprehensive health services which includes health promotion, prevention, treatment and rehabilitation services. We firmly believe in primary health care approach for improving the health status of the population and the departmental activities over the years are a testimony for the same.

Karnataka is currently facing triple burden of diseases. Emerging and re-emerging infectious diseases, unfinished agenda of maternal and child health issues and the rising burden of non- communicable diseases including injuries and mental health made the health system to respond to all challenges. With rising incidence of cancer, the need for palliative care is assuming greater importance. Apart from these, other specific health challenges relate to urbanization and climate change. These clearly highlight that the Department of Health and Family Welfare should continuously assess the changing health needs of the population, evolve appropriate responses and implementable interventions to these identified health needs and finally evaluate the responses to measure the progress made.

In this context, we thank the Chairman and members of the vision group for bringing out this comprehensive health vision document for the state of Karnataka in a relative short span of time. The approach of the report by covering all aspects of health system and following a life course perspective is commendable. I am happy that the report has made the department to examine all aspects of health care as highlighted in the report and by providing directions and a road map for health systems activities in the state along with providing possible and remedial measures for the same. Our efforts to achieve the Sustainable Development Goals of 2030 will be guided and supported by the findings of this report. The Department of Health and Family Welfare will consider the recommendations of the vision group seriously and will take all possible efforts to realize the same.

Commissioner
Health & Family Welfare Services.

Preface

Prof. G. Gururaj
Chairman
Karnataka Health Vision Group

On 2 January 2021, the Honourable Minister for Health and Medical Education informed the citizens of Karnataka that a Health Vision Group was constituted for the state to suggest measures for strengthening and reforming the health systems and to develop a roadmap for health sector improvements. I was invited to be the chairman of this group along with 30 other prominent health and medical experts from the state. I was surprised and puzzled in terms of the complexity of this task as the chairman of this group. It was both a challenge and an opportunity as well as a honour and privilege to serve the state. The group was constituted at a time when the state has been making progress in healthcare delivery through Central and State-supported investments and programs, albeit at a slow pace and hit by the Covid - 19 moving pandemic.

While our progress and moderate success with regard to improving basic water – sanitation - nutrition, control of communicable and infectious diseases, progress in maternal and child health services is worth applauding, the health scenario in the state is changing fast. The demographic and epidemiological transition has led to the emergence of noncommunicable diseases, injuries, mental health and several others that are already major public health problems. People today are living longer and elderly care demands our focus and attention. The need for decentralised healthcare services with the district as the central nucleus is becoming more prominent and evident. The Covid - 19 pandemic has taught many lessons for everyone to improve our health systems. The limited capacity to address health challenges of today and tomorrow calls for strengthening and reforming our health systems amidst regional disparities and unpreparedness to achieve better results.

Against this background, the process started with developing more clarity on the role, purpose, methodology, expected contributions, and to develop a framework for functioning. After several rounds of discussions with policy makers and experts, an approach based on uniform guidelines was developed. The vision group focussed on 3 domains of strong public health systems, implementing health programmes and identifying emerging public health topics. The vision group adopted a participatory and scientific approach to develop a roadmap for strengthening health systems in Karnataka. A Health systems approach was found necessary to deliver comprehensive and integrated services. It is also a balance of delivering required services covering preventive, promotive, curative, rehabilitative, palliative and all other services to our population based on the principles and framework of Universal Health Coverage.

Apart from review of previous efforts and on-going programmes, 20 subcommittees were constituted to examine specific components. The subcommittees examined the importance, the current state of activities, existing gaps and challenges and suggested measures for bridging gaps and improving specific areas.

The vision group also consulted a wide range of health administrators, implementers, program managers, district level officials, subject experts, other stakeholders to obtain their perspectives and views on health sector reforms and areas for strengthening for the coming days.

Successful programmes are always well coordinated, resourced, connected, communicated, funded, convergent, monitored and evaluated for results based on the principles of evidence base, equity, responsiveness, resilience and safety. Further, such programmes are also sustainable, cost effective, people centric and in today's world technology enabled. An examination of the status of implementation reveals several gaps in the implementation process. The report emphasises the importance of these elements to strengthen these components and by placing them in a framework for effective implementation.

Five major strategic approaches in healthcare delivery are strongly recommended in the report. The entire focus of the report is on **implementation of Interventions and the implementation process.** Integration mechanisms are urgently required to avoid duplication and to save resources for achieving maximum impact. Strong intersectoral platforms are critical. Great opportunities exist in health services for Innovations at all levels. Undoubtedly, an investment in financial, human and technology areas and people-centric approaches are required. These are crucial for success of our health programmes in the coming days.

We are at a stage capable of achieving many things on this planet. Health, education, welfare, safety and security form the bedrock for humans to be happy, healthy and productive. Ensuring this is the responsibility of the government and this recognition by the government is a significant step and noteworthy. I sincerely hope the government would examine the recommendations and the suggested mechanisms for improving health of people.

The efforts of the vision group will be amply rewarded, if our political leaders, policymakers, decision makers, professionals, press & media, academicians - researchers - students and people recognise the importance of health and give it a central place in our policies and programmes and take required steps for strengthening healthcare delivery in the coming days. In today's world, a child need not die of malnutrition or a child protected from infectious diseases yesterday need not be a victim of road traffic injury or an elderly person who contributed for the society need not be left in the lurch for our deficient health systems as we pursue our quest for development. Let's not forget, health of people is required for our progress and development.

The report is not all inclusive as health is a vast subject without any defined boundaries today. All aspects and concerns are important and we have focused on essential components of health systems in the available time.

The vision group's road map for the decade 2021 – 30 and beyond, as well as for Post Covid times, needs to be revisited by 2031 to examine our progress and achievements and to set new agenda for the new decade. As said by Winston Churchill, "Healthy citizens are the greatest asset any country can have", and it is a continuous process.

Prof. G. Gururaj
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Former Director and Senior Professor of Epidemiology
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Acknowledgements

The Vision Group is indebted to and acknowledges the commitment and leadership of Shri. B.S.Yediyurappa, Former Chief Miniister of Karnataka and Shri. Basavaraj Bommai, Hon'ble Chief Minister of Karnataka State. The vision to develop a road map for strengthening health systems and leading to provide best health care to 7 crore people of the state stands tall and remarkable.

The Vision Group was conceptualised by Dr K Sudhakar, Hon'ble Minister for Health and Medical Education, Government of Karnataka. In spite of the on-going COVID-19 pandemic in the state, he spent valuable time to share, contribute and facilitate deliberations. For bringing a host of professionals on board, and for providing unstinted support to this endeavour, we remain deeply grateful to him.

Our heartfelt and deepest gratitude to Shri Jawaid Akhtar, Additional Chief Secretary, Department of Health, Shri Pankaj Kumar Pandey, Formerly Commissioner Health and Family Welfare Services, Dr Trilok Chandra K V, Commissioner Health and Family Welfare Services, Dr Arundati Chandrasekhar, Mission Director, National Health Mission, Dr Om Prakash Patil, Director, DHS for their involvement, guidance and support. Not only did they champion the need for, but also enabled this initiative.

This work is a result and reflection of the concern and contributions of nearly 250+ experts, professionals and prominent individuals across the state. Our earnest and sincere thanks to all the Chairs and each of the members of the subcommittee for Chairman's, Convenor's their invaluable time and dedication which is bound to make this vision a reality. The details of individual sub-committees are available separately.

The officers from the DoHFW, Government of Karnataka extended their utmost cooperation and endearing involvement. we are grateful to them for their time and contribution in spite of being pre-occupied and busy during the pandemic - Dr. Parimala Marur; Dr. Venkatesh, Dr. Raj Kumar; Dr. Prabhu Gowda; Dr. Rangaswamy H V; Dr. Sridhar; Dr. Padma M R; Dr. Arun Kumar spent long hours in discussions and provided state information in number of areas. Several State Programme Officers contributed as members of subcommittees, joined online meetings and participated in stakeholder consultation and thanks to all of them. Special thanks to the District and Taluka Health Officer – Dr. Veerabadraiah (Tumkur), Dr.Chandrashekar (Mandya). Dr. Swathi (Chintamani) and Dr. Ravindra (Bellary) for sharing information and suggestions. Dr. Mohammed Shariff (DoHWFS) and Dr. Riyaz Basha (Bangalore Medical College) supported this work with information, programme details and supported this endeavour. Dr.Jagadeesh (DHO-Kolar) and Dr. Chandan Kumar S (DFWO-Kolar) provided inputs for human resource assessment and district administration scenario.

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Constantly working behind the scenes in a collective manner, CPH@NIMHANS team – Dr Pradeep B S, Dr Senthil A, Dr Gautham M S and Dr Aravind along with Dr. Girish, Ms Deepika, Dr Suma R, Dr Runalika, Dr Mahima B N and Mr. Manjunath DP supported, networked and contributed for the Vision group. A heartfelt appreciation and warm thanks to this exemplary collaboration and contributions.

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The Vision Group wishes to acknowledge all individuals who supported and facilitated various activities at different stages of the Vision group work, directly or indirectly.

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9. Dr. Veena V, Deputy Director - RBSK, DoHFW

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Health of Middle aged

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List of Abbreviations

AB ARK:	Ayushman Bharat Arogya Karnataka Scheme
AB HWC:	Ayushman Bharat Health and Wellness Centre
ADL:	Activities of Daily Living
ADSI:	Accidental Deaths and Suicides in India
AES:	Acute Encephalitis Syndrome
AFS:	African swine fever
ANC:	Antenatal Care
ANM:	Auxiliary Nursing Midwifery
ARS:	Arogya Raksha Samiti
ART:	Antiretroviral Therapy
ASHA:	Accredited Social Health Activist
AWC:	Anganwadi Centre
AYUSH:	Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy
BBMP:	Bruhat Bengaluru Mahanagara Palike
BCC:	Behaviour Change Communication
CDC:	Centers for Disease Control and Prevention
CDs:	Communicable Diseases
CHC:	Community Health Centre
CKD:	Chronic Kidney Disease
CMNNDs:	Communicable, Maternal, Neonatal, and Nutritional Diseases
CNAA:	Community Needs Assessment Approach
CNNS:	Comprehensive National Nutrition Survey of India
COPD:	Chronic obstructive pulmonary disease
COVID-19:	Coronavirus disease 2019
CSR:	Corporate Social Responsibility
CST:	Centre for Social Transformation
CVD:	Cardiovascular Diseases
DALYs:	Disability Adjusted Life Years
DDMA:	District Disaster Management Authority
DH:	District Hospital
DHFW:	District Health & Family Welfare Department
DHO:	District Health and Family Welfare Officer
DM:	Diabetes Mellitus
DMHP:	District Mental Health Programme
DoHFW:	Department of Health and Family Welfare
DPHL:	District Public Health Laboratories
DRTB:	Drug Resistant Tuberculosis
EBM:	Evidence Based Medicine
EBPH:	Evidence Based Public Health
EHC:	Elder Health Care
EHR:	Electronic Health Records
EMRI:	Emergency Management and Research Institute
ENMR:	Early Neonatal Mortality Rate
GOI:	Government of India
GOK:	Government of Karnataka
Govt:	Government
GRAAM:	Grassroots Research and Advocacy Movement
HHR:	Health Human Resources
HIA:	Health Impact Assessment
HIS:	Health Information System
HIV/AIDS:	Human Immunodeficiency Virus infection and Acquired Immunodeficiency Syndrome
HRH:	Human Resources for Health
HRMIS:	Health Resource Management Information System
ICD:	International Classification of Diseases
ICDS:	Integrated Child Development Services
ICMR:	Indian Council of Medical Research
IDSP:	Integrated Disease Surveillance Programme
IEC:	Information, Education and Communication
IHD:	Ischemic Heart Disease
IMNCI:	Integrated Management of Neonatal & Childhood Illnesses
IMR:	Infant Mortality Rate
IPHS:	Indian Public Health Standards
ISC:	Intersectoral collaboration
IT:	Information Technology
JE:	Japanese Encephalitis
JSSK:	Janani Shishu Suraksha Karyakrama
KEA:	Karnataka Evaluation Authority
KFD:	Kyasanur Forest disease
KHSDRP:	Karnataka Health System Development and Reforms Project
KJA:	Karnataka Jnana Aayoga
KPHP:	Karnataka Public Health Policy
KPME:	Karnataka Private Medical Establishments
KRSA:	Karnataka Road Safety Authority
KSAPS:	Karnataka State AIDS Prevention Society
KSDLWS:	Karnataka State Drugs and Logistics & Warehousing Society
KSDMA:	Karnataka State Disaster Management Authority
KSHCIM&HC:	Karnataka State Health Council for Integrative Medicine & Health Care
KSHSRC:	Karnataka State Health System Resource Centre
KSNDMC:	Karnataka State Natural Disaster Monitoring Centre

List of Abbreviations

KSRRIM:	Karnataka State Resource Center for Research in Integrative Medicine
KSTePS:	Karnataka Science and Technology Promotion Society
KTM:	Karnataka Telemedicine Mentoring
MAS:	Mahila Arogya Samitis
MOH:	Medical Officer of Health
MOHFW:	Ministry of Health and Family Welfare
MRW:	Multipurpose Rehabilitation Workers
NABARD:	National Bank for Agriculture and Rural Development
NACP:	National AIDS Control Programme
NCDI:	National Non-communicable Disease and Injury
NCDIR:	National Centre for Disease Informatics and Research
NCDs:	Noncommunicable diseases
NCRB:	National Crime Records Bureau
NDHM:	National Digital Health Mission
NDMA:	National Disaster Management Authority
NFHS:	National Family Health Survey
NHM:	National Health Mission
NIC:	National Informatics Centre
NIMHANS:	National Institute of Mental Health and Neuro Sciences
NITI Aayog:	National Institution for Transforming India Aayog
NMHP:	National Mental Health Programme
NMR:	Neonatal Mortality Rate
NPCDCS:	National Program for Prevention and Control of Cancer, Diabetes, CVD and Stroke
NPHCE:	National Program for Health Care of the Elderly
NRHM:	National Rural Health Mission
NSSO:	National Sample Survey Office
NUHM:	National Urban Health Mission
NVBDCP:	National Vector Borne Disease Control Programme
OHA:	Occupational Health Authority
OHIS:	Occupational Health Information System
OOP:	Out-of-Pocket Cost
OOPE:	Out-of-Pocket Expenses
PHC:	Primary Health Centre
PHS:	Public Health Surveillance
PIP:	Programme Implementation Plans
PM JAY:	Pradhan Mantri Jan Arogya Yojana
PPP:	Public-Private Partnership
PSU:	Public Sector Undertakings
RAPPID:	The Rapid Appraisal of Preparedness and Performance of health systems in managing COVID- 19 cases across Districts in Karnataka
RBSK:	Rashtriya Bal Swasthya Karyakrama
RCH:	Reproductive and Child Health
RKS:	Rogi Kalyan Samitis
RMNCH+A:	Reproductive, Maternal, Newborn, Child and Adolescent Health
RoP:	Record of Proceedings
RTA:	Road Traffic Accidents
RTI:	Road Traffic Injuries/Right to Information
SAPCC:	State Action Plan for Climate Change
SAST:	Suvarna Arogya Suraksha Trust
SC:	Sub Centre
SCoE:	State Center of Excellence
SCRB:	State Crime Records Bureau
SDGs:	Sustainable Development Goals
SDMA:	State Disaster Management Authority
SIFHW:	State Institute of Health and Family Welfare
SIOH:	State Institute of Occupational Health
SRS:	Sample Registration System
TB:	Tuberculosis
THO:	Taluk Health and Family Welfare Officer
TLH:	Taluk level Hospital
TMHP:	Taluk Mental Health Programme
ToR:	Terms of Reference
TPT:	Tuberculosis Preventive Treatment
U5MR:	Under Five Mortality Rate
UHC:	Universal Health Coverage
UN:	United Nations
UNICEF:	United Nations Children's Emergency Fund
UPHC:	Urban Primary Health Centre
UTs:	Union Territories
VHSNC:	Village Health, Sanitation and Nutrition Committee
VPD:	Vaccine Preventable Diseases
VRW:	Village Rehabilitation workers
WCD:	Women and Child Welfare
WHO:	World Health Organization

List of Figures

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List of Box Items

Strategic Approaches and Investments...

Good health of individuals is crucial to the well-being of any society; this was known earlier and has been re-enforced during the COVID pandemic. A healthy society reflects the productive contributions of its members, showing progress in education, economy, safety and security and other areas. In Karnataka, the health systems and services have evolved over time to promote and maintain the good health of all its citizens. However, now this requires strategic strengthening and reorienting of our health systems to adapt to the current greater demand; the strategic approach involves five aspects.

Interventions, Integration, Implementation, Innovations and Investment are required for today and tomorrow. Intervention(s) could be one or a combination of several approaches, including medical, educational, policy, environment, technology, economic, regulatory or more. There are a wide variety of evidence based, cost effective, sustainable, people-centric, technology-enabled interventions that are known to benefit the good health of populations. They are referred to as ' Best Buys – low hanging fruits – package of' measures'. These range from fundamental practices such as consuming healthy food, regular exercising and working towards good mental health, to more complex disease-specific interventions of modern day. The health sector needs to identify these effective interventions for individual(s) and population(s) based on cultural appropriateness, feasibility of its adaptation and mechanisms for their delivery. A variety of such doable, sustainable interventions are highlighted in this report for different age groups and situations.

Integration should be the platform to efficiently bring together multi-modal interventions and deliver them to the masses. With the verticalization of programmes, a disjointed and uncoordinated approach has come into force with duplication of activities and double spending on resources in health systems. Good integration efforts will avoid such problems to produce a healthcare system that operates seamlessly, smoothly and allow for easy navigation by users. A small scale example of good integration is when a healthcare worker is able to undertake multiple tasks during a single patient visit; while on a larger scale, a well-integrated elderly care facility should be capable of catering to the multiple needs of aged individuals efficiently. With well-trained human resources, it is possible to integrate multiple tasks into a single task-list towards economy in time and money. As this report will describe, well thought out integration within and beyond our health sector is urgently required, especially so at district and taluka levels. Some ideas to improve the existing integration are the joint development of plans, sharing of resources, common training programmes for core activities and a unified platform for monitoring.

Implementation is the key to the success of the above mentioned interventions. As the famous saying goes, 'Knowing alone is not enough – we need to act.'

Implementation science systematically closes the gap between what we know and what we do (know- do gap). This act of putting a programme into action and executing it correctly such that it accomplishes the program's goals is of paramount importance. Poor implementation or the failure to implement prescribed programmes can be to the detriment of the health of a society. Programmes can be implemented in different settings like worksites, schools and educational institutions, healthcare facilities, homes and other places to obtain maximum impact at lesser costs. Health impact assessments inform whether implementation has been able to deliver results. A strong focus on implementation, as outlined in the report, is required in all policies and programmes through strong action plans, dedicated and skilled teams, adequate resources, advocacy – awareness activities, systematic monitoring and evaluation – all with the goal of making interventions deliver results.

Innovation in health sciences is the continuous process of developing new processes, techniques, services, methodologies and products over time. There is a critical need to innovate in our health programmes, products and services- examples could range from creating a 'centre of excellence' that can bring new vision to 'delivering a message for people' for taking appropriate actions. In addition, creative innovation from the health sector around training of human resources at all levels of operation is very important to stay updated with the latest knowledge, methods and technologies. With a changing landscape of health and disease, this is now more important than ever.

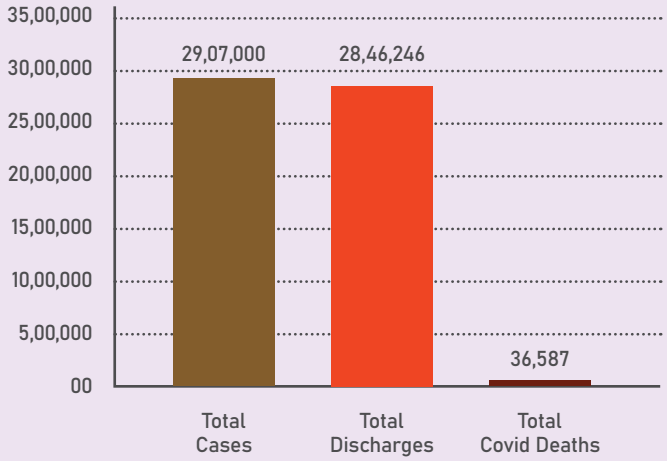
Investment in the health of people is the need of the hour, especially in primary and secondary health care as it can greatly lower the need for, and spending on, curative care. This is the premise of Universal Health Coverage – a vision where all individuals have access to quality health services without financial hardship. Commonly, health investment is restricted to increased allocation and spending in health care; this is an absolute necessity. However, it should be expanded in scope to investments in health facilities, health human resources, support systems, technology resources and more. Currently, there is a need for the public and private sectors, industry partners, philanthropic agencies and media houses to join the conversation towards increased investment in a healthy society.

Using this five-pronged strategy, the vision group strongly envisions that the Government of Karnataka would take all necessary proactive measures to strengthen health systems and services to deliver comprehensive health care for its citizens for 2030 and beyond. The immediate next step would be to create a health sector and multisectoral plan with an actionable roadmap for the plan's implementation. As mentioned earlier, we believe that efficient implementation is the key to success.

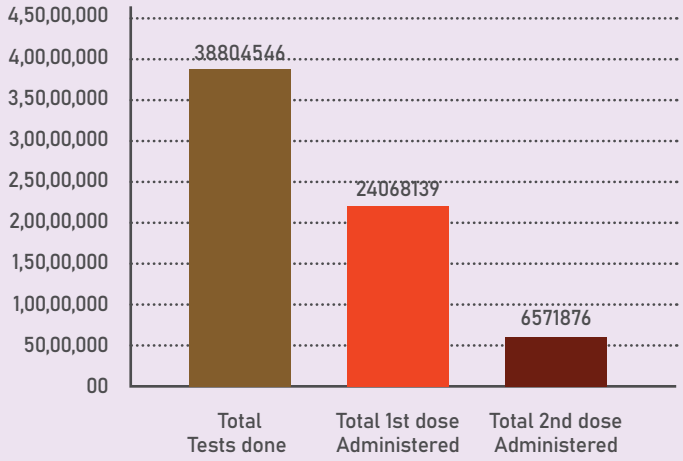
Learning's from COVID-19 Pandemic

Karnataka reported its first case of COVID-19 on 8th March 2020, and thereafter state was gradually engulfed by the corona pandemic. As per official reports, the state has recorded a cumulative total of 29,06,999 positive cases and 36,587 deaths since the beginning of the pandemic as on 1st August 2021. About 3,88,04,546 lab tests (including both rapid antigen test and RT-PCR test) have been undertaken during this period. Vaccination in the state was introduced on 16th January 2021 and as of 1st August 2021, around 24000000 persons have been vaccinated with 1st dose of COVID vaccine and nearly 6500000 have received the 2nd dose (1). The state government has taken several measures to contain and control the pandemic, limit mortality and morbidity and support the needy. The whole of the government system jumped into action to mitigate the effects of the pandemic, with the health system being at the forefront of managing this pandemic. During this journey, several positive developments and an equal amount of setbacks have been recorded. Both have provided several valuable lessons for strengthening the state's public health and health system to avoid mistakes in the future. Few major ones are highlighted below:

Cumulative COVID-19 cases, discharges and deaths in Karnataka (as on 01/08/21)



Cumulative number of lab tests, 1st and 2nd dose of COVID-19 vaccines administered in Karnataka (as on 01/08/21)



1) **Strong political leadership:** Strong leadership is required in ensuring coordinated and integrated actions across departments, swift decision making, ensuring public cooperation, mobilizing and allocating resources, scaling up infrastructure and resources, confirming availability of beds, oxygen and adequate quantity of drugs-vaccines-equipment and other supplies, overseeing effective implementation of all prevention and control measures along with regular monitoring and reporting: all based on the available evidence in a moving pandemic. During the COVID pandemic, the Government demonstrated strong political leadership, and the continuation of these efforts through strong leadership will significantly enhance health sector performance over time.

2) **Transparency and accountability:** The government and health system should function by considering transparency and accountability at every stage as one of its core principles to strengthen people's beliefs and cooperation towards the system, which is one of the essential principles of primary health care. Lack of transparency and accountability would eventually result in a lack of trust in the Government's efforts to control pandemics and may impair governmental efforts.

3) **Pandemic Preparedness is more required than ever before:** Poor preparedness of the health and related system took everyone by surprise especially during the peak of the second wave of pandemic when family members could not find beds, ventilators, and oxygen support. In fact, Lockdown was more used as a measure to strengthen the health system to manage the COVID-19 cases-which is akin to preparing oneself to sail through the storm during the storm. Hence, governments and health system should be in a state of preparedness for managing pandemics, epidemics and disasters by being responsive rather than being reactive.

4) **Need to strengthen the public health system:** The major crusader in the current pandemic was the public health system. However, years of underinvestment and neglect of the public health system challenged the system's capacity to manage the crisis efficiently. Despite the presence of a private health system, accessibility and affordability were significant barriers. Considering the COVID situation as an event for realization and as an opportunity, the government should strengthen, give importance, and scale up investments in the public health system now and in the future.

5) **Increase healthcare spending:** Most of the issues or concerns related to health and public health can only be addressed by increasing the health budget. Karnataka is spending less than 1% of its GSDP on health. COVID has reinforced the need to strengthen the public health system in the state and can only be achieved by increasing health care spending by the state government, which in turn requires strong political leadership and commitment.

6) **Build human resource and infrastructure:** Deficiencies in health resources was evident at all levels, in urban and rural areas, in hospitals and health services, in general, and specialty cadres and in both public and private health systems for many ground-level activities. The Government scaled up infrastructure, augmented human resources (temporary/ contractual/ permanent/ pooling from various institutions) and made arrangement for all support facilities. The learning is that health systems cannot function in the absence of an efficient human workforce, and these gaps must be filled in both the short and long term.

7) **Address health inequalities:** The inequalities in availability, accessibility and affordability of health care facilities across districts, regions and between urban and rural areas were evident during the pandemic. Migrants and those in lower socio-economic strata were affected disproportionately during the pandemic. Health inequities should be addressed based on principles of universal health coverage and better social welfare measures.

8) **Strong Surveillance is critical:** A strong surveillance system with mechanisms for quick data compilation (at least on a minimum set of data points) – analysis by a skilled team – quick actions – support for evidence-based prioritization and decision making, constant monitoring of the situation, timely intervention(s), evaluation of the implemented interventions are some best practices of the public health response to the pandemic. Though systems for surveillance exist, limitations and challenges were in plenty, and real-time data on cases – tests –hospitalizations – deaths – supplies were lacking. The existing surveillance system was used mainly to report data rather than analyze the data and take appropriate action meaningfully. The state needs a strong health surveillance programme for the coming days which acts as pillars of the invigorated public health system

9) **Make district health systems effective:** While a systems approach in health care cannot be overemphasized, managing health care requires a robust and resilient district health system in the state, including building capacity of Panchayat Raj institutions. This can only happen with strong leadership, adequate funding, appropriate human resources, a public health strategy (action plan, surveillance, monitoring, evaluation), efficiently functioning district and taluka hospitals and laboratories along with private sector engagement, and general public involvement, all at a district level. Utilizing the present opportunity, the Government should bring in public health and medical cadres within the health system at state and district levels.

10) **Pandemic exposed neglected urban public health system:** Though the pandemic affected urban and rural populations, large cities and towns bore the maximum brunt: for trace – test – track – treat with non-availability of hospital beds, drugs, and oxygen reported frequently and at times regularly. The existing public health workforce in urban areas was often helpless, calling for strengthening the urban public health system.

11) **Integrate technology-based solutions in the health system:** The pandemic also witnessed the use of technology in different ways: helplines (e.g., Apthamitra), tracking patients (Arogya Sethu), communicating test results, , GIS applications, computerized bed allotment system, teleteaching, telemedicine and several others using real-time data management. Going forward, , big data analytics, artificial intelligence and communication technologies, should integrate the existing and emerging technology-based solutions within the health system and optimize the health system outcomes.

12) **Communicating for people's health needs a defined strategy:** Incorrect and inadequate information about various aspects of the COVID pandemic communicated by health and other departments through various media channels often instilled fear and insecurity among the public, acting as a deterrent in managing and controlling the pandemic. This was evident with regard to testing – tracing-treatment and now, vaccine hesitancy. Health communication needs a strategy to inform people on what, when, how and through what methods to communicate. Communicating information to people should aim at strengthening and strategizing IEC/heath education activities to create community awareness, promote healthy behaviour (COVID appropriate behaviour) and ensure community participation.

13) **Channelizing social media is an important means for health communication:** During the pandemic, apart from mainstream media, social media emerged as an important source of information . While, merit is factual information, the demerit was misinformation which caused the "infodemic". COVID-19 pandemic, lockdown and infodemic, and other factors severely affected the mental health (more than physical health) of all population segments, including children. Miscommunication and fake information while utilizing social media calls for some level of regulation.

14) **Lockdown and its consequences:** Globally, it is now well acknowledged that lockdowns of varying nature, severity, duration, location have differential impacts on the population. Proponents and opponents have their views, and often is a balance between people's health and survival. Sudden and prolonged lockdowns have a negative impact, as seen during the first wave of the pandemic, indicating that timing is a decisive factor. Although the benefit of lockdown in controlling the pandemic is worth noting, implementing such measures in the future requires complete planning with measures in place to protect the most vulnerable segment of the population from disastrous social and economic consequences. Along with infodemic, lockdown and other factors of managing the Covid 19 pandemic severely affected the mental health (more than physical health) of all population segments, including children and has been unprecedented as the pandemic itself.

15) **Strengthen public health laboratories:** During the initial stages of the pandemic, the state was completely dependent on national laboratories to diagnose COVID cases. This limited the state's ability to respond effectively. In response, in a short period of time, the number of labs capable to perform tests was ramped up from 10 to 190 in the state, in both urban and district areas, along with the provision of all manpower and supplies by both self and Government. It is hoped that these labs would continue to support the much needed broader range of public health activities in the coming days.

16) **Build a resilient health system:** During the COVID pandemic, general health services (both medical and surgical) and most emergency health services suffered a lot. Several individuals required routine medical care like dialysis, antenatal care, routine follow-up care for chronic health conditions, etc. Services for such needy individuals were severely interrupted during the pandemic. Hence, there is a need to build a resilient and capable health system capable of responding to all types of health services in all situations, including epidemics and pandemics.

17) **Cooperation and coordination at all levels are vital:** The novel coronavirus, COVID-19, caused a crisis that people had never witnessed before in decades. With little understanding of the virus in the past, the moving pandemic, high transmissibility, the potential for significant mutational changes, and lack of proven treatment in early stages led to devastating effects on communities for which identifying solutions were challenging for nations across the globe. Tackling such unprecedented crisis situations requires coordinated efforts of effective planning and management at all levels, including engagement with local bodies, NGOs, voluntary agencies and others. Cooperation and participation by the private health system during the pandemic was a welcome move. COVID situation has emphasized that both public and private health systems can function co-ordinately for a general cause, which should be further explored and continued during the non-pandemic times.

18) **National and international coordination is critical:** Both during the first and second wave of the pandemic, Karnataka is dependent on other states and other countries for drugs, vaccines, oxygen, PPE kits, diagnostic test kits, ventilators etc., including addressing migrant labour issues. COVID pandemic has highlighted the need to structure and streamline such coordination efforts with mechanisms to quickly and effectively respond to crisis situations.

19) **Continuous research is crucial in managing the pandemic:** The research output during the COVID pandemic in the state was very minimal, and most of them were not of much value to support policy or program-related decisions. Building the research capacity and creating an enabling environment for research by the state government would have helped it to quickly mobilize them for undertaking evidence-based actions based on the analysis of local data (local data for local action by local people).

20) **Establish a Centre of excellence for microbial research:** Along with establishing public health labs, having a 'Centre of Excellence for Microbial Research' in the state would support and strengthen microbial surveillance in the state. The centre can undertake several activities for supporting state government on both an emergency and regular basis as the state doesn't have such an apex institute for microbial research.

The focus in a moving - raging - less understood pandemic should be to - (i) reduce the number of deaths and hospitalizations, (ii) protect all vulnerable sections of society (iii) have an effective and efficent health services, (iv) vaccinate populations with a safe and effective vaccine, and (v) ensure livelihoods of people.

Most significant learning from Covid - 19 pandemic has been - health is important, public health is vital and mental health is as important as physical health.

References

1) COVID-19 information portal, Government of Karnataka. available at https://covid19.karnataka.gov.in/storage/pdf-files/EMBJUL21//12-07-2021%20HMB%20English.pdf

01. Good health and its greater impact

Health is of paramount importance for everyone in today's life. The growth and development of every family and society is increasingly dependent on health of its members. Recent years have brought health to the centre stage of growth and development and increasingly made the governments to recognise the importance of people's health and for people to take care of their health. The definition of health as per WHO, as a state of "optimum social - biological and emotional well-being and functioning and not just the merely the absence of disease" is recognised as a fundamental requirement for all activities related to life, growth and development(1).

The right to health, education, welfare, clean air, water and sanitation, employment are all enshrined in the Constitution of India, and as health is on the concurrent list, it is the ethical and moral obligation and responsibility of the state and centre to provide good health for its citizens(2). Globally, in India and in Karnataka, it is well demonstrated that good health can be - achieved by everyone; provided to everyone irrespective of age, gender, residence and income; and to be utilised by everyone. Good health of citizens can happen when health is everyone's business and moves beyond care to address its determinants. Preserving good health, protecting people from ill-health, promoting wellness and ensuring services for everyone in need is important to develop healthy societies; needs commitment and action at all levels.

It is increasingly recognised that good health is a product of the interaction of several macro and micro, intrinsic and extrinsic, biological and nonbiological, social and economic as well as all societal and individual factors operating in a continuum. Health is influenced by several factors ranging from customs and beliefs of people to policies and programmes in health and related sectors. In a world that is largely influenced by liberalisation, globalisation, urbanisation, industrialisation and several others it has become increasingly important to deliver health to people by the governments, amidst conflicting interests.

Commitment to deliver health for people dates back to historical times and is not a new development; it is only gathering momentum. The Alma - Ata declaration of 1978(3), Health for All movement(4-6), and the Millennium Development Goals(7) to name a few have influenced us to a greater extent. Universal Health Coverage (UHC)(8), Sustainable Development Goals (SDGs)(9) and the recent primary Healthcare declaration in Asthana in 2018(10) have remained the frameworks to shape our health policies. The five-year development plans over time have become important in successively reforming policies to scale up activities. The UHC aims at providing comprehensive health security based on the principles of universality, equity, non-inclusion, nondiscrimination, comprehensive care, financial protection, protection of patients' rights along with accountability, transparency and community engagement.

The Covid-19 pandemic affected everyone in the country and in the state. The moving pandemic resulted in death of 36,587 persons and 29,00,000 people turned positive as per official reports as on 1st August 2021 and disrupted the lives and livelihoods of everyone in the society; and counting still continues. The need to balance saving lives ensuring livelihood has become a central point of all our debates, discussions and actions. Most significantly, the pandemic exposed our weak health systems due to neglect of public health, absence of robust health systems, deficient resources, unpreparedness of the governments, low importance of health in people's lives and several others. Despite the increased investments, the inability of the systems to respond to address needs and concerns of people's health came to the forefront in our societies.

The state of Karnataka has been a pioneer in implementing policies and programmes with strong commitment and stewardship over decades to improve health of people. This is seen with the progress in indicators over time. Despite its significant growth and development, health has been on the backstage and not central to the process of our growth and development. In this scenario, the Karnataka government constituted the Health Vision Group for strengthening health systems and to develop a roadmap for future; and the reasons were several (Government order dated 31-12-2020). Firstly, the state having made progress in maternal and child health and prevention and control of some communicable diseases areas has to develop policy frameworks, strategies and mechanisms to address many existing and emerging health concerns of today and tomorrow (like Noncommunicable Diseases (NCDs), injuries and others). Secondly, the fact that health systems and departments have to reorient and redirect in line with global and national developments is recognised as a necessity. Achieving accessible and affordable healthcare for all based on equity is the real need of the hour. Thirdly, current disparities, limitations, gaps and challenges in the health systems have to be overcome to develop more robust mechanisms.

The need to achieve balance in protecting and promoting health and treating the sick was acutely felt as neglect of public health services is more evident and glaring. Finally, the COVID – 19 pandemic informed that health – public health – mental health is central for our growth, development and happiness.

Thus, a vision and a roadmap for the coming years based on evidence, equity and people centric approaches are essential. Achieving good societal health calls for intervention(s), implementation, integration, innovations and investment, all with total dedication and commitment, based on strong evidence based decision-making processes and moving away from adhocism and knee jerk reactions. This report is an effort in this direction to support and strengthen health systems in Karnataka towards delivery of health for all citizens and to achieve the goals of 2030 and beyond.

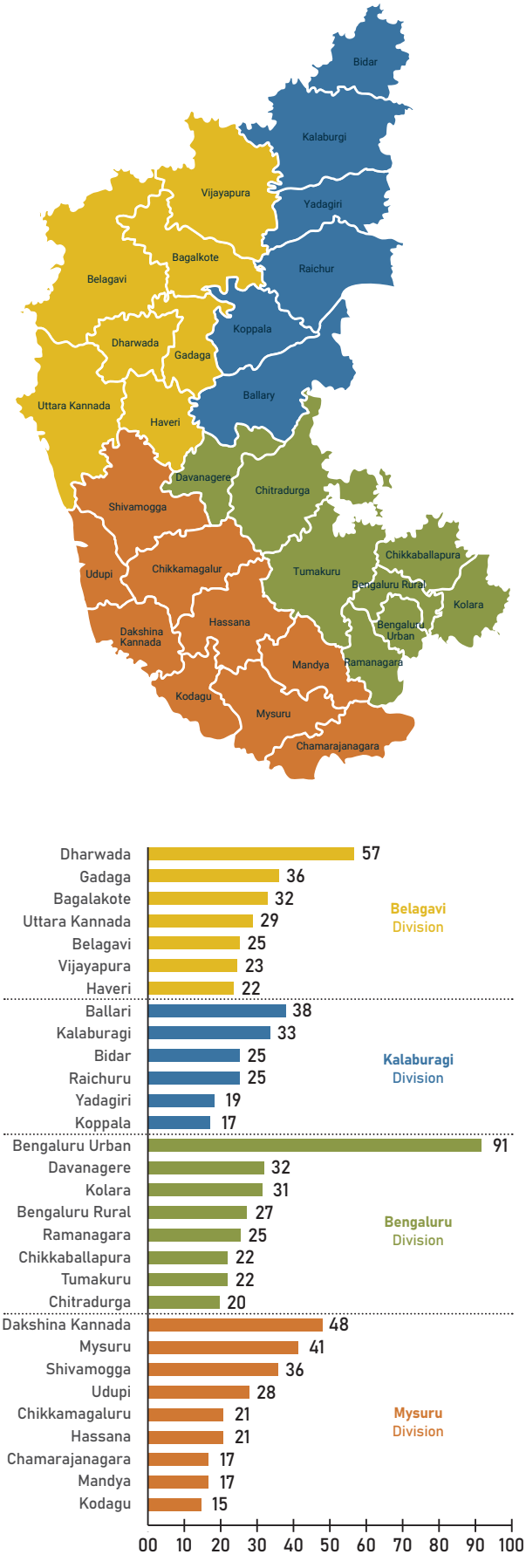
02. Karnataka Profile

Karnataka is one of the fastest growing states of India and has made significant strides in the last two decades in health, education, income, literacy, standards of living and other areas. In 2020 - 21, Karnataka ranked third in NITI Aayog's Sustainable Development Goals (SDGs) India Index and is at 19th rank in Human Development Index. With a parliamentary government system, the state has strong administrative mechanisms through a three tired Panchayat system for effective implementation of programmes. The state has 4 revenue divisions, 49 subdivisions, 31 districts, 237 talukas, 747 revenue circles, 281 towns, 7 municipal corporations, 11 urban agglomerations and nearly 6000 panchayats at the grass root levels(11).

The state's population is estimated to reach 72 million by 2021 with nearly 60% living in rural areas. The urbanisation has been increasing at a phenomenal pace from 23.9% in 2001 to 38% in 2011, being the seventh most urbanised state(12). The literacy levels in the state had increased to 75.4% in 2011 with an urban and rural literacy rate of 85.78% and 68.73%, respectively. The state ranks fourth among Indian states in terms of the GDP contribution to the country.

The urbanisation rate is fast with more than a third of state being urbanised (Figure 1)Nearly 21% of the population in the state is Below Poverty Line, though 45% of the population classified themselves as workers and the annual per capita income is 1.43 lakh rupees (year 2018). Being an educational and technological hub, the state has been a major contributor to the workforce in the country and contributes for 7 % of national GDP. Only 27% of the households use LPG as fuel, 62% has tap water as drinking water source and 88% have electricity connection(11, 12). In contrast there are nearly 56 million mobile phone users. However, this growth has not been uniform across all districts and in all talukas on all parameters. Huge disparities exist across and within districts in health, economy, education and living standards.

Figure 1: District wise urbanisation in Karnataka (%)



03. Karnataka Health Vision Group

TOR of the vision group

1. To review the developments and processes in Karnataka health systems and health services covering public health and health care, including medical and allied education towards delivery of comprehensive, integrated, cost-effective, evidence based and technology supported solutions.
2. To suggest areas of strengthening along with implementable and sustainable solutions for improving health systems and medical/ health care covering preventive, promotive, curative, rehabilitative and other support services at primary, secondary and tertiary levels.
3. To provide a roadmap for delivery of equitable, accessible, affordable and quality health care to achieve universal health coverage for improving health of the citizens.
4. To recommend a framework for strengthening health systems (including health human resources) and progress towards a more decentralized and effective health systems.

Process and Methods

The Vision group adopted a scientific, comprehensive and participatory approach with the active involvement and engagement of nearly 250 health and related professionals in Karnataka state drawn from the fields of public health, epidemiology, medical/health care, medical education, health administration, hospital management, health economics, social sciences, rehabilitation and others through comprehensive document reviews, expert committee's deliberations, discussions with state and district programme officers, programme appraisals, interactions with state level NGOs and discussions with senior state policy makers and programme implementors in the framing of this report during Jan - July 2021. The final report was drafted by the Chairman with inputs and contributions from technical committee and subcommittees of individual areas. Detailed steps and activities undertaken are provided in the main report.

Changing Health Scenario

Reforms undertaken by successive governments along with a focus on implementation focus has resulted in positive outcomes in many areas; health, education, welfare, transport, water and sanitation in the past two decades as reflected in the health indicators of the state. With nearly 70 health programmes and a variety of schemes that directly or indirectly impact health of people, efforts are in progress, despite the fact that investment in health sector has only moderately increased : in fact there has been a decline in allocation and underutilisation of available resources . The health infrastructure and human resources have improved though not at the required pace. The number of grass root level institutions and health care facilities as well as workers like ASHAs, Anganwadi workers, village rehabilitation workers, health workers, doctors and specialists were all below the expected levels till the COVID – 19 pandemic hit the state. During the Covid 19 pandemic, the state government has invested heavily to augment the infrastructure and increase the healthcare resources.

As per the assessment of Niti Aayog, the state ranking has improved from 9th position in 2015 – 16 to 8th position by 2017 – 18(13).The state has registered noticeable progress in the area of maternal child health, water and sanitation, infectious and communicable diseases and a few others in terms of completeness, coverage and quality as seen by a decline in maternal mortality, infant mortality, neonatal mortality, under nutrition and several others; institutional deliveries and childhood immunizations, deaths and cases due to vaccine preventable diseases has also registered a decline. Tuberculosis, malaria, leprosy, HIV AIDS are showing a reduction over time(14).

Due to epidemiological and demographic transition, the burden and share of Noncommunicable diseases (NCDs) and injuries has increased significantly in the last decade(15).Today, cardiovascular diseases, diabetes, stroke, cancer, respiratory illnesses, injury and violence, disabilities, environmental health-related problems and several others have increased; reasons are several ranging from individual to societal factors. As there is no permanent cure, but only lifelong care, the economic impact of these conditions has increased significantly at a time when health expenditure has remained at 5.3% as per the data available for 2021 – 22(16). People are living longer due to higher life expectancy and consequently many social economic and health problems of the elderly have gained focus. In this scenario, the much required reorientation of health systems and health sector reforms to respond to these new challenges and emerging threats is still not in place. The struggles, preparedness and inadequacies of health system were glaring and evident during the Covid 19 pandemic.

In addition, because of the increasing costs of health care, huge health inequities persist with disparities in health care and services. Apart from slow pace of investment in health sector, the strong presence and emergence of private health sector has only added to increasing out-of-pocket expenditures and catastrophic outcomes in the absence of uniform guidelines and regulatory practices. The absence of robust health Information Systems and good quality data has only made the problem worse. In this scenario, the need for strengthening – reorienting – reforming health sector to provide quality healthcare for people has been acutely felt and requires concerted efforts by the state governments and all partners.

Scope and focus of the report

The Vision group – Arogya Karnataka report covers a broad range of areas related to health systems and services dwelling in depth on various subcomponents required for strengthening policies, programmes, services and activities from a broader systems perspective. The major focus is on policy/programme strengthening for service delivery and implementation to provide a roadmap for the government to accelerate and augment efforts to meet goals and targets. As the state has adapted national goals and targets in many areas, the same framework is applied for the state as well.

The summary report provides a comprehensive coverage of all areas and domains, while the detailed report entitled "Advancing People's Health in Karnataka" provides detailed observations on all topics. Individual reports of all subcommittees in different domains are available as standalone reports

This report is presented in six sections.

Section 1 covers introduction, current health scenario, goals and targets to be achieved and a broad strategic framework under the 5 'I's of Interventions, Implementation, Integration, Innovations and Investment. These are further discussed in individual areas in detail.

A comprehensive coverage of the scope and focus of public health – systems, services, policy, action plans, programmes, AYUSH services, human resources, financing, health protection for the poor and vulnerable sections, public-private partnerships, public health legislations, intersectoral collaborations, health information, health technology, management systems, health promotion, advocacy and awareness, mobilising communities for action, monitoring and evaluation and other areas are presented in section 2 of the report. Across all subcommittees, these areas also emerged as major action components to be strengthened in general, and in specific programmes.

Section 3 focusses on building systems from a life course perspective covering health determinants, health promotion, maternal and reproductive health, child health, adolescent health, middle aged population and care of elderly.

Section 4 details implementation of national and state programmes for communicable and infectious disease control with a focus on TB, malaria, Leprosy, HIV/AIDs and other conditions of state importance. Emerging Noncommunicable diseases (CVD, diabetes, cancer, stroke, COPD, mental health, neurological diseases, eye health, oral health), injuries, disability and rehabilitation, trauma and critical care issues that are placing a huge burden on health systems in the state and for which national and state programmes are being implemented is also discussed in this section.

Section 5 highlights some specific topics like urban health, environment and health, tribal health, disaster-epidemic-emergency preparedness and scope and opportunities for AYUSH systems of care.

Section 6 presents an overview of challenges to be overcome for improving health systems and the way forward for implementing findings and action areas from this report.

As health is a vast area with expanding boundaries, the report is not all inclusive. In each of the covered areas, the basic principles – vision, goals and targets, existing scenario, current status of implementation – gaps and challenges and required actions as recommendations are highlighted.

What the report does not cover

The report does not include discussion on specific interventions or treatment aspects related to individual management of people suffering from one or more disorders, based on the premise that a strong programme or integrated services addresses needs of all those requiring different/ individual services. It also does not cover a hospital or any one type of hospital or a disease and moves beyond a particular health problem to bring changes in the larger health systems and health of people. The report also moves beyond COVID – 19 pandemic (on which volumes have been written, discussed and debated) and draws on the lessons learnt from managing the pandemic in Karnataka.

Target audience

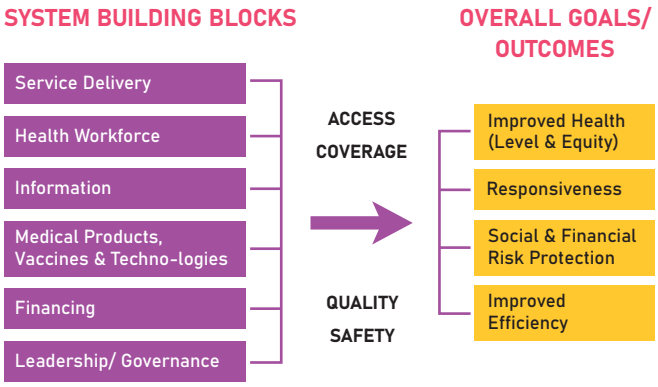
'Health is everyone's responsibility' and people's health can be improved by collective inputs and coordinated efforts of all stake holders. The present report is aimed at all stake holders engaged directly or indirectly in delivering services and programmes and working for improving health of people in the state. This includes political leaders and parliamentarian's, policy makers, administrators, planners, programme officers, care providers, district officials, economists, academicians, researchers, technologists, media professionals, NGOs, industry partners, private sector, students and youth organizations, informal organizations and others from health and all related sectors. The purpose is to engage all these partners in building and strengthening health services and programmes across the state.

04. Health Systems

Robust and responsive health systems should be developed in the state and the current system fails to meet many requirements of an efficient health system. The current systems need strengthening, reorganization and reorientation with more robust mechanisms. Improving health of people requires a right mix of interventions, implementation, integration, innovation and investments for with good governance and leadership.

Health programmes and services should be delivered through well organised and efficient health systems. It is essential that a health system framework for organisation, planning, implementation of policies and programmes is established in which everyone can participate as "health is everyone's business". Health systems performance is largely influenced by financial resources, health workforce, policies, health iniquities, legislations, technology, partnerships, public-private models and several others and, strengthening each one and integrating all, at different places is required for an effective public health system.

Figure 2: Health systems framework



Source: (17)

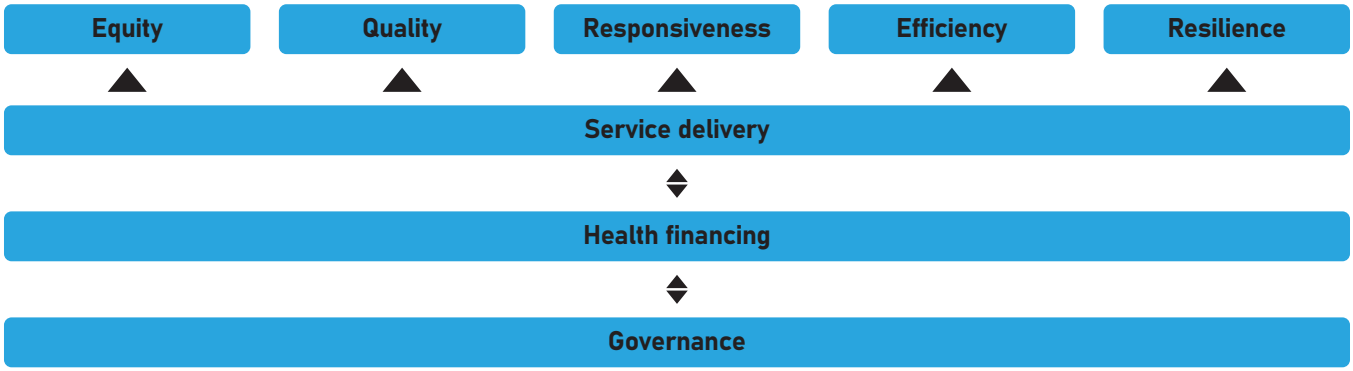
The six system building blocks of health system include - service delivery, health workforce, information, product devices and technologies, finances and leadership as well as governance. These six building blocks based on equity (Figure 2), responsiveness and efficiency are required for adequate functioning of health services with the inclusion of people as the seventh building block(17).

- Leadership in healthcare at all levels of state, district and taluka levels is much talked about, but found missing most often. Overseeing the functioning of the health system and managing several programs and activities for protecting public interests are the primary responsibilities of leadership in an environment of growing expectations, pluralistic society, decentralisation and an established private sector; accountability, transparency, direction for policies and programmes are absolute necessities. There is no readily available blueprint for effective leadership and governance but should evolve from within the society and also from lessons learnt in the past. Governance and administration needs significant improvement in the state at state, district and taluka levels.
- Service delivery is the interface between health systems and people. Universal Health Coverage provides framework for increasing access to quality care at affordable costs at all levels of healthcare facilities. Well-functioning health infrastructure in sufficient numbers is an absolute requirement. Both NUHM (National Urban Health Mission) and NRHM (National Rural Health Mission) are state flagship programmes aiming to scale up infrastructure across the state apart from investments made under specific programmes.
- Human resources for health is the backbone of healthcare delivery. A well performing health workforce is one where a fully equipped workforce is available, skilled and competent, responsive, productive and capable of responding to all health needs of populations by managing dynamic situations. The availability of sufficient numbers, of proven quality and at different levels of health facilities requires recruitment and deployment, training and skill building (a continuous process), facilitating multitasking, creating support systems, maintaining high levels of motivation and commitment and monitoring of the health workforce. Several reports and reviews have identified huge deficiencies in human

resources in public health facilities at different levels across the state. Deficiencies in the number, quality and efficiency of human resource within the health system across Karnataka need to be addressed immediately.

- Health Information Systems are often the foundation on which health systems are built by ensuring production, analysis, dissemination and use of information by different decision-makers at different levels both at regular times and in emergency situations. The current systems are fractured and fragmented working in silos and often unresponsive to programme requirements. There is a need to integrate programmes across departments and sectors through uniform data collection mechanisms.

Figure 3: Health systems strengthening towards Universal Health Coverage



Source: (17)

- Accessibility to medical products, drugs, vaccines, technologies in terms of quantity, quality, safety, efficacy and cost effectiveness based on evidence and scientific practice is a critical requirement for health systems to function optimally based on regular planning. Health systems should promote the rational use of essential medicines through appropriate pharmacovigilance, guidelines and strategies, ensure adherence, patient safety, training of the staff and strong regulatory mechanisms. It is evident that people across the state are unable to access timely care and required medications (as seen during Covid times) and technologies in emergency and non-emergency situations on a regular basis ; when available, it is expensive. It is recommended to ensure easy and timely access to required medications and technologies at an affordable cost to citizens of Karnataka.

- Health financing includes resource allocation, mobilising resources, establishing arrangements, expanding pooling arrangements, generating additional resources, spending funds and ensuring assistance mechanisms with transparency at each step. The catastrophic expenditures in emergency and chronic disease care has been reaching staggering proportions in recent years, pushing families to greater levels of poverty. Poor health financing and limited coverage of health insurance and protection mechanisms has been a serious problem in the state; situation became serious during covid pandemic.

The success of a health system depends on an understanding the demand for services, delivery of a package of integrated preventive, promotive, curative and rehabilitation services, organisation of the entire network, efficient management to maximise coverage, quality and safety, reduce duplication and address issues regarding infrastructure and logistics along with protecting poor and vulnerable communities. An appropriate mechanism for delivery of services is essential considering the network of public and private providers to enhance equitable access, quality and safety (Figure 3). Equity in health care means everyone in the society is able to get services irrespective of any financial and structural barriers.

Health Systems Strengthening Towards Universal Health Coverage

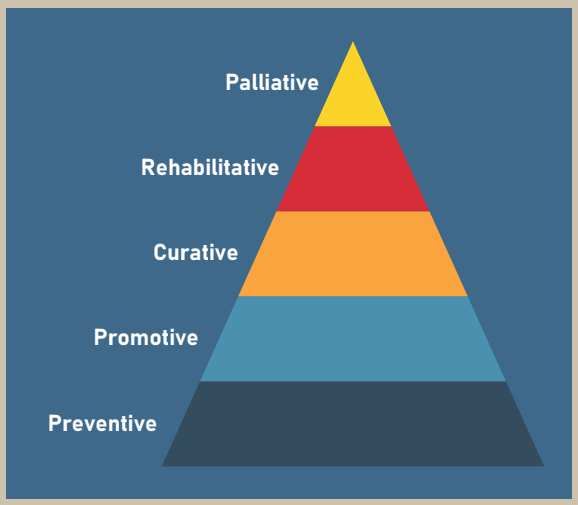
Evidence based

Cost effective

Sustainable

Universal

- Apex Referral Hospitals
- District Hospitals
- Taluk Hospitals
- Community Health Centres
- Primary Health Centres
- Health and Wellness Centres



Acceptable

Integrated

Intersectoral

Equity oriented

Health Determinants	Health Services	Health Promotion	Drugs and logistics	Health Financing
Public Sector	Human Resources	Private Sector	NGOs & Communities	Legislation
Programmes	Policies	Action Plans	Health Technology	
Monitoring & Reporting	Surveillance	Health Information	Research	Evaluation

HEALTH SYSTEM

05. Our Goals 2030 and Beyond

- Reduce the proportion of population living below the national poverty line
- Increase the percentage of Households covered by a health scheme or health insurance.
- Increase the percentage of Population getting safe and adequate drinking water within premises through Pipe Water Supply
- Substantially increase government spending on health and social protection
- Drastically reduce under nutrition among children
- Significantly reduce anaemia among pregnant women and children under 5 years of age
- Reduce the incidence of TB and HIV/AIDS
- Strengthen efforts for prevention and control of NCDs including injuries and suicides
- Address on priority physical and sexual violence among married women

Health of people is getting prominence and gaining importance in the state; Covid – 19 has only made health, public health, health care and mental health as important societal issues. The state ranked 6th amongst the large states in India in NITI Aayog's composite health index scoring (1), highlighting the need for much more concerted efforts by the government. Despite the gains in health over the years, the state has the potential to take the health of the population to new heights. The United Nations Sustainable Development Goals (SDGs - 17 goals and 169 targets) (2), India's National Health Policy 2017 (3) and NITI Aayog strategy (NITI Aayog National Nutrition Strategy, NITI Aayog strategy for new India at 75), the New National Education Policy, framework for UHC and other recent proclamations provides direction and a roadmap for the state to move forward to achieve equitable and optimal health for all.

Figure 4: Sustainable Development Goals

The Ministry of Statistics and Programme Implementation (MoS&PI) is primarily responsible for monitoring of SDGs at the national level under the National Indicator Framework (NIF), whereas NITI Aayog is responsible for overall implementation of SDGs in the country. In the NIF, MoHFW is responsible for data management with regard to 45 health related national indicators (details available in the main report). For nearly 43 out of 45 health indicators assigned to MoH&FW, the metadata and SDG baseline (2015-16) data at National and State level is provided to MoS&PI (4,5). Every state in the country has to develop a framework for measuring progress towards SDGs and put in place a mechanism for data reporting to MoHFW at suggested intervals. Table 1 shows that Karnataka has made good progress with regard to some indicators in the areas of water and sanitation, maternal health, child health and for select communicable and infectious diseases. From the table (in the main report) it is clear that for some of the indicators data is not available at the state level. The need for establishing and or strengthening data collection mechanisms that supports computing the required indicator value and which also help in monitoring or tracking them to measure the progress is urgent and important.

Karnataka ranked third in NITI Aayog's Sustainable Development Goals (SDGs) India Index for 2020-21. Based on the review of available data it can be concluded that the following health and health related issues needs to strengthened or improved by the state for achieving the health related goals and targets set under SDGs and National Health Policy-2017 (Table 2)

Reaching the goals and targets under various programmes as agreed by Government of India and its different states and based on the action points and framework proposed by NITI AAYOG, Karnataka requires strong policy frameworks, programmes with vision and mission, implementation frameworks, agreed upon goals – targets – indicators by different departments , multi- level and multi-type trained and skilled human resources, adequate funding (including developing innovative funding mechanisms), systematic monitoring and most importantly concerted and coordinated action plans with the support of a strong public health work force. Needless to say, political will and support at both central and state levels are critical along with effective use of technology. Success depends upon vertical and horizontal integration of policies and programmes; all measured - monitored and evaluated on a continuous and real time basis.

Coming Together for implementation

- Communication
- Cooperation
- Convergence
- Coordination
- Collaboration

Table 1: Current health status of Karnataka with respect to Key health related Sustainable Developmental Goals

Target	Indicator	Status of Karnataka
By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births	Maternal Mortality ratio per 1,00,000 live birth (2020)	92
	Percentage of women aged 15-49 years with a live birth, for last birth, who received antenatal care, four times or more (5 years preceding the survey)	70.9%
By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.	Percentage of Children who are underweight /stunted/ wasted	32.9%/ 35.4%/19.5%
By 2030, end preventable deaths of new-borns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births.	Under 5 Mortality rate (per 1000 live birth) (2020)	28
By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water- borne diseases and other communicable diseases.	HIV Adult Prevalence Rate	0.47
	Tuberculosis incidence per 100,000 population.	133.5
By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.	Prevalence of hypertension among men and women aged 15-49 years.	Women-25.0% Men-26.9%
	Blood sugar level - high or very high (>140 mg/dl) or taking medicine to control blood sugar level	Women-14.0% Men-15.6%
	Suicide mortality rate, (per 1,00,000 population)	2015-17.4 2020- 17.7
By 2020, halve the number of global deaths and injuries from road traffic accidents	People killed/injured in road accidents (per 1,00,000 population)	2015- 17.51 2018- 16.79
Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation	Percentage of ever married women age 15-49 who have experienced Physical or sexual violence committed by their husband	44.4%
By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters	Number of human lives lost per 100,00,000 population due to extreme weather event	10.24
Implement nationally appropriate social protection systems and measures for all, and by 2030 achieve substantial coverage of the poor and the vulnerable.	ercentage of Households with any usual member covered by a health scheme or health insurance.	28.1%
Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States	Percentage of government spending (including current and capital expenditure) in health sector to GSDP (2016-17)	0.8

Table 2: Current health status of Karnataka with respect to Key targets of National Health Policy of India 2017.

Goal/Target	Current status of Karnataka
Increase Life Expectancy at birth from 67.5 to 70 by 2025	68.8
Reduce Total Fertility Rate to 2.1 at national and sub-national level by 2025	1.7
Reduce Infant Mortality Rate to 28 by 2019	25
Reduce Neonatal Mortality Rate to 16 and Still Birth Rate to "single digit" by 2025	NMR-18/1000 live birth Still birth rate-6/1000 live birth
Reduce Under Five Mortality to 23 by 2025 and MMR from current levels to 100 by 2020	U5MR-28 MMR-97
Antenatal care coverage to be sustained above 90% and skilled attendance at birth above 90% by 2025	Care coverage-70.9% Skilled birth attendance-93.8%
Meet need of family planning above 90% at national and sub national level by 2025 More than 90% of the new born are fully immunized by one year of age by 2025	93.5% 84.1%
Reduction of 40% in prevalence of stunting of under-five children by 2025	35.4%
Relative reduction in prevalence of current tobacco use by 15% by 2020 and 30% by 2025	Women-8.5% Men-27.1%
Achieve and maintain elimination status of Leprosy by 2018, Kala-Azar by 2017 and Lymphatic Filariasis in endemic pockets by 2017	Leprosy eliminated -2018-19 (0.34/10000 population)
Reduce the prevalence of blindness to 0.25/ 1000 by 2025 and disease burden by one third from current levels	1% (2006-07)
Achieve and maintain a cure rate of >85% in new sputum positive patients for TB and reduce incidence of new cases, to reach elimination status by 2025	Cure rate-69% Incidence-133.5 per 1,00,000 population
Achieve global target of 2020 which is also termed as target of 90:90:90, for HIV/AIDS i.e., 90% of all people living with HIV know their HIV status, 90% of all people diagnosed with HIV infection receive sustained antiretroviral therapy and 90% of all people receiving antiretroviral therapy will have viral suppression	79-85-79
Establish primary and secondary care facility as per norms in high priority districts (population as well as time to reach norms) by 2025	1 PHC for every 28715 population 1 Sub-centre for every 7636 population 1 CHC for every 327239 population
Increase health expenditure by Government as a percentage of GDP from the existing 1.15% to 2.5 % by 2025	0.8% of GSDP
Increase State sector health spending to > 8% of their budget by 2020	3.8% (2009-10)
Decrease in proportion of households facing catastrophic health expenditure from the current levels by 25%, by 2025	8%

Source: NFHS-5, 2019-20, http://rchiips.org/nfhs/NFHS-5_FCTS/FactSheet_KA.pdf; India TB report-2020, https://tbcindia.gov.in/showfile.php?lid=3538; Status of National Aids response-2020, http://naco.gov.in/sites/default/files/Sankalak%20Status%20of%20National%20AIDS%20Response,%20Second%20Edition%20(2020).pdf; Accidental Deaths and Suicides in India-2019, https://ncrb.gov.in/sites/default/files/ADSI_2019_FULL%20REPORT_updated.pdf; National Sample Survey 76th Round-Drinking water, sanitation, Hygiene and Housing condition in India-2018, http://mospi.nic.in/sites/default/files/NSS7612dws/Report_584_final.pdf

06. Health Policy

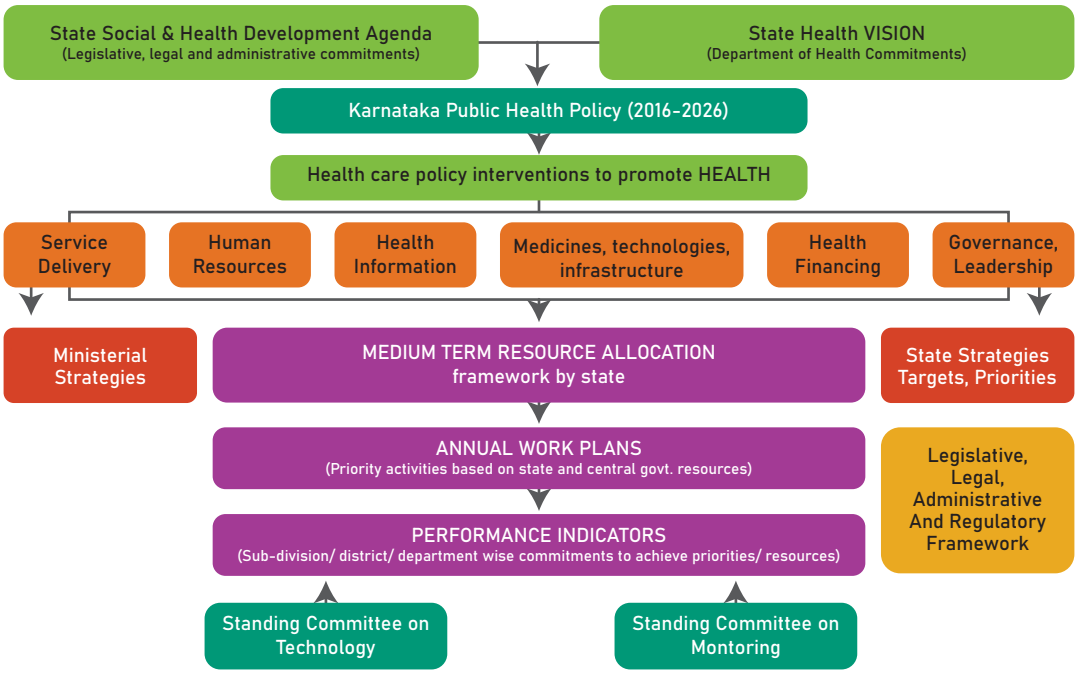
- The translation of state health policy to action requires a well-defined plan, road map and investments along with an implementation process that is well monitored and measured for its impact.
- Health impact assessment of all policies should be an inbuilt activity of policy implementation process in Karnataka.
- The state should establish a "Centre of Excellence in health policy research" in a public sector or academic institution to support the government in formulation – development – implementation – measuring impact of policies.

A health policy is a reflection of the vision, direction, road map and political commitment of the state and nation. Karnataka State is one of the pioneering states aiming to deliver comprehensive public health services to its population by using defined policy frameworks. Apart from implementing many national policy frameworks like National Health Policy 2017(18) , National Education Policy(19), National Transport policy(20), National policy to address environmental concerns and welfare policies of different departments ; the state has also developed its own policies over time in different areas.

One of the earliest efforts in the state was the development of the Karnataka Health Task Force that developed a report with the 'draft Karnataka State integrated health policy' included in 2002(21), leading to the development of Karnataka state integrated health policy in 2004 and then in 2017(22). The broad aim of this policy was to improve access to health care based on the principles of equity, provision of healthcare, responsive system guided by the principles of transparency, accountability and community participation. In 2008, the Karnataka knowledge commission was set up as an independent body to further strengthen health systems in the state. The Mission group on public health under the Karnataka Jnana Ayoga in 2013 developed the report entitled "towards a community oriented public health system development in Karnataka" which paved the way for further reforms(23).

The Karnataka public health policy 2017 brought together major health policy elements to establish an administrative and managerial framework to support measures for improving the health status of people(22). The policy is focused on the attainment of the highest possible level of good health and well-being of all people in the state through delivery of comprehensive health care services with universal access to quality and affordable care and the inclusion of health in all developmental policies. The policy document includes vision, mission, objectives, and provides an implementation framework in number of areas. (Figure 5)

Figure 5: Comprehensive health policy implementation framework



Source: Karnataka Health policy 2017

07. Health Sector Action Plans

The Department of Health and family Welfare (DoHFW), in consultation with public health experts and program Directors, should develop a comprehensive – multisectoral and integrated state health action plan (with vertical and horizontal integration) for the health department and for all state implemented programs (at least for flagship programmes) and can be revised once in 3 – 5 years. Similar action plans should be developed in each district with help from local medical colleges and public health experts.

To translate policy into action, a written action plan is a requirement. The health sector action plan should list activities, work components, department(s) / agency(y) for implementation, timelines, resources and monitoring indicators for achieving health improvements usually based on systematic needs assessment or a well conducted situation analysis. The health action plan is based usually on prioritisation of health issues and is a process in which the state health department should be actively engaged once in 3 to 5 years. Most importantly, the health action plan includes a set of measurable indicators to decide and define the direction of implementation.

Action plans should be developed at both state and district levels for efficient implementation. Building the capacity of state and district teams is vital for making action plans and should be facilitated by the state planning unit in the Directorate of Health and family Welfare Services. It is learnt that state and districts formulate actions action plan every year for submission to MoH under NHM activities. At present, the annual Program Implementation Plans of the department are considered as action plans, in addition to programme directives from centre. However, this would not suffice.

Central to the process of policy development and progress is the fact that health is not a major component of non- health sector policy (ies), while the health sector has not measured the health impact of all policies in detail. This is primarily due to lack of professional expertise in health policy research within the state.

A specific and well defined integrated health sector action plan that brings in medium term and long term vision for health sector is very much required for the state. For example, the National Multi-sectoral action plan for prevention and control of NCDs has 4 strategic action areas of Multisectoral coordination, health promotion, health systems strengthening and surveillance – monitoring – evaluation and research. The action plan was reviewed by 39 ministries and provided comments during 2015 – 17. The action plan has vision, mission, goals, objectives, action areas, outcomes and a framework for implementation. This framework has proposed activity, responsible implementation partner, year of monitoring and specific indicators for each of the activity(24). Recently, the national NCD risk factor monitoring survey has been completed to get baseline information which will now be done at periodical intervals(25). Such a type of framework on a scale applicable to Karnataka is required for major flagship programmes

08. Health Programmes

- The state DoHFW should undertake a landscape analysis of status of implementation of all programmes, at both state and district levels, in terms of inputs, activities, progress, resources, outcomes and impact using a set of easily measurable indicators with technical assistance from state public health experts.
- Capacity building of all programme officers should be strengthened by State Institute of Health and Family Welfare (SIHFW) for overseeing programme implementation in terms of feasibility, community orientation, resource planning, sustainability and measuring progress.
- All public health programmes should be well monitored and evaluated at periodical intervals for their effectiveness and impact at state and district levels. .
- Digital technology should be fully integrated into monitoring, evaluation and surveillance activities of all health programs and services.

Every citizen should benefit from every health program and should be able to access preventive, promotive, curative and specialty health care delivery within a radius of 50 km in the state of Karnataka. Since independence, several national and state health programs have aimed towards control/elimination/eradication of communicable/ infectious diseases, improvement of potable water supply and sanitation, raising the standards of nutrition, population welfare and control, and for improving health care access and delivery. In recent years, new programmes in the areas of non-communicable diseases, mental health, elderly care, oral health, adolescent health, prevention of blindness and several others have been developed in addition to the existing programmes.

A health Program consists of a formal set of aim, objectives, guidelines and procedures that contribute for achieving pre-set goals and indicators, e.g., National program for Cancer, Diabetes, Cardiovascular diseases and stroke NPCDCS(26). A clear demarcation about the activities to be rolled out by a program, nature of services, target beneficiaries, financial mechanisms and arrangements and man power implementing the programs is often required in an effective public health program. Overall, to improve public health, need based, community driven, evidence-based intervention(s) should be instituted with due considerations to feasibility, cost effectiveness, sustainability, community acceptance and availability of technology(in recent days).Public health programs succeed and survive whenever there is ,

i. Innovation to develop evidence base for action;

ii. A technical package of a group of limited number of high-priority, evidence-based interventions that will have a major impact;

iii. Effective performance management of the program with adequate human resources combined with robust real-time monitoring and evaluation.

iv. Good partnerships and collaborations with public, private and community based organizations;

v. Communication of accurate and timely information to the community and decision makers to engage civil societies and effect behaviour change; and

vi. sustained political commitment to support for effective action

Table 3: Flagship Programmes of Karnataka, 2020-21

Sl No	Name of the Program	2020-21	2019-20	2018-19
01	National Health Mission (NHM)	▪ National Health Mission (NHM) ▪ Aysushman Bharath Arogya Karnataka ▪ Arogya Sahayavani - 104 ▪ Ayushman Bharat Health & Wellness Centre ▪ PMNDP - Pradha Mantri National Dialysis Programme ▪ Health Infrastructure Strengthening - NABARD	▪ National Health Mission (NHM) ▪ Swasthya Bhima Yojane ▪ Arogya Karnataka ▪ Comminicabe Diseases ▪ Arogya Sahayavani - 104 ▪ EMRI & Call centre (108) ▪ Universal Health Coveage/ AB HWC ▪ PMNDP - Pradha Mantri National Dialysis Programme	▪ National Health Mission (NHM) ▪ Arogya Karnataka ▪ Comminicabe Diseases ▪ Arogya Sahayavani - 104 ▪ EMRI & Call centre (108) ▪ Universal Health Coveage/ AB HWC

In Karnataka state, services are delivered through the implementation of National Health Mission (NHM) and nearly 75 national and state health programmes (details in annexure 1). The Ayushman Bharat program has a target of establishing 11,595 Health and Wellness Centres across the state. In addition, financial support is available through the Ayushman Bharat Arogya Karnataka scheme to offset costs for poor communities.

Karnataka has been a progressive state with regard to public health programme implementation, despite several challenges and implementation delays (13). The number of programmes in the area of maternal and child health and communicable disease control are several, at times leading to duplication of efforts at gross root levels. Some of the flagship programmes of the state are shown in Table 3. Programme officers in the State Directorate and at district levels are given responsibility of coordination, delivery, supervision and monitoring. Programmes in the areas of water

and sanitation, immunisation, RCH and Communicable diseases have delivered reasonably good results; programmes like National Programme for prevention and control of Cardiovascular diseases, Diabetes, Cancer and Stroke and National Programme for Health care of elderly are yet to see significant results and some (trauma care, environment) have not yet been initiated. Some programmes (eg., deafness prevention) operate with severe constraints of resources. Collaborative programmes in partnership with academic agencies (eg., Yuva Spandana programme) have delivered good results along with sustainability over time. Demonstration projects in NCD and road safety have also shown positive results. Most often, guidelines from MoH is usually followed to facilitate state level implementation.

Over time, the context in which public health programs have been operating in the state has become more complex raising demands for accountability from policymakers and other stakeholders. Major challenges in programme development and implementation include situational context, inadequate knowledge about the existing bottlenecks at the field level, lack of awareness and misconceptions about the program among the implementers, limited man power and finances, lack of intersectoral coordination, absence of tailor-made evidence based planning for the state or district, difficulties in engaging with private sector, urban – rural disparities, community participation and acceptability/availability of services for the beneficiaries. Adding to the complexity of public health programs for its implementation are challenges such as inequity, public demands, segmentation of health care system, commercialisation of health care and sustainability, calling innovative methods in programme implementation.

Our discussions with stake holders and an appraisal of programme implementation revealed that programmes with (i) leadership,(ii) defined goal and programme directives, (iii) timely release of funding, (iv) focus on implementation in districts, (v) sustainability, (vii) continuous community engagement, (viii) coordinated activities, and (ix) good monitoring mechanisms delivered better results. Due to multiplicity of programmes and activities, flagship programmes get higher priority, while others get side-lined. The vertical nature of the programs is also a strong limitation by its selective focus, prioritised augmentation of resources, missed opportunities for integration and duplication of services. Selective focus on implementation of programmes has led to verticalisation of programmes leading to greater importance, focus and resources for few, while relegating others to periphery. In addition to the governmental schemes a wide range of common, speciality and super speciality services are provided by the private sector in urban, peri urban and semi urban areas, which is largely unregulated. As all programmes are important for health of people, every programme must be implemented in true spirit and action.

District focus research activities

- Assessment of human resources
- Survey on NCDs - risk factors – determinants
- Health financing and health protection
- Health impact assessment
- Verbal autopsy study
- Population-based registry
- Pilot project on technology integration
- Integration of Ayush in healthcare
- Survey on disabilities
- Integrated surveillance
- Assessment of emergency, trauma, and critical care services

Critical Areas for Improvement

- Health determinants
- Strengthen human resources
- Monitoring and evaluation
- Technology applications
- People's engagement

Priority areas for action

- Urban health
- Adolescent health
- Mental health
- Environment health
- Elderly health

National Rural Health Mission

National Rural Health Mission (NRHM) was launched on 12th April 2005 under the NHM, a flagship Programme of the Ministry of Health & Family Welfare, Government of India to provide accessible, affordable and quality health care to the rural population, especially the vulnerable groups. The thrust of the NRHM is to bridge the gap in rural healthcare services through improved health infrastructure, augmentation of human resources, enhanced service delivery and decentralization of the programme to the district level to facilitate context specific, need based interventions, improve intra and inter-sectoral convergence and promote effective utilization of resources.

A State specific programme implementation plan, by integrating district health action plan, is being prepared and implemented under NRHM since the year 2008-09. It is based on the district specific health needs and comprises of most of the components of NRHM. The main approaches of NRHM includes communitization, improved management through capacity, flexible financing, innovation in human resource management and monitor progress against standards.

NRHM has contributed to improvement in the functioning of public health system and better health profile in the state. Under NRHM the state has made considerable progress in enhancing availability of human resources in public health system especially by recruiting more medical doctors, staff nurse and ASHA workers. The gaps in availability of sub-centres, primary health centres and community health centres have been closed. The range and quality of services available within the public health system has been enhanced which is reflected upon the health indicators for the state. The overall health management capacity at the district level has improved with district health action plan being developed in all districts and with regular meetings of district health society. Involvement of communities in managing public health facilities and other community monitoring activities is showing signs of improvement.

Despite the significant achievements, as per the findings of an evaluation study of NRHM by Karnataka Evaluation Authority (KEA), the rates of fund utilization in the State needs strengthening (An amount of 988 crores INR was sanctioned and 578 crore INR was spent for NRHM activities in the Financial Year 2017-18 in the State). Health officers have a broad understanding about the overall goals and strategies of NRHM, however their perceptions about planning and monitoring were limited. Moreover, the Southern Districts of the State reported ill equipped PHCs with high shortage of human resources and in districts of Gulbarga and Belgaum, it was reported to have reduced field presence of field-based personnel, lagging health infrastructure and health indicators. Also, the NRHM documentation follows multiple and overlapping reporting formats, inefficient reuse of existing data, and lack of trained personnel for data entry.

Recruiting staffs like MHWs, JHA, LHVs in the state for field presence can reduce the work overload on ANMs and ASHAs. The clerical and administrative positions at the grassroots level need to be filled. Staffs should also undergo capacity building and training about NRHM and its activities. Single database to streamline reporting activities and merge data requirements will help in improving planning, analysis and monitoring of activities. Allocating a demand-based funding will contribute towards promoting effective utilization of resources based on needs and demands for better implementation of NRHM.

National Urban Health Mission

National Urban Health Mission (NUHM) is the sub-mission of National Health Mission and was launched in the year 2013. It aims to improve the health status and well-being of the urban poor, particularly the slum dwellers and other disadvantaged sections such as homeless, rag-pickers, street children, rickshaw pullers, construction workers, brick & lime kiln workers, commercial sex workers and other temporary migrants. NUHM facilitates equitable access to quality health care through an upgraded public health system and with the active participation of the urban local bodies.

NUHM covers all the District headquarters and other cities/towns with a population of 50,000 and above whereas the cities and towns with population below 50,000 are covered under NRHM. As per census 2011, State has 236.25 lakh people (31.57%) living in urban localities and 36.31 lakhs urban slum population placing a huge challenge for public health service delivery in urban areas. NUHM is playing a key role by effectively providing adequate primary health care to the urban poor focusing on preventive, promotive and curative aspects of health and illness.

On the norms of one UPHC (Urban Primary Health Centre) for every 50,000 population under NUHM, 361 UPHCs across the state have been made functional supported with required human resources including specialist doctors. Evening clinics have been made functional in almost all UPHCs for the benefit of urban daily wage earners. Adequate resources for establishing laboratories and for procuring of generic drugs are provided to prevent the out-of-pocket expenditure of the urban poor. Communitization through selection and training of ASHAs and Mahila Arogya Samitis for every 50-100 households are other initiatives under NUHM.

Since NUHM is being implemented in the state from 2014 onwards there has been no formal evaluation of the program and the achievements of NUHM in improving health of the urban population are unclear. However, NUHM has certainly contributed to improving the resources for urban health care especially through increased funding, establishing new urban primary health centers, strengthening existing primary health centers, recruiting more health personnel, improving community participation through ASHA, mahila arogya samithis and by strengthening lab services. A baseline community needs assessment focussing on urban poor and resource mapping has been undertaken across 23 cities/towns of the state to help in health planning.

Challenges in implementing NUHM includes: increasing population in the urban areas and the uneven infrastructure development in cities, fostering intersectoral coordination and public private partnerships; increasing burden of various lifestyle diseases and emerging infectious diseases among urban population and in-effective fund utilisation. A well-structured plan for implementing NUHM in the state, collaborating with multiple stakeholders across different sectors and an authority responsible for monitoring the implementation of NUHM are urgently required. To ensure effective implementation, augmenting the manpower especially for Urban Primary Health Centres will help along with nd capacity building of health systems.

9. Health Services

The state should commission a well-designed and scientific study, in three districts to begin with on a pilot basis, to document the comprehensive range of services and interventions (required and to be delivered) in different facility based settings to identify the investments to be made in the coming years: with implementation as the focus.

Public health services include a broad range of activities for delivery of services, based on equity, enabling provision of services to all citizens, based on a continuous and evolving needs assessment through a wide range of policies and programmes. Public health services delivered should be an optimum and required mix of preventive, promotive, curative and rehabilitation services. Services delivered should cover all age groups and in urban, rural and difficult to reach areas. These services range from the most essential and basic services provided at a village level to a wide range of complex and advanced services delivered in an apex referral healthcare facility through a combination of central and state-supported programs. In addition to health sector activities, number of partners from many other sectors is essential to improve healthcare of the people of the state. For example, the ICDS program implemented in collaboration with the Department of Women and Child development to rehabilitation programs delivered by the Ministry of social welfare and empowerment needs to work in unison for the benefit of people.

The 10 essential components of public health services include - monitoring population health, responding to threats at an early stage, effective communication, community empowerment, clear framework for policies and plans, strong legislations and regulatory mechanisms, ensuring equity, strong workforce, strengthened monitoring and evaluation with a strong and well-functioning organisational infrastructure (Figure 6). The optimum health of people can be insured and promoted only when all these are integrated and work to their fullest capacity.

Figure 6 : Essential Public Health services

Source :https://phnci.org/uploads/resource-files/EPHS-English.pdf

10. AYUSH Services

- The Government should establish an overarching implementation body, the Karnataka State Health Council for Integrative Medicine and Healthcare that links education, healthcare, research, drug manufacturing and IT platforms in the Ayush sector in a comprehensive manner for robust healthcare management.
- A district Ayush care model should be implemented across four districts of the state as demonstration projects to integrate Ayush services into existing services for identifying areas of stand-alone management of Ayush effective interventions and setting up a wide range of integrated services through standardised and integrated approaches.
- The analytical capabilities of existing testing laboratories need validation and certification for quality of products as well as for adherence to Indian public health standards as per existing licensing rules and regulations.
- All Ayush institutions should be accredited to ensure quality and standards of care as well as standards in teaching and training methods.
- Infrastructure in all existing Ayush dispensaries and Ayush hospitals needs unpgradation for need-based and uniform services at PHCs, CHCs and health and wellness centres for expansion of services and integration.

- Bridge courses in the Ayush curriculum as well as in modern medicine should be established to promote an interdisciplinary understanding of all medical systems among students. In addition, the Ayush faculty should be tried in evidence-based methods of medical diagnosis and treatment – monitoring, along with initiating short term diploma or certification courses for therapists, nursing and paramedical professionals.
- Research should be scaled up through pilot projects, feasibility testing for data safety and a strong research culture should be introduced in the Ayush systems of medicine.
- The existing Ayush grid project encompassing both the government and private sector should be strengthened to assess patient well-being and create Ayush health service database for all public health services.

The Indian Systems of Medicine (ISM) are of great value and known for its traditional systems by playing a crucial role in ensuring healthy living of communities by prevention of diseases, promotion of health as well as management of illnesses. Ayurveda, Yoga and Naturopathy, Unani, Siddha, Homoeopathy (AYUSH) are the oldest systems originating nearly 2000 years ago and evolving over centuries. The ISM has also come into prominence at a time, when new infectious diseases are emerging and lifestyle disorders are on the increase.

Table 4: Number of AYUSH Hospitals, beds and dispensaries in Karnataka State - 2019

System	Government Hospitals		No. of Dispensaries
	No. of Hospitals	No. of Beds	
Ayurveda	115	1821	564
Unani	18	392	56
Homeopathy	18	260	43
Nature Cure	05	46	05

The Department of Indian systems of Medicine and Homoeopathy established in March 1995 was renamed as Ayush in the year 2003. With the creation of a dedicated Ministry of Ayush in 2014, there is a Department of Ayush in GoK which includes both Ayush health and Ayush medical education services. The District Ayush officers look after the services in the district hospitals, taluka hospitals and in dispensaries. In Karnataka, there are 159 government Ayush hospitals with 2534 beds and 662 Ayush dispensaries (Table 4). The 101 Ayush colleges with an annual intake of 7215 students in medical education offer a great human resource pool for healthcare programmes and services (27). Under the Ayushman Bharat scheme, health and wellness centres have been established with a target to develop 10% of the total health and wellness centres. These centres are envisaged to deliver range of comprehensive primary healthcare services with a major focus on prevention of diseases and promotion of good health and wellness. Yoga is an important activity promoted in all centres along with support services in terms of medicines, diet and lifestyle modifications.

Despite the developmental efforts, Ayush is in fragmented state in terms of its functioning, implementation of services and integration into the existing health system. Huge disparities in infrastructure, diagnostics and assessment, equipment and supply are evident as compared to modern systems of medicine. Poor recruitment policies, deficient utilisation of available manpower, shortfall in scientific documentation of benefits are some major obstacles in the integration process of Ayush with the mainstream healthcare. The lack of uniform training of Ayush students in modern systems of medicine and scarcity of well-qualified Ayush paramedical staff due to accreditation deficiencies are also major barriers. The medicinal flora conservation and cultivation is an area of concern as it is the backbone of the entire system. The traditional community health practices which have its roots in Ayush systems need validation. In addition, the utilisation of information technology in the Ayush sector is totally inadequate and nonuniform.

Strategic Pillars

- Public engagement
- Building evidence base
- Establishing cost effectiveness
- Strengthening technology
- Ensuring sustainability

Ayushman Bharat Health and Wellness Centres

Ayushman Bharat attempts to move from sectoral and segmented approach of health service delivery to a comprehensive need-based health care service. It adopts a continuum of care approach to holistically address health (covering prevention, promotion and ambulatory care), at primary, secondary and tertiary level and comprises of two pillars namely Health and Wellness Centres (HWC) and Pradhan Mantri Jan Arogya Yojana (PM-JAY)

Health and Wellness Centres

The National Health Policy, 2017 recommended strengthening the delivery of primary health care, through establishment of "Health and Wellness Centres" as the platform to deliver comprehensive primary health care and called for a commitment of two thirds of the health budget to primary health care.

Key principles

In order to ensure delivery of Comprehensive Primary Health Care (CPHC) services, existing Sub Health Centres covering a population of 3000-5000 would be converted to Health and Wellness Centres (HWC), with the principle being "time to care" to be no more than 30 minutes. Primary Health Centres in rural and urban areas would also be converted to HWCs.

- Transform existing Sub Health Centres and Primary Health Centres to Health and Wellness Centers to ensure universal access to an expanded range of Comprehensive Primary Health Care services.
- Ensure a people centered, holistic, equity sensitive response to people's health needs through a process of population empanelment, regular home and community interactions and people's participation.
- Enable delivery of high quality care that spans health risks and disease conditions through an expansion in availability of medicines & diagnostics, use of standard treatment and referral protocols and advanced technologies including IT systems.
- Instill the culture of a team-based approach to delivery of quality health care encompassing: preventive, promotive, curative, rehabilitative and palliative care.
- Ensure continuity of care with a two- way referral system and follow up support.
- Emphasize health promotion (including through school education and individual centric awareness) and promote public health action through active engagement and capacity building of community platforms and individual volunteers.
- Implement appropriate mechanisms for flexible financing, including performance- based incentives and responsive resource allocations.
- Enable the integration of Yoga and AYUSH as appropriate to people's needs.
- Facilitate the use of appropriate technology for improving access to health care advice and treatment initiation, enable reporting and recording, eventually progressing to electronic records for individuals and families.
- Institutionalize participation of civil society for social accountability.
- Partner with not for profit agencies and private sector for gap filling in a range of primary health care functions.
- Facilitate systematic learning and sharing to enable feedback, and improvements and identify innovations for scale up.
- Develop strong measurement systems to build accountability for improved performance on measures that matter to people.

Comprehensive Primary Health Care (CPHC)

The aim of CPHC is to provide a seamless continuum of care that ensures the principles of equity, quality, universality and no financial hardship. The announcement was made in the context of the annual budget presentation, assigning financial resources to the National Health Policy 2017, which commits two thirds of the budget to primary health care, and explicitly mandates a move from peripheral centres providing selective primary health care to 150,000 HWCs acting as the first point of contact for an expanded set of health-care services closer to the community.

ESSENTIAL PACKAGE OF SERVICES

- Care in Pregnancy and Child-birth.
- Neonatal and Infant Health Care Services
- Childhood and Adolescent Health Care Services.
- Family Planning, Contraceptive and other Reproductive Health Care Services
- Management of Communicable Diseases including National Health Programmes
- Management of Common Communicable Diseases and Outpatient care for acute simple illnesses and minor ailments.
- Screening, Prevention, Control and Management of Non-Communicable Diseases
- Care for Common Ophthalmic and ENT Problems
- Basic Oral Health Care
- Elderly and Palliative Health Care Services
- Emergency Medical Services including Burns and Trauma
- Screening and Basic Management of Mental Health Ailments

Key Inputs to be provided at a HWC are listed below:

1. Primary health care team to deliver the expanded range of services.

- At the upgraded SHC – A team of at least three service providers (one Mid-level health provider/MLHP, at least two (preferably three) Multi-Purpose Workers – two female and one male, and team of ASHAs at the norm of one per 1000.
- At the strengthened PHC – PHC team as per IPHS standards. In 24*7 PHCs having inpatient care, an additional nurse for cervical cancer screening is planned. In PHCs that are not envisaged to provide inpatient care, the existing nurses should receive modular training in certificate course for primary care. In urban areas, the team would consist of the MPW- F (for 10,000 population) and the ASHAs (one per 2500).

2. logistics – Adequate availability of essential medicines and diagnostics to support the expanded range of services, to resolve more and refer less at the local levels, and to enable dispensation of medicines for chronic illnesses as close to communities as possible.
3. Infrastructure – Sufficient space for outpatient care, for dispensing medicines, diagnostic services, adequate spaces for display of communication material of health messages, including audio visual aids and appropriate community spaces for wellness activities, including the practice of Yoga and physical exercises.
4. Digitization – HWC team to be equipped with tablets/smart Phones to serve a range of functions such as: population enumeration and empanelment, record delivery of services, enable quality follow up, facilitate referral/continuity of care and create an updated individual, family and population health profile, and generate reports required for monitoring at higher levels.
5. Use of Telemedicine/iT Platforms – At all levels, teleconsultation would be used to improve referral advice, seek clarifications, and undertake virtual training including case management support by specialists.
6. Capacity Building – Mid Level Health Providers will be trained in a set of primary healthcare and public health competencies through an accredited training programme that combines theory and practicum with on the job training. Other service providers at HWC will also be trained appropriately to deliver the expanded range of services.
7. Health Promotion – Development of health promotion material and facilitation of health promotive behaviours through engagement of community level collectives such as – Village Health Sanitation and Nutrition Committee (VHSNCs), Mahila Arogya Samiti (MAS) and Self-Help Groups (SHGs), and creating health ambassadors in schools. Enabling behaviour change communication to address life style related risk factors and undertaking collective action for reducing risk exposure, improved care seeking and effective utilization of primary health care services.
8. Community Mobilization – for action on social and environmental determinants, would require intersectoral convergence and build on the accountability initiatives under NHM so that there is no denial of health care and universality and equity are respected.
9. linkages with Mobile Medical Units – Linkages with Mobile Medical Units (MMU) could serve to improve access and coverage in remote and underserved areas where there is difficulty in establishing HWCs. In such cases, medicines and other support could be provided to frontline workers, with periodic MMU visits. MMUs could also be linked to nearby HWCs, where medical consultation could be arranged on scheduled days, for those unable to travel to referral sites.

Financing

Suitable payment mechanism for primary health care will need to be explored. Once the systems for population empanelment and record of services are streamlined, the possibility of financing on a per capita basis can be explored. In addition, team based incentives would be initiated. This will be done to facilitate accountability to outputs/outcomes and provide individual centred care.

Essential Outputs of HWC

1. The HWC data Base: Population enumeration and empanelment implies the creation and maintenance of database of all families and individuals in an area served by a HWC. This is planned such that every individual is empanelled to a HWC.
2. Health Cards and Family health Folders: These are made for all service users to ensure access to all health care entitlements and enable continuum of care. The health cards are given to the families and individuals. The family health folders are kept at the HWC or nearby PHC in paper and/or digital format ensuring that every family knows their entitlement to healthcare through both HWC and the Pradhan Mantri Jan Arogya Yojana or equivalent health schemes .
3. Increased access to Services: HWCs would provide access to an expanded range of services as shown above. The availability of services would depend on - the availability of suitably skilled human resources at the HWC, the capacity at district/sub-district level to support the HWC in the delivery of that service, and the ability of the state to ensure uninterrupted supply of medicines and diagnostics at the level of HWC

"Medical education does not exist to provide student with a way of making a living, but to ensure the health of the community"

- Rudolf Virchow

Essential Outcomes of HWC

1. improved population coverage: Active empanelment and HWC database will improve the population coverage. The HWC database would enable HWC staff to monitor and identify the left out population and improve coverage of national health programmes.
2. reduced out of pocket expenditure and catastrophic health expenditure: Improved access to expanded services closer to the community, assured availability of medicines and diagnostic services and linkages for care coordination with Medical Officers/specialists across levels of care will reduce financial hardships faced by community.
3. risk factor mitigation: Health promotion efforts by primary health care team would support in addressing the risk factors for diseases.
4. decongestion of secondary and tertiary health facilities: A strong network of HWCs at the sub district level would facilitate resolving more cases at primary level and reduce overcrowding at secondary and tertiary facilities for follow up cases as well as serve a gate keeping function to higherlevel facilities.

Expected impact of HWC

1. improved population health outcomes: Improved availability, access and utilization will in turn contribute to equitable health outcomes measured through periodic population based surveys for key indicators listed in Section 10.1- Monitoring.
2. increased responsiveness: Provision of care by primary care team will be based on principles of family led care including dignity and respect for individuals and communities with particular focus on marginalized, information sharing, encouraging participation, including intersectoral collaboration that will lead to increased trust building, comfort in access to care and enable addressing social and environmental determinants.

To achieve above goals, paradigm shift is required at 5 levels

1. Innovation in human resources: Services at the HWC at the most peripheral level, will be delivered through a team, led by a new cadre of non-physician health worker, a mid-level health provider, supported by one or two multipurpose workers, and ASHAs – as India's community health workers are called.
2. Dispensation of free medicines for chronic care, at the HWC, to avoid patient hardship, reduces out-of-pocket expenses and enables improvement in treatment adherence. Needs planning and uniterupted supply of medicines.
3. Financial reforms, including capitation-based payments to HWCs and performance-linked payments to the mid-level health provider and to the team of front-line workers. The salary of the mid-level health provider is blended – consisting of a fixed component and an incentive component linked to key outcomes, which are measured using monitoring data captured through an IT system.
4. Use of digitalised technology and information and communications technology (ICT) platforms to ensure continuity of care through universal population empanelment and registration to a particular HWC, enabling, inter alia, treatment adherence and tracking of referrals, facilitating performance payments and ensuring continuity of care
5. Every year, 5 % of HWCs selected in a random manner with representation to all districts should be evaluated for its progress and performance by external public health experts to bring continuous improvement.

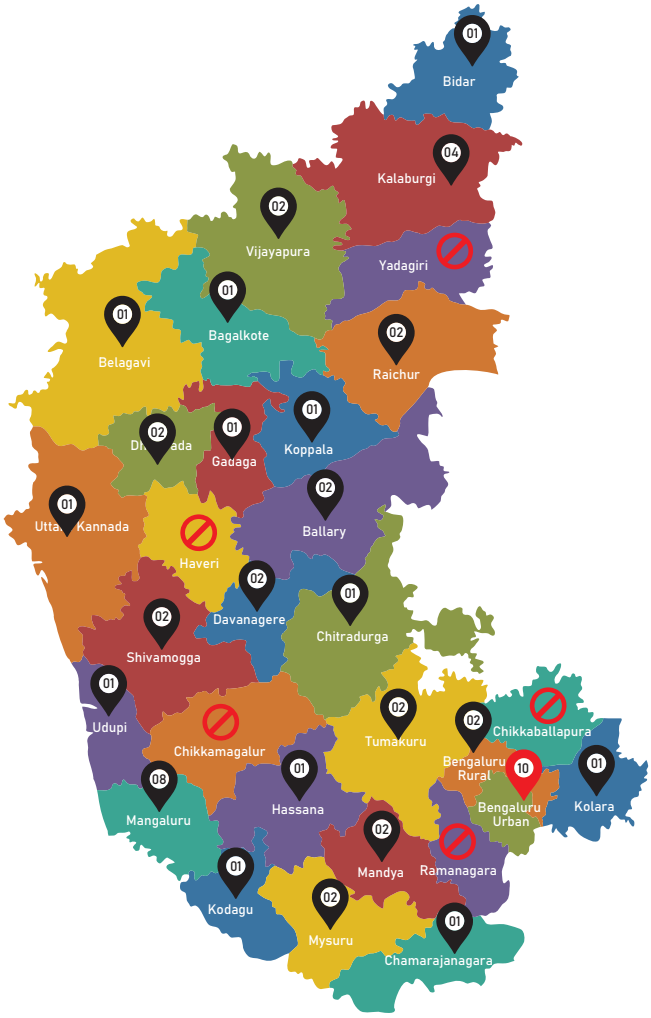
11. Health Infrastructure

- The district administration should have a "directory of resources on a digital dashboard" to know the presence, location, availability of beds, costs, and, status of health care agencies to develop mechanisms for effective coordination as well as to share responsibilities in all emergencies based on good resource mapping.
- All health care institutions should undergo accreditation process within the next 5 years for quality care improvement in services, teaching and training and product usage for maintaining quality services with adherence to prescribed norms.

As per data available from the DoHFW, there are 5917 wellness Centres, 8871 sub centres, 2299 PHCs, 207 CHCs, 146 taluka hospitals and 17 district hospitals run by DoFHW (Figure 8). The Department of Medical education is in charge of 60 medical colleges for undergraduate and postgraduate medical education, at the rate of 2 per district; most of them run by private establishments (Figure 7). The cities of Bangalore and Mangalore have 14 and 9 medical colleges surpassing the norms of any regulatory authority(11). In addition, nearly 1000 institutions education institutions are functioning to develop manpower in related areas of nursing, physiotherapy, dental, pharmacy and other areas. Allied professional courses in many disciplines (like laboratory technology, etc.,) are run in both Government (14 disciplines) and private sectors. There are nearly 100 Ayush colleges, 178 hospitals with 3096 beds , 662 Ayush dispensaries are present in the state with huge variations across districts(11).

Within a district, most villages have a sub centre / health and wellness Centre at the rate of one per 5000 population in plain areas and one per 3000 population in difficult to reach areas(26). Nearly 3360 health and wellness centres have been established under the Ayushman Bharat program by upgrading existing sub centres performing expanded roles and coverage of activities. Two thousand more are likely to be added in 2021 - 22. Most districts have PHCs as per prescribed norms of I per 30,000 population. The CHCs are located for an approximate population of 1.5 lakhs providing clinical services in addition to a range of preventive promotive services. A taluka hospital for every five lakh population has been recommended as per IPHS guidelines. Every district has a district hospital or a district hospital run by a medical

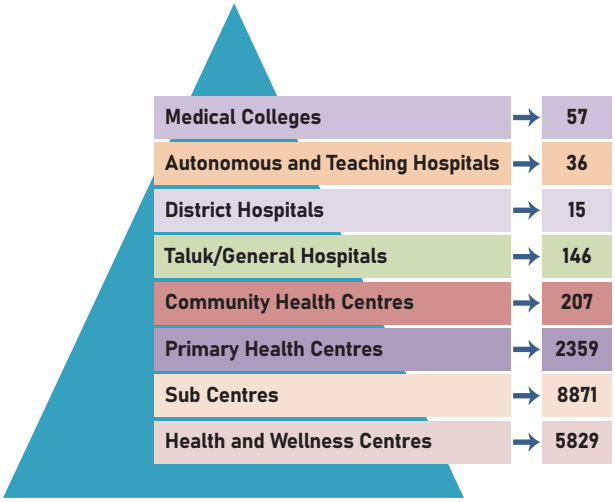
Figure 7: Presence of Medical colleges in Karnataka, 2021



College. In addition, a school, an Anganwadi center, a panchayat function in most places of the state. The district wise distribution of health care facilities in the state is provided in annexure 3.

The situation in urban areas is very different. Urban health infrastructure comprises of both public and private healthcare facilities. An urban PHC is available for a population of approximately 50,000 along with other health care facilities run by state government and local municipal bodies. The availability of tertiary care facilities is much higher in the private sector with the presence of super speciality corporate hospitals in many of the major cities of Karnataka. The private sector has wide range of facilities from a simple clinic in a village to the corporate super speciality hospitals in the city. The number of these facilities at the state and district levels is not clearly known.

Figure 8: State Government Public Health Infrastructure



Source: Health and Family Welfare Annual Report 2020-21 of Karnataka

Data from NFHS indicate that nearly 70 to 80% of healthcare is provided by the private health sector, confirmed with a recent assessment of trauma care facilities and mental health care services in Kolar district of Karnataka(28-30).

The populations are also served by many other support facilities like laboratories, blood banks, x-ray centres, CT scan centres, MRI centres and others and a significant proportion of them are in the private sector. Dialysis services are also available across all the districts in the state with some of the districts having higher number of dialysis units.

The establishment or addition of new facilities over time is based on expansion, addition, up gradation, administrative bifurcation, programme operations and political considerations resulting in wide disparities in the availability of infrastructure and an uneven distribution across different districts. A number of public facilities have been upgraded recently during the Covid 19 pandemic with additional manpower and infrastructural facilities. Hence, the number of facilities may not exactly match as per IPHS guidelines.

In addition there are a host of other agencies within a district (both urban and rural) which includes hospitals run by factories, industries, missionary agencies, philanthropic organisation and several others. Given the wide range and variations in formal and informal, public and private, corporate- noncorporate organisations for health care sector in a district the numbers and population covered, the quality of services needs systematic assessment and monitoring. Challenges lie in the lack of effective coordination mechanisms with resources being unavailable to the needy patients.

District Health and Developmental Programme: Need of the hour

....if 'Local people are not engaged – Local data is not available – Local implementation does not happen', impact is likely to be lesser.

A district is the nucleus of all health, welfare and development programmes. Karnataka has 31 districts catering to populations ranging from 560990 in Kodagu district to 5426096 in Belagavi district (11).On an average, a district caters to an approximate population of +/~ 2.5 million with urban districts and cities covering larger populations. Each district has about 5 – 10 talukas per district with each one catering approximately to ~ 3 – 5,00,000 population. Each district and taluka is different with some commonalities and significant variations.

The policies, programmes, action plans, guidelines and directives generally flow from top to bottom, being formulated in national and state capitol and implemented in a district. It is well acknowledged that the involvement of a district team in planning health and welfare activities are generally limited.

Every district health administration should be able to provide comprehensive preventive, promotive, curative, rehabilitative, palliative, laboratory, telemedicine services to its population through implementation of health programmes / schemes. Within each district, departments of education, welfare, women and child development and others also implement schemes that benefit health of people.

The central and state governments are focussing on district level strengthening with decentralisation mechanisms as all programmes are to be implemented at district and taluka levels. The 100 Aspirational Districts development programme based on the core principles of Convergence, Collaboration, and Competence has selected Yadgir and Raichur districts from Karnataka(31).The state government has The Kalyana Karnataka Regional Development Board to strengthen the districts of Bidar, kalaburagi, Yadgir, Raichur, Koppal and Bellary for inclusive growth and comprehensive development (Figure 9)(32). Additional resources are provided to few other poorly performing districts and also for specific programmes in the state (eg., SNCUs for child health) to accelerate programmes.

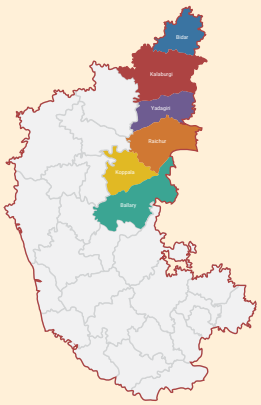


Figure 9: Kalyana Karnataka Regional Development Board - Districts

Table 5: Estimates for Major Health care needs for a district with 2 million population in Karnataka

	Measure (Prevalence per 100,000)	**Estimated persons** (for 2 million population)
MATERNAL AND NEONATAL DISORDERS		
Protein Energy Malnutrition	3295	65900
Maternal disorders	289	5780
Neonatal disorders	1250	25000
Maternal and child health needs		
Expected Number of pregnancies#	NA-	37840
Expected Number of pregnancies registered at any given month#	NA-	18920
Major Disease Categories		
COMMUNICABLE DISEASES		
Respiratory infections and tuberculosis	38905	778100
HIV/AIDS and STI	13671	273420
Malaria	357	7140
Dengue	94	1880
NON-COMMUNICABLE DISEASES		
Cardiovascular diseases	5656	113120
Ischemic Heart Disease	3096	61920
Ischemic Stroke	525	10500
Intra cerebral haemorrhage	251	5020
Hypertensive Heart Disease	78	1560
Neoplasms	3332	66640
Breast cancer	92	1840
Cervical cancer	47	940
Lip oral cavity cancer	33	660
Colorectal cancer	25	500
Chronic respiratory diseases	5992	119840
COPD	3196	63920
Asthma	3174	63480
Digestive diseases	29790	595800
Cirrhosis	18632	372640
Gallbladder and biliary disorders	2794	55880
Mental disorders	12786	255720
Depressive disorders	3601	72020
Anxiety disorders	3200	64000
Bipolar disorders	381	7620
Alcohol use disorder	1342	26840
Neurological disorders	34335	686700
Headache disorders	33820	676400
Idiopathic Epilepsy	404	8080
Alzheimer's disease	318	6360
Diabetes and kidney diseases	14385	287700
Diabetes	7765	155300
Chronic Kidney Disease	8954	179080
Musculoskeletal disorders	17891	357820
Low back pain	5270	105400
Osteoarthritis	4899	97980
INJURIES		
Self-harm and interpersonal violence	4601	92020
Unintentional injuries	12244	244880
Falls	6927	138540
Road injuries	6658	133160
Elderly heath care needs		
Cardiovascular diseases (CVDs) among older adults age 60+yrs	35%**	80500
Diabetes mellitus among older adults age 60+yrs	19.10%**	43930
Anaemia among older adults age 60+yrs	10.20%**	23460

* The estimates are derived from India State-Level Disease Burden Initiative as part of the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2019 that use various data sources and robust statistical modelling and hence may not reflect the estimates of individual studies

Using Birth rate 17.2/1000 for Karnataka from Vital Statistics Division, Office of the Registrar General, India, Ministry of Home Affairs, Govt. of India. SRS Bulletin (2020).

** Longitudinal Ageing Study in India (LASI) Wave 1, 2017-18, India Report, International Institute for Population Sciences, Mumbai 2020. An estimated 11.5% of total population was used for 60+ in Karnataka from Report of the Technical Group on Population Projections 2019 by National Commission on Population Ministry of Health & Family Welfare, Government of India.

Focussing on a district, and developing that as a hub of implementation activities for completeness, coverage and quality is achievable and advantageous as it helps in improving health of local populations.

- A district is the administrative nucleus for all present and future growth and development activities with regard to health, education, welfare, transport and other areas.
- Developing district programmes covering a population of approximately ~ 2.5 million is possible, feasible, sustainable and manageable from an administrative viewpoint with decentralisation mechanisms.
- A district provides the right opportunity and a manageable population for implementation, monitoring and evaluation purposes.
- Many programmes implemented at the district level and can bring convergence, integration and improved coordination. With a good district management, programmes can be moved further to taluka areas for more focussed implementation.
- Each district has a wide network of health care facilities, district hospital, medical colleges in almost all (except 8) districts, private health care providers, local NGOs, industries and educational institutions and are led by the District Commissioner, CEO – ZP, District Health officer and a District Surgeon. Selective investment can be made by the state in focussed areas for improvement. Developing intersectoral approaches which are scientific, sustainable and cost effective becomes easy in a district based on good quality data.
- Capacity building and strengthening of district officials from health, education, transport, police, rural development, municipality, welfare and others is possible and can lead to better planning, implementation and monitoring through intersectoral coordination mechanisms.
- All district training centres can plan and implement human resource development activities as per their needs and at their times with coordination from state. Local medical colleges can provide support through agreed upon frameworks.
- Each medical college can be given the responsibility of providing care and services in 3 primary health centre areas (as per earlier practice subject to overcoming administrative barriers)
- Optimization and sharing of health manpower (through integrated training programmes for health personnel) brings greater benefits and can avoid duplication of activities. With decentralization of activities, personnel can be trained together on health matters and programmes. (eg., health and education , health and welfare, etc.,) programmes, organizational structures and integration,
- The possibility of implementing existing rules and regulations (in health and different sectors) is more feasible, sustainable and economical in the long run at a district level.
- Information systems can be better managed and supervised in a district level to data managed programmes as per local needs while state can provide guidelines, frameworks and directives.
- The district and taluka population can be actively engaged in health matters , also leading to innovative, people – driven and people – centric programmes.
- The burden of various health impacting conditions as shown in Table 5 indicate that district hospital and medical college hospital can serve as referral hospitals for the population with strengthening of facilities and required manpower and most health problems can be effectively managed within a district.
- Linkages with community medicine departments and other health care and allied medical schools can strengthen public health capacity, monitoring and evaluation through an agreed framework.
- Establishing a strong public health surveillance team in a district can address local epidemics, disasters, communicable diseases, NCDs and injuries by further liasoning with state level agencies and academic institutions.
- Converting all sub enters to Health and wellness centres in a district can effectively strengthen number of health promotion and wellness activities to defined populations with integration.
- Some districts can be identified and centres of excellence can be established in medical colleges subject to quality performance.
- Regional specialised care centres in cardiology, nephrology, neurology, cancer care, trauma care can be established and developed for 4 – 5 neighbouring districts.
- Most significantly, implementation, monitoring, surveillance and evaluation become easy to implement at a district level and brings in convergence and coordination of activities.
- Greater CSR funds can be mobilised for programmes and services in a district for general or focussed activities

For example, NIMHANS Bengaluru, developed the District Mental Health Programme in Bellary district Karnataka in 1984 which paved the way for National Mental Health Programme in all 700 districts and state wide DMHP (implemented in all districts) by 2020(33).The District Road safety and injury Prevention programme in Tumkur in 2014 district demonstrated the feasibility of road safety in an Indian district(34).The Yuvaspandana programme of Karnataka for youth mental health promotion by GOk and NIMHANS has got expanded to all 30 districts of the state by 2021(35).

The state has major responsibilities of coordinating and funding all activities based on administrative and regulatory frameworks. To build robust district health programmes, there is need to invest in developing annual action plans, capacity building of programme officers, training all categories of health staff, filling up all required posts, investment in other resources, strengthening implementation channels, building strong surveillance division, ensuring drugs and logistical supplies, advocacy and awareness, developing set of monitoring indicators and mobilising communities for action along with greater autonomy. Implementing interventions, integration, investments and innovations are possible and sustainable in a district

12. Health Human Resource Planning, Development and Strengthening

1. A Health Human Resource Development Policy should be developed for the state-by the state with a focus on structuring - augmenting – rationalizing - distribution and efficient utilization of manpower in different geographical areas, in diverse disciplines, in emerging health priorities by active participation of public and private sectors.
2. Manpower Study of Health Human Resource (HHR) in the State of Karnataka is urgently required to (i) determine the existing workforce of all categories of Health Care Professionals in Government, Public Sector Undertakings (PSUs), Private sector and medical and health universities and (ii) quantify the gap between current requirements and availability of different categories of health professionals and workers by a systematic gap analysis study.
3. Establishment of a quality monitoring and enhancement cell in the state government is an absolute requirement in view of the increasing number of health education institutions, the number of courses started in both medical, dental, nursing, pharmacy, Physiotherapy and allied professional areas, increasing number of admissions, correcting the imbalance in post-graduate and undergraduate courses, avenues for improving quality – standards – accreditation across all existing courses, consideration of the job opportunities and promotional avenues, and others.
4. The State Directorate of Health should be reorganized keeping in view the increasing burden of NCDs and injuries for better implementation of programmes with well-defined roles and responsibilities to create a public health and a clinical cadre based on recommendations of Halagi Committee report and discussions with concerned stake holders.
5. State Institute of Health and Family Welfare and the 4 regional health and family welfare training centres should be supported with manpower and funding along with external technical support from leading state level academic institutions for redefining the scope of on-going training in different domains of public health for better implementation of national health programmes through an annual training plan to develop efficient health managers.
6. Capacity building programmes for all senior and midlevel officials should be undertaken by SIFHW, public health institutions and departments in the state to sensitize and orient them in scientific and evidence based health planning- management- implementation – monitoring and evaluation through short term programmes of 1 to 2 weeks.
7. District wise resource mapping of health care institutions and human resources along with needs assessment should be undertaken to identify vacant positions and projected needs for district health management and measures have to be taken to fill all vacant positions on a year to year basis .
8. Adoption of three primary health care centres by each medical college should be re-examined for its merits for its implementation in the state as it has the advantages training and teaching opportunities along with availability of medical graduates in rural areas.
9. Pilot demonstration project under the leadership of RGUHS should be undertaken urgently in a district (with a good mix of urban and rural population) to demonstrate the feasibility and effectiveness of integrated human resource development based on a real time needs assessment study.
10. Universities to be encouraged to come together with RGUHS to identify future human requirements in upcoming areas (e.g., tele-medicine, geriatric care, specialties in Nursing (Eg. ICU Care), dialysis technicians /nurses, dental chair assistants, etc) to design – implement short term (ranging from 1 – 6 months) courses.

"Health Human Resources" (HHR) is the foundation of health systems and is the backbone of health care delivery. A well performing health workforce is one, where a fully equipped workforce is available, has the right mix, skilled and competent, responsive and productive , capable of responding to all health needs of populations as well as managing dynamic situations(36). Real time assessments and evidence-based approaches should lay the foundations for developing a well-equipped health workforce.

Based on the review of current scenario, recommendations of the public health and health systems subcommittee, report of the Health HR subcommittee on Planning, Development and Strengthening with regard to manpower, education and training of Medical, Dental, Nursing, Pharmacy, Physiotherapy and allied profession, micro study of human resource availability in Kolar District, observations made with regard to human resources made by all subcommittees, it is observed that there is a major gap in defining health work force requirements , quality output in both health and medical education sectors and to develop the required manpower ; both in quantity and quality.

Human resources in health are of a wide variety in nature, ranging from administrators to gross root level workers: all need to be skilled, competent and committed in their respective tasks. Broadly, they can be categorized under the headings of (i) administrators - policy makers and decision makers, (ii) Public health workforce for delivery of health services, (iii) medical categories and specialists to provide clinical services (iv) medical and allied education and (vi) well informed and empowered institutions. Interestingly, recent years have witnessed growth and development of specialty clinical services, while many others have lagged behind. The current state workforce is of a diverse nature in both public and private sectors.

Capacity strengthening of Policy makers/Decision makers

Capacity building involves ensuring that a combination of staff and support systems along with required tools and skills are available and functional and building the capacity of policy makers/ programme managers/ administrators/ grass root level healthcare workers and communities in their required areas is a critical requirement for an effective and robust health system. Institutional capacity building requires a wide variety of roles to be performed by institutions to catalyse different stakeholders, building technical support, establishing think tanks, developing observatories, strengthening managerial capacity, harmonizing policies and linking activities to different action areas, both within and outside the health sector. In Karnataka, very few programmes are undertaken for senior health managers and decision makers in public health areas and are usually Master Trainer programmes. This vacuum needs to be bridged by engaging with national and state institutions in the state.

Public Health Human Resources

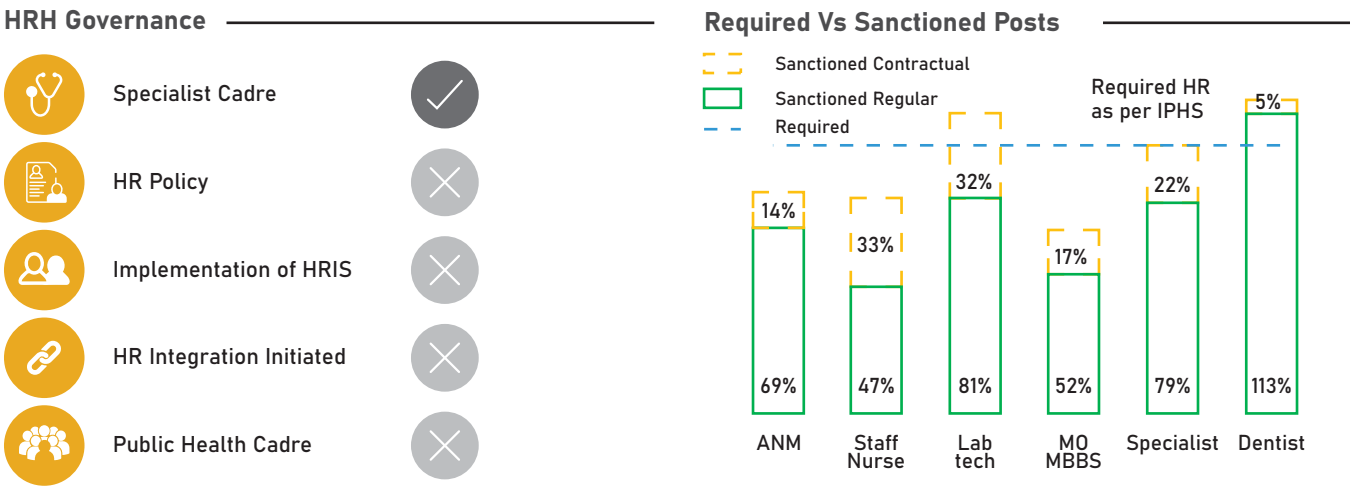
The state does not have - a clearly defined HHR policy covering public health, clinical care and medical and allied education; coordinating units and mechanisms that can direct HR policy and programmes; balanced distribution of manpower development process in public and private sector; a dedicated public health cadre; capacity strengthening programmes for decision makers and policy makers; integrated and shared approaches due to verticalisation of programmes; specified matrix in availability of specific and specialised manpower across districts; equal deployment of staff ; short term integrated public health programmes in health and medical education sectors, and most importantly, any well-defined monitoring and evaluation activities. This scenario is unlikely to change, if proper and scientific mechanisms are not put in place on a war footing and actions are not initiated by the state department.

Deficiencies as well as maldistribution of human resource personnel in public health services and medical education sectors are glaring and visible(36, 37). Notable to mention is the deficiency among peripheral health workers, general doctors, specialists in district and taluka hospitals and support staff in laboratories and radiology centres. In addition to generating the required human resources, retaining different categories of workers in healthcare institutions essentially requires building a strong motivation to work, dedication, commitment to patient care, ethics, ensuring adequate service standards, financial parity, in-service training programs as well as promotional and career opportunities overtime ; all these have been contentious and unresolved problems even today.

In the report entitled " Human resources for Health in District Public Health Systems of India: state wise Report 2020" (data with reference to 2019 as per IPHS guidelines) by the National Health Service Resource Centre of the MOH, GOI, it is observed that - a strong human resource policy and the implementation of a human resource information system for estimating the availability of a dedicated public health cadre to manage public health programs is lacking in the state (Figure 10); in comparison of required versus sanctioned posts, a deficit of 14% for ANMs, 33% for staff nurses, 32% for lab technicians, 17% for medical offices at MBBS level, 22% for specialists and 5% for dentists has been reported. The overall vacancy including the regular and the contractual posts was lower with deficiency in the availability of specialists at 38%, ANMs at 30%, nurses at 11%, medical officers of MBBS at 10%, laboratory technicians at 13% and dentists at 22%.The situation in urban health care facilities is no different as huge deficiencies exist in all categories . However, this situation has changed in recent times due to COVID – 19 pandemic with appointment and filling up of certain specified posts in district level and also in urban areas .

- Introspection on HR situation in Karnataka with data available from DoHFW, GoK during end of June 2021 informs the deficiencies in the health sector (annexure 4). In the State of Karnataka, there are 40,744 ASHA workers, 3214 health workers male, 6543 health workers female, 156 programme officers, 6838 nurses, 1886 pharmacists, 1840 lab technicians,228 physicians, 237 surgeons, 477 OBG specialists, 375 paediatricians, 289 dentists, 462 radiologists, 1127 other specialists, working in the public sector(11, 38). Crucial to note that wide disparities exist in their distribution and availability across and within districts as well as deficiencies in availability of these personnel in each of the districts and Talukas.
- The State Institute of Health and Family Welfare, four regional health and family welfare training centers, district training institutions (19/30) and a dedicated Karnataka state health research and training center undertake a wide range of training programmes for different categories of health personnel at state and district levels for varying durations, in both general and specific areas under various health programmes. Many medical colleges, centers of excellence, apex tertiary institutions, NGOs conduct – facilitate –participate in a wide variety of general and specific HR development programmes.
- The committee for reorganization of health services in Karnataka, popularly known as Halagi Committee report strongly recommended the creation of public health cadre and clinical cadre along with internal reorganization measures as well as clear guidelines for proper staffing as per needs(39).The findings of the committee are under the consideration of state government for 7 years.

Figure 10 : Health Human Resource scenario in Karnataka



Management Training for Health professionals : Need for multipronged approaches

It has been strongly recognized at all levels by senior administrators and the experts that there is a need to design and develop a mechanism for enhancing leadership and managerial skills of Public Health Personnel. This will definitely contribute to working towards reaching goals of SDG 3. Focus needs to be on Planning, Budgeting, Programme delivery, Monitoring, Evaluation, Information management and utilization, Inter agency and interpersonal communication, reaching out to communities, Risk communication during Pandemic and disaster situations and other topics covered in the public health and health systems section of this report. This is required to create a strong health workforce in the state and at district levels. This needs to be enhanced in the existing system by following five approaches:

Approach I: The team of senior Programme Officers at state level, Management Experts from IIM-Bangalore, Public health experts and State Institute of Health and Family Welfare should join hands and develop short capsules of:

- Fifteen day Induction Training of DH and FW officers and District Surgeons, District Programme Officers before being posted or at the time of their posting as DH and FW Officers/District Surgeons.
- Fifteen day Induction training for Taluka Health Officers.
- Two -month induction training of Medical Officers of PHCs, Senior Pharmacists, Senior Nursing Staff, Nutrition Officers.

The current training curricula should be reviewed by a team of public health professionals and mechanisms designed and developed, implemented and monitored within the State at SIHFW/IIM-Bangalore/BMCRI/ Divisional HQ at Mysore, Belgaum, Gulbarga/ other locations deemed fit.

Approach II: The Health management training curricula of all Health Profession Institutions to be revisited, strengthened in Health Professional Education –MPH, Medical, Dental, Nursing, Pharmacy, Allied Health Profession, and other courses to bring a public health focus.

Approach III: Management and Health Communication Training of Community leaders, Arogya Raksha Samithis, Zillah, Taluk and Panchayat Samithis should be strengthened with core principles through short orientation courses.

Approach IV: Civil Surgeons, Deputy Civil Surgeons, Medical Superintendents of Taluk, Sub Divisional Hospitals, District Hospitals, Municipal Hospitals of Urban areas , Medical Officers of PHCs should be encouraged to (and sponsored) enroll for distance learning Programmes offered by various agencies like PGDHHM (Post Graduate Diploma in Health and Hospital Management), Geriatric Care, MCH (RCH), Certificate Course in Health Care Waste Management Offered by Institutions like IGNOU, Diploma in Health and Family Welfare Offered by Institute of Health and Family Welfare GoI, Diabetes care by PHFI and other short term programmes. There are several institutions across the country that offers Health management and leadership courses.

Approach V: Efforts should be made to encourage Medical Officers to pursue MPH courses or other short-term focused courses (in select areas) offered by RGUHS, NIMHANS, other Institutions and Universities before they are posted as Taluk Health Officers, District Programme Officers, District Health and Family Welfare Officers in a phased manner.

The SIHFW and District Training Institutes (19) should be strengthened and involved more in delivering training - collaborating with RGUHS - Deemed Universities and Health Professional Institutions across the State.

Similar approaches should be examined for health care disciplines and specialties to provide opportunities for skill and competency building in district and taluka levels. This could be considered in need based areas considering all other factors of availability and need. For example, doctors and nurses can be provided training opportunities in specialized areas of cardiac, neuro, trauma and other vital areas.

A committee should be set up to study these programmes, develop state specific programmes, implement in a time bound manner and monitor the same in a scientific manner for its impact and outcomes.

Highlights of the Halagi Commission report

The Halagi Commission was constituted by the Government of Karnataka in 2011 to recommend measures for reorganisation of the Department of Health and family welfare to strengthen healthcare delivery system in the state. The committee reviewed several previous recommendations made by different committees from 2004 onwards, reviewed existing legislation, rules and acts, held large number of brainstorming discussions with different officers in the Karnataka health cadre and examined the existing structure of the Department at district, taluka, community health centres, primary health centres and others. The need for reorganisation of the Department was felt to improve the quality of the delivery of healthcare services, amidst increasing workload of the staff of the health and family welfare Department, role of institutions that were created in the past, the nature of the emerging burden of noncommunicable diseases and injuries, increasing number of programs and demands on the health systems, the motivation and commitment level of the staff different levels and the need for better delivery of services. The following recommendations were put forth by the committee in different areas for implementation.

1. The establishment of a Public Health Directorate is highly required to provide coordination, service integration, monitoring, evaluation, data integration and technical supervision. Towards this, the committee recommended that a position of Director General of Public Health be created for coordination and to provide leadership for efficient public health delivery system to ensure goals set under all different national health plans are met.
2. A technical core group should be formed at the Commissionerate to act as a think tank consisting of different members drawn from diverse disciplines to guide state health policy matters.
3. The state health services should have defined public health and medical care cadres to look after public health and clinical services at different levels.
4. Divisional level officer's to oversee functioning of the districts by creation of a district divisional level officer of Additional Director grade with specific responsibilities and for coordination. In this direction, 4 regional Additional Directors in the districts of Gulbarga, Belgaum, Mysore and Bangalore are to be created without incurring additional expenditure with specified roles and responsibilities.
5. Director of Medical services should be appointed to oversee functioning of District Surgeon's, taluka hospitals and CHCs and to look after the different programmatic units of the Department at state and district levels.
6. Development of a mandatory up gradation of the seniority list in both public health and medical cadres in the state including GDMOs, specialists/senior medical officers, senior specialists/Deputy Chief medical officers and other categories, and publication of this mandatory upgradation list on the department website on an annual basis. A government order to this effect to be issued every year in the month of February with regard to the same.
7. The committee recommended putting in measures for promotion which should be in accordance with the feeder cadre and merit and as per norms for all specified posts. Promotions to be strictly based on required qualifications and experience and not just on seniority.
8. Three levels in the public health cadre at taluka, district and state-level to be created in the state. The entry-level for a public health cadre should be at the level of the taluka health officer and over time, people could be provided opportunity to move up the ladder.
9. In order to bridge the shortfall of qualified public health professionals, it was recommended that the government should conduct counselling in state health services with immediate effect to identify medical officers interested in pursuing public health cadre as well as to a public health qualification.
10. Training opportunities for all professionals working as Deputy Directors, Joint Directors and programme officers from established public health institutions either at national or state-level should be provided.
11. Reorganisation of the State Institute of Health and Family Welfare to be undertaken to develop this as an apex Centre for excellence for training all officials under health and family welfare services.
12. The committee also recommended examination of the functioning of the Health and Family Welfare training centres in Mysore, Bangalore, Gulbarga and Hubli with additional roles and responsibilities.
13. Urgent reforms to be undertaken at the state drug logistics society with the appointment of a Regional Additional Director to oversee all aspects of drug procurement, supply, distribution and logistics.
14. The committee also recommended restructuring of several existing schemes of the Department like plague control unit, leprosy control unit, malaria control unit, TB hospitals, KFD and others.
15. Greater financial allocation and independence to be given to district and taluka levels for speedy implementation of programmes.

Box 1: Micro-study of human resources in kolar district

A Micro-study was undertaken in Kolara district to map infrastructure and human resources during April – May 2021. Data collected from the district administrations revealed that – (i) there was a higher concentration of facilities in Kolar, Mulbagalu and Srinivasapura Talukas as compared to other talukas, (ii) density of allopathic doctors and nurses per lakh population in Kolar district was 37.6 and 53.8, (iii) the number of Sub Centers (less by 15%), Community Health Centers (less by 88%) and Village Health Sanitation and Nutrition Committee (less by 18%) in the district (suggestions from UHC, NHM and NHP 2018)(table 1) were less as per recommended norms, (iv) requirements with regard to ASHA workers, Anganwadi workers, village rehabilitation workers and multipurpose rehabilitation workers were adequate (v) deficiencies in general and specialist manpower in public sector with greater availability of all categories of medical manpower in the private sector (265 vs 666),(vi) services of specialized manpower from private sector is not easily available for services in public hospitals, even at times like COVID – 19 pandemic, (vii) lesser numbers of nursing officers, pharmacists, laboratory technicians and female health assistants (viii) specialist category manpower (specific to specialists manpower) for trauma care was higher in private facilities, including availability of visiting specialists from Bangalore, (ix) only 41% of the total doctor and 14% of the total nurses in emergency rooms were trained in trauma life support, and (x) all the above indicating poor planning of facilities and resources in the district. The deficiencies in specialist manpower services in public sector results in patients seeking care in private facilities despite the presence of several good programmes and services in the district.

This scenario is likely to be different in different districts of Karnataka. Only a systematic assessment will enable us to develop required manpower in different categories for public health services and clinical care services and calls for an assessment in all the districts based on work load to rationalize facilities and human resources. A complete resource mapping of facilities and human resources in a district will help in organizing health care and referral services in the district. Furthermore, such a mapping will help the district administration to organise human resources at times of epidemics, pandemics and disaster situations.

Medical, Dental, Nursing, Pharmacy and allied professional education

The subcommittee chaired by Dr. S. Sacchidanand, Former Vice Chancellor, Rajiv Gandhi University of Health Sciences (RGUHS), Bangalore, examined and reviewed the current manpower development scenario along with quality standards in medical, dental, nursing, pharmacy, physiotherapy and allied health sciences in Karnataka.

Box 2: Excerpts from National Education Policy (2020)

.....Healthcare education shall be re-envisioned such that the duration, structure, and design of the educational programmes are as required for the roles that graduates will play. For example, every healthcare process/intervention (e.g., taking/reading an ECG) does not necessarily need a fully qualified doctor. All MBBS graduates must possess (a) Medical skills, (b) Diagnostic skills, (c) Surgical skills, and (d) Emergency skills. Students will be assessed at regular intervals on well-defined parameters primarily for the skills required for working in primary care and in secondary hospitals. Quality of nursing education will be improved; a national accreditation body for nursing and other sub-streams will be created. Given that our people exercise pluralistic choices in healthcare, our healthcare education system must be integrative: this would mean, illustratively, that all students of allopathic medical education must have a basic understanding of Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy (AYUSH), and vice versa. There shall also be a much greater emphasis on preventive healthcare and community medicine in all of healthcare education(19)

- Despite the growth of educational institutions in the state, (i) the number and type of health and allied professionals required and available on an annual basis for the state of Karnataka is not clearly known and, (ii) manpower requirements for health sector in urban and rural areas, public and private establishments, primary and tertiary care, established and emerging health priorities and for implementation of number of national health programmes has not been undertaken (filling up of posts is based on programme requirements) ; primarily due to lack of research and policy directives in the state. In recent times, an acute paucity of trained medical teachers in pre and para clinical departments of medical colleges has been experienced affecting quality of teaching and training.

RGUHS in Bangalore, established in 1986, is affiliated to nearly 168 institutions from medical, dental, nursing, pharmacy, physiotherapy, Ayush and other courses (www. https://www.rguhs.ac.in). Total number of students admitted to UG & PG courses in different institutions affiliated to RGUHS during academic year 2019-20 was 56,048 (Admission data). In addition, the state has 9 Deemed to be Universities, 2 private universities and 2 institutions of National importance (NIMHANS, AIISH, Mysore).

Table 6: Increase in number of seats in 2014 and 2020 with respect to Medical courses

	2014	2020	%
Medical colleges	381	539	Increase by 45%
UG seats	54,348	80,312	Increase by 48%
PG seats	23,903	54,094	Increase by 79%
DNB / FNB	4845	8394	Increase by 73%

- Based on policy initiatives of central and state government, India has witnessed an increase in medical colleges by 45 % during 2014 – 20 with a corresponding increase in student intake in both undergraduate and post graduate courses (Table 7). With introduction of DNB courses, the uptake has increased from 4845 in 2014 to 8394 by 2020 , registering an increase by 75 % to fill the gap of specialists in health care. (Table 6 and Table 14 of the detailed report of Health HR subcommittee on Planning, Development and Strengthening).

Table 7: Number of Institutions in Government & Private sector conducting UG (undergraduate) Courses during 2019-20

Faculty	Total number of institutions affiliated to RGUHS	Govt Institutions	Pvt Institutions	Institutions under Deemed to be Universities	Institutions under Pvt Universities	Institutions under NIMHANS	Paramedical Board, GoK (Diploma courses)	Total
Medical	56	19	37	8				64
Dental	37	2	35	7	1			45
Nursing	429	15	414	7		1	765(18)*	437+765 =1202
Physiotherapy	80	2	78	7	1			88
Pharmacy	88	1	87	6	1			95
Allied Health Sciences	124	13	111	7	1		565(34)@	132+565 =702

* Diploma courses; @ Certificate courses; Numbers in Parenthesis indicate Government institutions.

Table 8: Number of Institutions Government & Private conducting Postgraduate Courses Faculty-wise during 2019-20

Faculty	Total number of institutions affiliated to RGUHS	Govt Institutions	Pvt Institutions	Constituent Institutions of Deemed Universities (Pvt)	Constituent Institutions of Pvt Universities (Pvt)	Constituent Institutions of NIMHANS	Total
Medical	46	18	28	7		1	54
Dental	36	1	35	7	1		44
Nursing	196	6	190	7		1	204
Physiotherapy	31	0	31	7	1		39
Pharmacy	56	1	55	6	1		63
Allied Health Sciences	26	1	25	1			27
Fellowship Courses	124	48	76	35	3	2	164

(Data source : Data Collection by structured format through email March/April 2021 by the Subcommittee from RGUHS, Deemed to be Universities, Private Universities, NIMHANS)

In total, the state of Karnataka has nearly 700 institutions that generate human resources in undergraduate medical courses covering medical, dental, nursing, physiotherapy, pharmacy and Allied health sciences from a wide variety of institutions. Similarly, there are 164 institutions covering these diverse areas offering postgraduate medical courses. In 2019 – 20, 49112 undergraduate and 6936 post graduate students passed out from RGUHS, apart from 6936 students in other institutions.

- DNB courses were started in Government district and general hospitals of the state in 2016-17 to bridge the gap in specialist positions by providing opportunities in public and private sectors and make them available under bond Scheme. Totally 7 specialties are accredited with 19 hospitals for DNB courses with 8 accredited in the 12 district along with 2 general hospitals at KC General Hospital - Jayanagar General Hosptial in Banagalore. It is gratifying to note that 5 taluka hospitals in Holenarasipura, Doddaballapura, Sira, Basavakalyana, Gangavathi have also started the course. Number of seats accredited as on 2020-21 are 108 (Primary 63 and Secondary 45) spread over 34 courses with an annual intake of 158 candidates(Primary 121 and Secondary 37) (for three years) with a pass rate of 8/12 (66%)in year 2020. Number of courses in various stages of accreditation is 15 as on 2021.
- In addition, some medical colleges and tertiary care centres also provide super speciality training (DM courses) in specialised areas like cardiology, neurology, emergency medicine, child mental health, Geriatric mental health and others. Total number of super specialists graduating from within the state may be smaller numbers and not be a real reflection of actual available numbers.
- There are nearly 7000 Aush practitioners of varying types AYUSH doctors graduating from 100 + colleges every year. In recent times Ayush doctors are also employed in Government healthcare facilities to provide preventive promotive healthcare services.
- A number of healthcare institutions belonging to both Central and State governments as well as medical colleges offer in-service training programs to wide variety of professionals in specialised areas (eg., NIMHANS in mental health, AIISH in speech language disorders, NTI in Tuberculosis and others).
- Many professional bodies also conduct manpower development programmes and in-service training programmes in the state (eg., society of hospital administrators)
- A paramedical board established by the government also offers Diploma in Nursing course in 765 institutions(18 government) and certificate courses in 565 (34)courses across the state.

Challenges in the Current Scenario

- Overtime, several questions have risen with regard to the quality of medical education in terms of the graduate's preparedness to deliver primary and secondary care services in rural and community settings. Many concerns with regard to teaching methods, curriculum, availability of qualified medical teachers, quality improvement have been expressed by several committees and in anecdotal media reports.
- Karnataka has highest number of medical colleges in the country (60 in 31 districts) at the rate of two colleges per district with an annual output of 49112 from RGUHS affiliated Government and Private Medical Colleges every year. Based on the analysis made by the subcommittee towards the availability of graduating students for services in Karnataka based on a few assumptions, it is estimated that 750 to 1000 MBBS doctors and 1-2000 nursing graduates are available every year in the state (after excluding all those mentioned above). Similar calculations for other categories are required to understand availability of manpower in different areas.
- Physiotherapy (nearly 90 colleges), nursing (700 schools), pharmacy and dental colleges (36) and courses need strengthening in several years. The timing of starting these courses, course contents, quality of teaching, accreditation of these colleges and regulatory mechanisms of these institutions need a closer examination and setting standards. Recently the National Commission for Allied and Healthcare Professions Act has been passed in the Parliament in March 2021(41) and further measures are awaited towards implementation,
- In addition, there is also a greater need to developing need based human resources in emerging areas of NCD care, elderly care, chronic care, disaster and pandemic management, disabilities, health informatics and other areas along with creating job opportunities. A felt need has been expressed by many health care providers and technology specialists to employ a variety of trained and skilled categories of health personnel like - nursing aides, data information personnel, instrumentation usage technicians, NCD counselors, geriatric care givers, psychologists, telemedicine technicians, technical people in radiology – anaesthesia - cardiology - critical care - dialysis operations and other areas, rehabilitation personnel, dental assistants, personnel for disaster management, pandemic management, disabilities and other areas in both urban and rural areas to support health care in hospitals and community as well as to strengthen technology applications on a regular basis.
- Especially during COVID -1 9 times, telemedicine and tele teaching have come to the forefront with a mix of formal and informal programmes and found useful. National Digital Academy of NIMHANS offers a variety of Diploma and Certificate courses in the field of mental health as per approved standards. There is need to bring strict regulations into such courses to maintain quality of education as similar programmes are being started in other centers and in other disciplines.

State Initiated Responses

Acknowledging the paucity of health human resources in the state, successive governments have initiated several proactive measures in collaboration with number of state agencies, academic institutions, internal and external agencies Major changes have been implemented with regard to recruitment, distribution, promotions, salary structures, special allowances, transfer policy, on the job training, capacity building, introduction Health Resource Management Information System (HRMIS) and several others. The Karnataka Private Medical Establishment Act(42) came into effect along with mandatory registration and monitoring of private medical establishments to share relevant information on manpower infrastructure in the private sector.

Two recent developments are worth highlighting at this stage and requires further follow-up over time to see its impact on public health system in the state.

- Firstly, in view of HR deficiencies observed during COVID 19 times, the state DHFW has appointed 1700 doctors, including specialists into state services (it is learnt that these are permanent positions) along with large number of nurses, technicians, and others (nearing 4000 in number) in 2021.
- Secondly, it is learnt from reliable sources that the state department is in the final stages of reorganizing the DoHFW with the introduction of "Public health cadre and clinical cadre" in health systems along with associated and additional changes in recruitment, promotions, cadre strengthening, roles and responsibilities at state and district levels; indeed, a long-felt need.

As per the world Development Report of 1993 entitled "Investment in Health", good health increases the economic productivity of individuals and the economic growth of country; undoubtedly, good health is a goal in itself (43). For this to be achieved, it is important that an investment in health systems and health resources, especially health human resources is one of the fundamental requirements. Human resources should be adequate, efficient, and capable of delivering quality services.

Box 3: Emerging role of Health Learning Universities in the New Decade

Traditionally and for too long, health universities and medical colleges have played a major role in bringing out hundreds of students in different disciplines; all get a degree and a certificate that helps them in procuring a job or starting on their own – for some, in the country, and for others outside. Medical and allied science students during their course are taught by faculty in a subject, equipping them with knowledge and some skills. In recent years, a lot of concern has been raised on their preparedness to be health managers for populations they are intended to serve. Many educationists and policy directives like National Health Policy, National Education Policy 2020, Universal Health Coverage and others emphasize the need for a new breed of health and allied sector graduates to be health managers to meet the emerging needs of the state and country. In this new and emerging scenario, it is crucial to introspect and build a new vision for health learning universities and institutions.

- Fundamentally, students – teachers – administrators – policy makers need to communicate, coordinate and converge in their goals and skill building process that are essential in education along with life skills, empathy and value systems.
- Developing a new breed of leaders, champions and mangers for health care who understand broader public health principles and practices, and health care needs should be an essential goal of health universities
- There is need for proactive role by Health Professional Institutions and Public Health System to work together towards generating human resources for comprehensive health care of the communities. Preparing and equipping students for this, requires a new way of teaching and training.
- Health Professional Universities and Institutions need to expand their vision towards orienting students on UHC, National Health Policy, Primary Health Care, National Health Programmes, Disaster preparedness, mitigation, disability rehabilitation and other contemporary topics.
- Opportunities should be created for students to work in talukas, district hospitals and in villages and slums and communities during student days to learn about culture, life styles, health issues and concerns and other aspects to develop empathy, values and equity issues.
- Apart from teaching by dedicated faculty, Officers in Public Health – public health experts – community leaders – health entrepreneurs should be engaged for orientation and knowledge sharing about existing and emerging health scenarios as part of regular teaching.
- Preparing students to volunteer during emergencies and bring a sense of volunteerism in all areas of health acre regularly, and not just during disasters/ Pandemics/Emergencies.
- Adoption of Villages, urban wards by institutions / Public Health system for teaching and training students and faculty is possible in several areas (eg., RCH, Immunization, Health and Wellness Centre activities, Investigation, mitigation of outbreaks, trauma care and emergencies and others) and can be examined.
- Working in talukas and district hospitals during student days will be a good opportunity for students to learn about culture, life styles, health issues and concerns and other aspects and opportunities to be created by universities.
- The need for interdisciplinary research is greater today and collaborative research between diverse areas (health and technology, health and urbanization, health determinants, etc.,) should be promoted by universities.

Health Professional Institutions and Health Professional Universities have the opportunities to demonstrate leadership in strengthening/developing/evolving medical and allied education to develop health managers and this opportunity should not be missed.

13. Health Information Systems

Accelerating e-Hospital on cloud in all public health facilities (ii) Developing an integrated dashboard of all programs at the state, district and sub-district levels ,(iii) Short term orientation program for data analytics for program managers, (iv) Formulating and piloting a district integrated Health Information System and (v) Establishing a State level Task group to envision the federated architecture for HIS in Karnataka are some measures to be implemented in the state.

The National Health Policy, 2017, underscores the importance of a robust Health Information System (HIS)(18), to record information on disease / health events and also about the quality of services rendered. Data generated needs to be of good quality, relevant and timely. With a focus on Universal Health Coverage, HMIS should aim to reduce inequity and the catastrophic costs for health care. With digitisation of data and computerisation of health events on the 'mobiles and smart phones', patient care, surveillance, monitoring, evaluation and research have got increasingly integrated; also disjointed in some areas. A big ounce of caution is that 'big data' and 'digitalization' does not automatically mean better patient care3 or improvement in health systems. ", far too often, health decision-makers at all levels lack tools and approaches to act on existing health data (44)".

A. Current systems in public health

The Demography and Evaluation cell created in the DoHFW is the entrusted entity responsible for HMIS in Karnataka. The NRHM-HMIS (Health Management Information System)(45) web portal launched on 21st October 2008 is envisaged as a "Single Window" Government to Government (G2G) web-based Management Information System to monitor the NHM and other Health programmes of the MoHFW, GoI. The physical progress of health programmes in general, and RCH programmes in particular, are captured from around 12,593 health institutions on the HMIS web portal. Based on the infrastructure availability and services being provided, the performance of health facilities is graded. It is acknowledged that private sector participation is minimal(46) : several challenges have been identified for its involvement.

In addition to HMIS several programs have their own information systems, which are stand alone for individual programs (NIKSHAY for TB; IDSP for Communicable Diseases, etc.,108 call centre, 104 call centre; the NPCDCS program application quite a complex one supports data entry on tablets and mobile phones across different levels of health care). In addition, repeat surveys to identify / update beneficiaries are done under 12 different programs/ schemes: CNAA, ICDS, RCH, NVBDCP, NPPCF, NCD, RNTCP, NLEP, NMHP, NPPCD, NIDDCP, NFHS, etc.,

Not surprisingly, recognising the duplication of data collection in the government sector by the departments of Health and Women and Child Welfare (WCD), and challenges in reconciling the two datasets, Government of Karnataka initiated e-sameekse, (Comprehensive Family Health Survey) a combined data collection endeavour by the two departments of Health and Child welfare. HMIS data is widely used by States in preparing Program Implementation Plans (PIPs) under NHM. Indicators from HMIS (like Institutional Deliveries, C - Section deliveries, Immunization, IPD, OPD, Surgeries, etc.) are used to evaluate the performance of the individual states during National Programme Coordination Committee (NPCC) meetings. With increased funding, introduction of new programmes and strategies, the PIP process has been made online with effect from 2020-21. HMIS data is also used to prepare the state Annual report of the health department. The general and schema flow of information is from subcentre upwards. Beginning 2019-20, NIC HMIS has shifted focus from monthly summary to daily summary data entry from individual PHCs and other health facilities.

B. Challenges in the current system

Health data generation challenges are observed at all levels and all interfaces of data collection. Two generic challenges are: (i) Computerisation v/s Digitisation (ii) complexities and difficulties in health system analysis.

The process of computerisation in several instances, like scanning and uploading filled up formats make digitisation of data untenable. Secondly, inadequate training in health information sciences and health staff who did not comprehend the need for structured data flow, result in Computerised HMIS being unwieldy and unfriendly for use.

Hesitancy in use of electronic devices for data entry, inadequate training, incorrect or missing entries, problems related to device and its maintenance (poor battery life, low specifications, no repair or replacements, poor after sales service, etc.,), nature of the population, demographics and characteristics (migrants, homeless persons, perceived stigma, vulnerability), huge turnover, acute shortage and vacancies of staff, etc., are key challenges for ensuring good quality data. Recently, non-payment of incentives has resulted in failing to capture even the basic data needed under some programs. The design of the software and

applications often for administrative and legal reasons do not permit data comparison and thus the problems of irreconcilable data continue to plague the system. A key issue of concern, especially at the sub-district levels is the weak monitoring and scrutiny of data, whilst data is progressively transmitted upwards without review or interpretation at local levels / contexts. Duplication of data collection often leads to different set of results, pointing towards the felt-need for developing and maintaining a federated system of structured health databases. Stand-alone and adhoc data collection "programs", silo and incompatible databases are making the available information redundant. Another dimension to this issue is the small to large scale pilot projects which do not sustain beyond the period of MoU posing difficulties to evolve systems. Additionally legacy softwares and non-standard database outputs pose challenges for inter-operability and or porting. Thus, the need for a vision and mission at the state level for better utilisation of data and information has been realised and efforts needs to be accelerated to kick-start this initiative.

C. Developments in the state

Proof of concepts which laid the ground for computerised HMIS in the state include:

1) Primary Health Centre (PHC) Management Information System (MIS): During 2017-18, at primary level, Karnataka state initiated the Primary Health Centre (PHC) Management Information System (MIS), using digital tablets in select PHCs across the state. This was helpful in centrally consolidating information such as patient treatment, delivery details, disease report and drug availability along with GPS information. Despite it duplicating the NHM-HMIS, this proved as a good starter for setting the agenda for computerised HMIS on a daily basis. Currently it is not operational.

2) Integrated Dashboard: The Single Integrated Dash Board using the GPMS Transportal for Universal Healthcare of Indian CST facilitated real time data capture at source and aggregation at institutional, District and State levels of all existing 21 software applications for Policy interventions based on data.

3) The e-Hospital@NIC application is the Hospital Management Information System (HMIS) for internal workflows and processes of hospitals as a one-stop solution to connect patients, hospitals and doctors on a single digital platform. The e-Hospital application is being offered as an as-is product to the government hospitals across the country through SaaS (Software as a service) model and eHospital on cloud is operational in nearly 201 institutions (District and sub-district hospitals) across Karnataka.

4) The District Mental Health Program under Innovation of NHM has developed a data visualisation for the Mental health program review and dashboard in collaboration with NIMHANS and IIITB. The dashboards are available at every level of data entry and help to review progress made and take corrective actions.

5) The Bruhat Bengaluru Mahanagara Palike has undertaken several initiatives which include:

a. Public Health Information and Epidemiological Cell collecting health related data of both Communicable and Non-communicable diseases prevailing in Bangalore city limits, from both Government and Private sector health institutions, on-line through web-enabled, pre-designed & pre-tested formats and issues health alerts to local health authorities for remedial actions and interventions ; endemic/epidemic disease prone areas and vulnerable population can be easily identified and mapped out within Bangalore city.

b. Vulnerability Assessment software "Namma Samudaya-BBMP" in slums and Housing and Residential Associations

c. Comprehensive Community Based Assessment Checklist (CBAC) Format for NCDs

Building on the experience of establishing the Digital Nerve Centre (DiNC) within the District of Kolar with support from Tata Trusts, a similar effort has been made in the district of Tumkur. The patient care co-ordinator (addon human resource) in each facility liaisons and enables the patient access to information about services and facilities. The multi-pronged approach termed as "primary health care transformation", includes call-centre services (for appointment, followup reminders, etc.,) and tele-consultations (referral, etc.,) which gets integrated with the existing public health facilities across the district (Report by IIIT-Dharwad)

D. Building capacity for data analytics and utilisation

Poor quality data often restrains any further analysis and if data is subjected to newer data visualisation and analytical techniques it could give better results as witnessed in the mental health program.

Formal sensitisation of program managers at district level in techniques of program review and management, Involvement of medical colleges for third party audit along with structured short term courses in Information sciences would enhance good quality data

E. Creating the nucleus for HIS

The future HIS in Karnataka needs to develop architecture for real-time and event-related data entry, cutting across different facilities and makes health information patient-centric rather than program-centric. Adequate and appropriate budgetary allocation (factoring technology obsolescence) should lead on to build a strong IT team within the Health Department. That the Vision 2035 for Public Health Surveillance in India has been articulated is indeed a welcome opportunity(46).Five themes for way forward are – (i) Uncluttering chaos, (ii) Life cycle strategy for case management , (iii) 360degree clinical decision support, (iv)Village to Vidhana Soudha, and (v) Evidence Based Medicine and Evidence Based Public Health. The urgent need is to dedicate a team at the District level: Integrated District Program Management Unit and develop and integrated program dashboard. Several related posts have been approved under the RoP for Karnataka for 2021-22 which need to be brought under a single umbrella at the district level for integrated outcome.

14. Public Health Surveillance

- A robust state-level institutional mechanism for timely dissemination of information to key stakeholders should be established in DoHFW.
- The scope of surveillance should extend beyond communicable diseases to include noncommunicable diseases and injuries in the next 2 to 3 years with state and district level integration.
- Building a skilled and trained health workforce dedicated to surveillance activities should be undertaken through capacity building exercises with each district team having a team of surveillance managers.
- Norms and standards for uniform and regular monitoring needs to be clearly established along with generating performance indicators to measure the quality of surveillance.
- Public health surveillance should be strengthened at the district level through citizen centric and community-based surveillance activities.

Nothing can be done in public health without surveillance: that is where public health begins. Surveillance is an important tool in public health that helps in systematically defining public health problems, collect and compile data report on the problem and its associated factors , analyse and interpret these data to provide solutions and provide this information to policymakers/ decision-makers to take appropriate actions and monitor the usefulness and quality of surveillance to improve it for future use (Figure 11). In essence, surveillance is collecting small quantities of good quality data for action and moves beyond routine field visits, reporting and monitoring. Most significantly, surveillance empowers decision-makers and key stakeholders to lead and manage problems more effectively based on evidence.

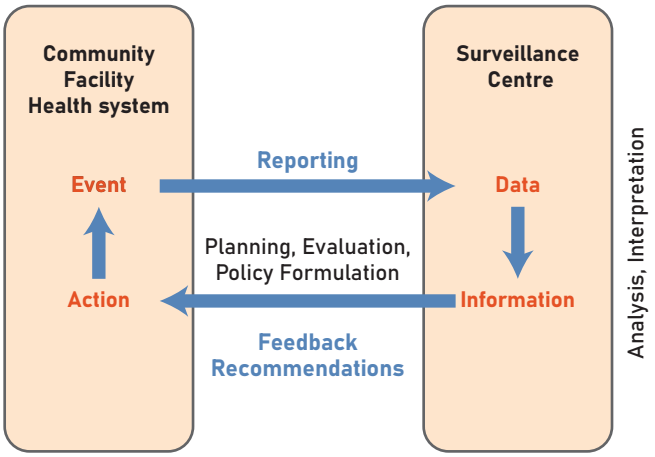


Figure 11: Public Health Surveillance

Integrated Disease Surveillance Programme (IDSP) with a focus on communicable diseases is operational in Karnataka since 2005 (47).It's a decentralised program for initiating effective public health action at district and state levels. The programme has been strengthened overtime with more than 90% of districts collecting weekly data and analysis at district and state-level. Surveillance program is adequately supported through a strong laboratory network at districts and in medical colleges to confirm disease outbreaks with data captured from the village level for 33 disease conditions.

"The greatest medicine of all is to teach people how not to need it"

- Hippocrates

The scope of surveillance in Karnataka needs to be expanded to cover more diseases of public health importance like NCDs and risk factors, road traffic injuries, suicide attempts and several others. Initial demonstration projects have shown the feasibility and possibility of establishing surveillance in these areas in select districts of Karnataka.

Despite the progress made, IDSP has major limitations with regard to data quality, timeliness and sensitivity due to system level factors resulting in no action or limited action. Digital technology, though used to some extent has scope for further applications.

Box 4: Epidemiology …. The science behind policies and programmes

The most significant public health achievements of the 20th century are built on epidemiology. Epidemiology (the science of public health) provided the foundational knowledge to measure the disease burden and changes in outcomes over time. Epidemiology identifies the distribution of diseases, factors underlying their source and cause, and methods for their control; this requires an understanding of complex interaction of political, social and scientific factors that exacerbate disease risk, making epidemiology a unique science(48). It is a multidisciplinary approach to studying human health and disease through formulation, testing, and modification of hypotheses using the scientific method of systematic observation. Epidemiology has made some remarkable contributions to humanity, including the eradication of smallpox, fluoridation of drinking water, improved motor vehicle safety, and recognition of tobacco as a health hazard(49).

Unquestionably, epidemiology has saved millions of lives, from both infectious and non-communicable diseases, through interventions and preventive programs that have been implemented as a result of systematic research. It may not be possible to precisely estimate the exact number of people whose lives have been benefitted or saved by epidemiological research. However, its crucial role in improving longevity and quality of life quality and cannot be overlooked. Epidemiology is at the forefront of public health in preventing and controlling diseases, promoting health and well-being by forecasting epidemics and pandemics, identifying diseases that are likely to be a burden in the future, and implementing planned targeted and collaborative interventions (48). Teaching in Epidemiology should be a part of all public health training programmes.

15. Monitoring

- The institutional capacity at the state level needs to be accelerated with a strong monitoring framework using set of core indicators and clearly defined process, rules and responsibilities along with coordination mechanisms.
- All programs implemented should be monitored at the district level with a set of simple program indicators for appropriate decision-making and periodic assessment of program performance.

Monitoring is the routine and continuous tracking of implementation and overall performance of a plan or a programme(50).It is essential to undertake monitoring so that problems are identified on a continuous basis. Monitoring is different from surveillance or reporting. Information collected through monitoring process feeds into systematic evaluations and also involves appraisal that can be used for informing the development of policy, planning and programme (Figure 12)(51). Monitoring helps in tracking the progress, ensuring that targets are met, improvements are measured based on indicators, identifying problems to take corrective actions, developing a basis for readjusting resource allocation and bringing in accountability within the system.

Figure 12: Monitoring and evaluation within Programme Implementation

Indicators are an important tool for effective program monitoring. Nearly 75 national/state programs and about 300 schemes are implemented in the state of Karnataka requiring a robust and strong mechanism to monitor all these programs at the state and district levels. Some programs (flagship programs, exclusively funded programs) have some inbuilt monitoring mechanisms and does not exist for many others. In 2021, the DoHFW has introduced a new system to strengthen monitoring activities at the district level for program implementation. The effectiveness of this method is to be seen in the coming days. This system should enable state program officers to implement monitoring that goes beyond supervisory reviews and reports.

16. Evaluation

- All health programs should be mandatorily evaluated once in 3 to 5 years at the district level by the State Department by engaging with academic partners and public health experts for returns on inputs, process, outcome and impact.
- The DoHFW should engage with Karnataka State Health resource Center and Karnataka Evaluation Authority to undertake periodic evaluation of health programmes at periodical intervals to bring changes in programme implementation

Evaluation is a systematic process to determine objectively the relevance, effectiveness, efficacy and impact of activities in line with their original objectives (Figure 13) (52).Evaluation is to ensure that the program meets the objectives, document the changes in system performance, provide an evidence base for modifying the program and strategies, enable resource allocation as per requirements, ensure that programs are sustained and provide specific answers for achievements and failures to make further corrections. Despite continuous monitoring, it is essential to have periodic evaluation of all programs.

The evaluation activities undertaken by the National Health Systems Resource Centre (53, 54), Karnataka Evaluation Authority(55) and independent agencies; academic institutions with strong expertise in evaluation are few and in select areas; not all programs have been evaluated in the state. There is need to integrate evaluation into the original program implementation strategies so that all programs are evaluated at different time points. In recent years, health impact assessment of policy, program or project on a population is recognised as an important activity for improving people's health and for strengthening program performance based on the principles of democracy, equity, sustainable development and use of evidence(56).

Figure 13: Framework for program evaluation in public health

17. Technology Enabled Health Care

1 Formulate a health IT policy for Karnataka that includes all aspects of software solutions, choice of technology and frameworks, adherence to standards, design considerations, interoperability, security and privacy circles, hosting and deployment as well as maintaining maintenance and IP and licensing needs to be developed.

2 Establish a state-level task force for digital health to oversee architecture, technology, solutions, and roadmaps to drive research and implementation.

3 Set up a dedicated health IT sell in the DoHFW to manage level II and level III support systems with empanelled architect teams, scale up capability. manage equipment and infrastructure to ensure support for users

4 Develop a dedicated district health IT cell with health IT professionals and analysts to plan and manage IT solutions and analysis/reporting of data

5 Implement a common format for e-prescriptions as the first step towards digital interoperability and health data exchange by operationalizing the relevant modules of the NIC e-hospital solutions which is already deployed in the state but requires strengthening.

6 Operationalize NDHM integration through a unique health ID for collating all digital registries of establishments and professionals. Karnataka should be the first state to join the piloting of NDHM by identifying two districts for the pilot rollout at the earliest. Two to three hospitals in each of the districts across public and private systems should be the initial participants in this integrated program which can further be replicated to other districts

7 Facilitate real-time data analysis for program monitoring and evaluation by moving away from periodic weekly reporting to real-time data availability generated under various programs by a dedicated analytics wing in the IT division of the DoHFW. This should also enable creating relevant dashboards for different (to be piloted for prioritise conditions to begin with) programmes. This HMIS should also facilitate SAST for treatment categorisation procedures and settlement of claims.

8 Undertake a pilot project for digital health cards by integrating health systems, especially in the NDHM ecosystem to improve online access to patient medical history by guaranteeing data availability for care providers.

9 Foster a digital health innovation hub and regulatory sandbox in the state by creating a corpus fund with industry and academic partners to support innovative solutions using cutting-edge technology. An initial grant of INR 20 crores over a three-year period should be allocated to set up this innovative start-up for accelerating programs for healthcare technology solutions

10 Strengthen tele-education, tele-training and evaluation in the state based on the lessons learnt from Covid 19 pandemic in the coming years. Apart from obvious need in pandemic like situations, leveraging technology in teaching and training methods should be established on a very firm footing as an integral part of tele-education and tele-training. Towards this, a coordination unit should be set up in Karnataka for compiling medical content in association with the state universities.

11 Support an annual digital health submit in Bangalore that brings together experts in healthcare, technology consultants, academicians and industry to provide a platform for catalysing collaboration and for showcasing advances in digital health.

The appropriate leveraging of technology for empowering and enabling healthcare in a comprehensive manner and to establish the state as a leader in the country's road map is vision of the group. This is based on the values of ensuring patient centric and quality healthcare for everyone, adopting a combination of physical and digital Information systems for reimagining health services, leveraging technology to integrate services in the existing systems, adopting a user driven digital transformation process to manage change and to ensure commitment and ownership at all levels and across stakeholders in public, private and NGO sectors. This has become a need as the expansion and exponential growth of technology in healthcare has revolutionised healthcare delivery practices and healthcare services.

The Covid 19 pandemic truly showcased the potential of technology to influence healthcare delivery in Karnataka and India, with its own unique challenges. Nevertheless, technology continues to be the key driver for improvements, innovations and advances in healthcare delivery. The importance of technology in healthcare scenario has been highlighted in the National Health Policy(18). The National Digital Health blueprint and the consequent National Digital Health Mission promise to provide a consistent, secure, national framework and architecture for interconnecting disparate systems(45). The standards for storage and exchange of health records are evolving as electronic health record standards for India. In addition, the vision 2035 for public health surveillance in India is a welcome opportunity for driving technology driven health systems(46). Furthermore, the recent development of telemedicine in all branches of healthcare has proven to be a clear pointer for its adoption on a larger scale.

The digital health scenario in Karnataka is fragmented with minimal integration and data exchange, poor adherence to standards and independently designed and managed software solutions typically driven by needs of a particular programme / department / hospital. With some developments noticed in NRHM - HMIS, there is a move to quality individual reports and reporting of summary statistics in facilities at periodical intervals

due to progressive digitisation of activities. However, majority of the health programmes have their individual versions of software and different formats usually developed by third-party vendors and operating in silos. Inadequate fund allocation and lack of a systems perspective continues to plague effective implementation. The appointment of a Deputy Director and an Assistant Deputy Director in recent times is a welcome development. In order to accomplish the desired objectives, it is important to reorganise the existing IT system support with clearly defined roles and responsibilities.

In Karnataka, there are nearly 35 distinct web-based applications in the DoHFW services with minimal interaction of flow of information amongst them, often managed and enhanced independently as per program needs. Every PHC, district hospital and ASHA worker continue to maintain a number of manual registers. Some efforts are in progress to integrate a few of the schemes within the department and at times with other departments. Apart from the highly critical L1 support for program activities, dedicated L2 and L3 support is lacking in different programs. In this context development of an inclusive ecosystem for digitally enabled healthcare is the need of the hour. The 10 strategies and the recommendations for leveraging technology use in healthcare programs and moving in a systematic direction to address these issues are urgently required. The recommended strategies are

1. Universalise digital personal health records
2. Align and adopt the NDHM federated architecture
3. Re-imagine and design applications to be user-centric rather than program-centric.
4. Aggressively scale up Tele-services.
5. Optimise resource management across private and public facilities
6. Build capacity within health department for Health Information Technology capability
7. Define a coherent and comprehensive strategy for data management
8. Comprehensively augment Health IT Infrastructure throughout the state.
9. Constitute a forum of experts from technology, medicine, public health and health informatics for ongoing assessment, evaluation and incorporation of relevant emerging technologies.
10. Enable both advanced clinical research as well as improved personalized patient care and catalyse health-related data for Public Health informatics.

18. Health Financing

- Increase state spending on health in a phased manner from existing 4.7% to 8% by 2025 in line with the recommendations of the 15th finance commission.
- Financing and pooling of resources from different departments and from different schemes towards a centralised scheme that is more convenient, easy and people friendly should be implemented for convergence.
- Consolidated measures to reduce Out of Pocket Expenditure (OoPE) for users through a decentralised state-level tender process will be helpful.
- Expanding the coverage and scope of Jan Aushadi centres in all districts and talukas will reduce expenditure on drugs and consumables for families.
- Increasing the participation of the private sector under the CSR programmes is worth exploring in select areas.
- Strengthening administrative processes to ensure transparency and to avoid duplication is urgently required.

Ensuring equitable access for all regardless of income, social status, gender, caste and religion to affordable, accountable, appropriate health services of an assured quality as well as public health services requires appropriate health financing mechanisms as recommended by the High level Expert group for UHC(57). The greater participation of private sector and the diminishing role of the public sector, more so in urban and transitioning areas is a matter of serious concern. As per NSS 75th round, the costs of healthcare in private healthcare facilities are 4 to 10 times higher in urban areas, in private sector, depending on the nature of ailment and service provider further influenced by the duration of treatment or hospitalisation and does not include indirect expenditure(Table 9)(58) .

Table 9 : Cost of health care and services in Karnataka and India

Sl no	Category	Details as per NSSO 75th Round 2017-18	Karnataka in Rs	India in Rs
1	OOPE by type of care			
		Mean OOPE for Out patient care	708	721
		Mean OOPE for hospitalisation	15546	18088
2	OOPE for hospitalisation			
		Mean OOP for hospitalisation excluding Child birth in PHI	3591	4600
		Mean OOP (excluding child birth) in private hospitals	19888	31000
3	Mean OoPE on hospitalisation based on Place of living			
		Mean OOP in Urban Areas	21657	
		Mean OOP in Rural Areas	11930	
4	OOPE by type illness			
		OOPE for Chronic Illness Outpatient care	647	
		OOPE for other Illness Outpatient care	771	
5	Mean institutional birth medical expenditure			
		Government Hospital	2177	1438
		Private Hospital	21852	22131
6	OOPE for hospitalisation in Government Hospitals			
		Medical Expenses	3624	20135
		Other Expenditure	1303	2245
		Total Expenditure	4927	22380
		Total OOPE	3591	18088
7	OOPE for hospitalisation in Private Hospitals			
		Medical Expenses	23086	20135
		Other Expenditure	2197	2245
		Total Expenditure	25283	22380
		Total OOPE	19888	18088

The national public health spending is only 1.2% of GDP even though there have been several recommendations to increase spending to a minimum of 2.5% of GDP with greater allocation for primary and secondary healthcare activities(59). The GoK spent only 0.7% in 2018 – 19(60). With an annual allocated health budget 12,035 crores for 2021-22 covering all areas, the per capita expenditure for health in Karnataka was Rs. 1 429 (60).The Ayushman Bharat scheme is implemented by the GoK to cover all healthcare services, routine public health services, preventive services and health and wellness Centre component.

The UHC scheme provides partial financial risk protection even in public hospitals due to the presence of user fees and accompanying expenditure on drugs, diagnostics and consumables resulting in high year out-of-pocket expenditure for consumers. The exclusion of outpatient primary care services, reauthorisation procedures and poor utilisation of the scheme by households even from BPL categories contributes for poor usage of the scheme. Furthermore, the private sector participation is limited to certain geographical locations in the state and non-existent in few of the districts. In addition, hospitals have empanelled themselves for selective specialities due to low package and late payment issues. The referral process is considered to be quite burdensome for both providers and beneficiaries especially for tertiary services due to nonuniformity in the public sector. In addition, several schemes coexist in the state leading to double dipping into resources due to overlapping beneficiaries and duplication of efforts. The coverage of population with health scheme / health insurance has remained the same at 28% over NFHS 4 and NFHS 5 rounds in Karnataka. The different package rates for different type of procedures and the payment to the facilities appears to be a quite complicated procedures. The OoPE for drugs and diagnostics are not covered under the UHC scheme with majority of the outpatient costs for investigations borne by users including admission expenses in empanelled hospitals. Even in the public sector hospitals, the lack of required drugs, human resources, equipment and consumables force the beneficiaries to spend in private sector leading to high OoPE.

The private health insurance coverage in the state is also only 12% of all those insured which can be much lower in different geographical areas(16). The high cost of the premium, waiting period for the policy to become active, terms and conditions in small print, unfair practices that include claim rejections, partial payments and delayed grievance

redressal mechanisms contribute for the low enrolment in private health insurance schemes. Data from the 71st and 75th round of NSS in 2014 and 2018 indicate that if public health facilities can be strengthened for outpatient, in patient and referral services it could lead to a dramatic fall in the overall financial burden on patients who visit private healthcare services(58, 61). This calls for a significant increase in public sector investment to make services more easily available for all sections of the society that would help in shifting patients from private providers to public facilities.

Risk Protection

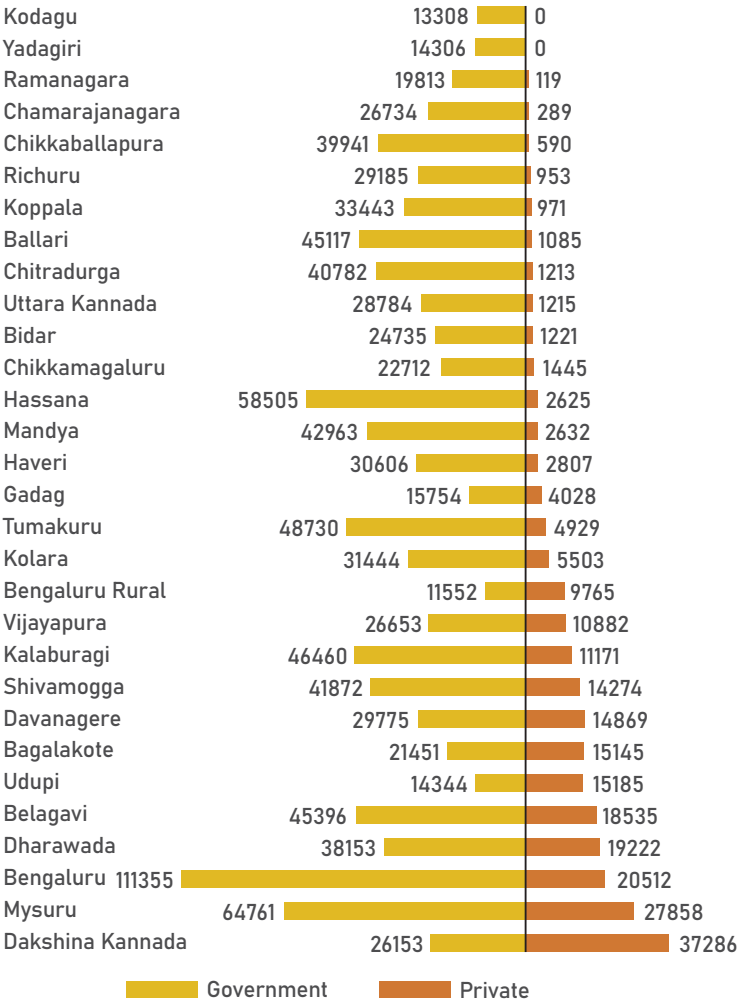
- There is an urgent need for focused and targeted empanelment of healthcare facilities in all districts to be done on a priority basis. The package rates at present needs a revision especially for certain categories of geographical locations, nature of the institutions and the type of services provided in these places.
- Strengthening district diagnostic facilities and streamlining referral mechanisms based on clear guidelines and protocols is very much required along with timely payment to healthcare providers.
- The implementation of the Karnataka private medical establishment act 2017 is urgently required through a consensus driven and a consultative approach.
- A common IT platform to avoid duplication and convergence of activities as well as expanding the scope of services in the scheme with strict monitoring and auditing mechanisms are urgently required.

With an exponential growth in private health care, costs has increased exponentially resulting in huge OoPE and catastrophic expenditures for the poor. Drugs, vaccines, diagnostics, specialised care, tertiary services are at the forefront today, while basic essential healthcare has been relegated to the periphery. This change has resulted in change in quality of services, costs of healthcare, greater inequalities, as well as limited access to affordable healthcare for people.

Karnataka launched the Arogya Karnataka scheme in March 2018 even before the Central scheme was launched in September 2018 by integration of the earlier schemes along with enhancing the coverage to Rs. 5 lakhs per family, now covering about 115 lakh families falling under the BPL category(62). The 19 lakh APL families are entitled to a 30% subsidy to an extent of Rs. 1.5 lakh coverage per family per year and also include expanded scope of services by including secondary care in its broader ambit. SAST working on an assurance mode is the state health agency for implementing Ayushman Bharat Arogya Karnataka Scheme and uses the ARS software for all public health institutions (62, 63).As on January 2021, 1.43 crore e-cards have been issued for 14 lakh beneficiaries treated and 3413 hospitals have been empanelled under the scheme. The empanelment process of hospitals and doctors are done as per standard procedures. Private sector services for emergency and tertiary care supplement the public health system by bridging the gap in the availability of health services.

However, the scheme provides only partial financial risk protection for the covered population. So far, the scheme has covered only 0.8% per year of the hospitalisations compared to the hospitalisation rate as per the NSS data of 4.7% for Karnataka(62). Among the beneficiaries, nearly 98% are from the BPL category and only 1.7% from APL categories with differential utilisation of available packages. Interesting to note that only a small proportion of the population is using the services considering the

Figure 14: District wise variation in pre-authorisation raised by type of provider



catastrophic expenditure for some ailments. Delayed payment to the empanelled hospitals, administrative barriers in empanelment, limited capacity of the financial software, burdensome reference procedures complicate the matter to a great extent. The public hospitals contributed for 77% of reauthorisation as against 23% from the private hospitals(62).

The developed districts of the state contributed for a high end utilisation with more private facilities in Tier 1 cities and majority the population in uncovered districts are still exposed to financial hardships in accessing healthcare (Figure 14). The scheme has several limitations by its non-comprehensive nature. For example, exclusion of Ayush packages, limitation of palliative care packages, incomplete coverage of NCD's, the co-payment strategy for APL in making use of the scheme. Despite the coverage for certain conditions, many services like transport costs, ambulance services, payment towards laboratory services are excluded along with limited number of Arogya Mithra's in many public and private empanelled hospitals.

19. Private Sector Engagement

Strong administrative and regulatory frameworks (as seen during Covid times) is a fundamental prerequisite for continuous engagement with the private sector to see that people are not exposed to greater risk and higher losses based on consensus and a consultative process. The GoK developed the Karnataka Private Medical Establishments (amendments) Act 2017 that aimed at bringing certain regulatory measures within the existing administrative framework(42).However this is still been an unresolved issue in establishing clear standards and guidelines. The quality of care needs to be standardised as per evidence (accreditation processes) and established regulations for different activities. The existing governmental schemes should be more people centric and help in availability of services to control the rising costs of healthcare. It is equally important that the government focuses on increasing the health budget and strengthening the public health system which would in turn help in greater utilisation of public facilities and services bringing in a healthy competition between public and private sector.

Privatisation of healthcare is a noticeable phenomenon in India and in Karnataka. Today, healthcare delivery system is often a combination of public and private sector resources used jointly for providing healthcare to people. Recognising the

Figure 15: Proportion of health care providers in rural and urban areas of India.

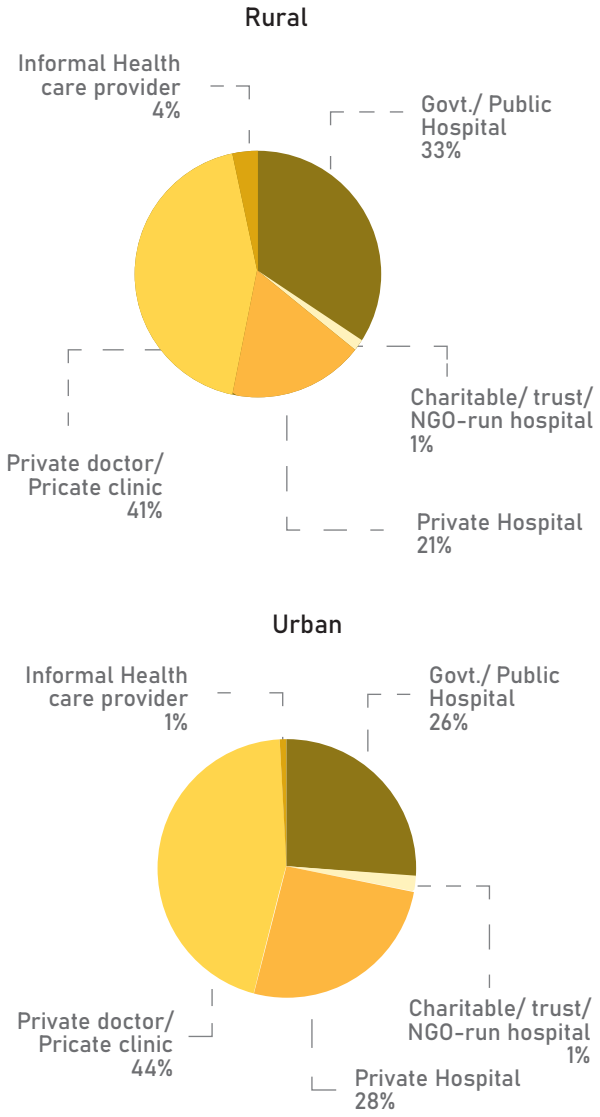
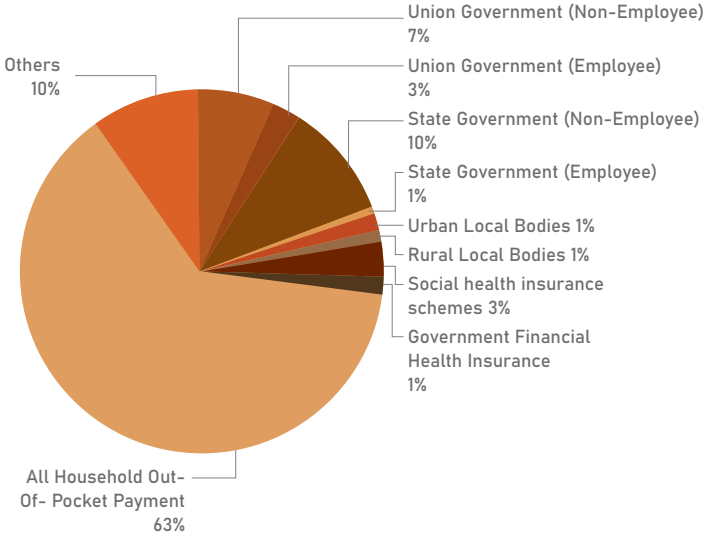


Figure 16 : Current health expenditures (2016-2017) by various health care financing schemes in India.



fact that public sector alone cannot cater to huge population needs, private healthcare services is delivered by a wide range of qualified and semi-qualified service providers with a predominant focus in curative services. Both in urban and rural areas such services are provided by general practitioners and specialist clinics, nursing homes, corporate hospitals, private medical colleges in addition to a host of private laboratory services, radiology services, supply chain management and other areas. The resource crunch in the government has necessitated giving greater autonomy and invitation for private partners to increase - expand – augment – consolidate public health services. Both pharma industry and medical consumable industry are highly visible from the private sector. Overtime, the private sector participation has evolved from a service model to a business model

As per data from NFHS – 4 and NFHS – 5, nearly 80% of ailments in urban areas and 70% in rural areas received care from private healthcare providers and contributed equally to the rate of hospitalisations in both the areas (Figures 15-16) (58). Due to the unregulated and the for-profit nature of the sector, the medical expenditure has increased significantly in the past few years. The cost of hospitalisation in a private healthcare facility is estimated to be INR 17085 in rural areas and INR 31 462 in urban areas,. while the same in a public healthcare facility was INR 3445 and INR 4195, respectively (64). An assessment of human resources in Kolar district for mental health care and trauma care respectively revealed that 60% of human resources was in the private sector and cost was significantly higher resulting in many families to face the catastrophic health expenditure(30).

Advantages that come in hand with the health sector privatisation are its availability, proximity to communities, increasing reach, greater range of speciality services and others, while providing the choice of choosing a method for people. However, the major disadvantage of this engagement has been the increasing costs leading to greater iniquity and lesser accountability. At times, it has even led to unhealthy competition as well as exploitation and misconduct towards patients.

The engagement of the private sector extends beyond simple healthcare to the larger commercial determinants of health as the industry can influence / nudge the government in formulating policies and programmes. Many industry players from tobacco, alcohol, motor cars, food industry, packaged foods and others engage with governments in indirect ways to develop a favourable climate for their continued presence and participation(65).

20. Public-Private Partnerships

- The government should establish an independent and autonomous PPP cell in the state to develop clear policy guidelines for PPP in health sector and to examine the benefits / threats to avoid conflicts of interest.
- All new PPPs should be carefully examined at the highest level for its benefits and risks and should be reviewed/ evaluated at periodical intervals for its public health benefits.
- Strong administrative and regulatory frameworks should be established for implementation of PPP models after defining the scope of services and investment patterns for maximum health returns.

Public-Private partnership (PPP) has emerged in a significant way as a cooperative arrangement between the government and private organisations for providing services by sharing/supporting public infrastructure, facilities, services through mutual agreements on an agreed-upon framework. A PPP model is an approach to address public health and social development issues amidst resource constraints through the combined efforts of public-private organisations. It is characterised by the sharing of investment, risk, resources, responsibility and rewards between all partners to best meet the required public needs. While there are few advantages of a PPP model in terms of extending the reach, enhancing program credibility, enabling governments to develop public assets, ensuring quality and client satisfaction, providing opportunity for equal and responsible engagement, PPP models also pose some major threats and challenges.

Several PPP models exist in Karnataka in areas of health care, infrastructure development, technology applications, primary healthcare delivery, telemedicine, Thayi Bhagya scheme(to address infant mortality and maternal mortality), Yashaswini health scheme by extending financial support to farmers, helpdesk teams, emergency ambulance services, running of hospitals and in other areas(66).

PPP models also present several challenges in its implementation due to deficiencies / absence of - a PPP policy for health at national or state level, output and outcome indicators, clearly defined institutional frameworks, grievance redressal mechanisms, accreditation standards, a clear understanding on the economics of health services and most significantly nonavailability of well-designed evaluation studies. The sustainability of these models over time is a major challenge and many PPPs can damage the credibility of public health institutions, when collaboration confirms legitimacy and credibility on programs that increase healthcare costs and affect quality of services.

21. Drugs and Logistics

- Ensure transparency in procurement, procurement performance should be monitored regularly to ensure that tenders for supply of drugs are finalised timely and drugs are available as and when these are needed;
- Strengthen quality assurance mechanism of the drugs procured and supplied through standard guidelines to health facilities for ensuring efficient drug storage/maintenance of storehouse and adherence to rational prescription practice, display essential drug list in all health facilities,
- enhance funding for the corporation, generate annual reports to document the procurement, distribution, consumption pattern,
- conduct prescription audit of public health facilities and survey of facilities once a year to examine the availability and stock-out position of essential medicines at all levels.
- Pharmacovigilance should be mandatory in all hospitals with more than 300 beds to closely examine antibiotic resistance, drug adverse reactions, drug monitoring as well as developing a hospital formulary be employing Pharma D graduates.

The goal of a health logistics system is much larger than simply making sure a product gets where it needs to go. Ultimately, the goal of every public health logistics system is to help ensure that every customer has commodity security. Commodity security exists when every person is able to obtain and use quality essential health supplies whenever he or she needs them. A properly functioning supply chain is a critical part of ensuring commodity security. Effective supply chains not only help ensure commodity security, they also help determine the success or failure of any public health program. Well-functioning supply chains benefit public health programs in important ways by increasing program impact, enhancing quality of care and improving cost effectiveness and efficiency. The Six Rights of Logistics are: The RIGHT goods in the RIGHT quantities in the RIGHT condition delivered to the RIGHT place at the RIGHT time for the RIGHT cost(67).The policies, framework, structure, administration and process of drug logistics system should be developed by considering the above rights.

The Karnataka State Drugs Logistics and Warehousing Society (KSDLWS) had been established during the year 2003 with the main objective of establishing an efficient, cost effective and decentralized Drug Logistics and Warehousing System in the State, adhering to modern warehousing and rigid quality control practices and providing information technology enabled services. The Society had been procuring drugs, vaccines, chemicals, equipment's and miscellaneous items for use in the hospitals in the State under the State Sector, District Sector, and Directorate of Medical Education. The Society had also been meeting the drug requirements of various programmes like National Rural Health Mission, Akshara Dasoha of Education Department and those of the Karnataka State Aid Prevention Society(68, 69.

Recently (2019), KSDLWS was transformed into a corporation called- Karnataka State Medical Supplies Corporation. Corporatization is expected to provide clear autonomy, transparency and management control in the decision-making process and help in providing better governance for effective buying and supply chain operations. Also, multidisciplinary professionals and healthcare professionals would be deployed in developing system optimization solutions for the procurement of medicines, chemicals, equipment and other medical supplies. Currently KSDLWS has 27 warehouses and 2,940 institutes (primary health centers, community health centers, taluk hospitals, and district hospitals) that they supply to. KSDLWS has automated supply chain management system called Aushada software and through which all the health facilities including PHCs would submit their

annual drug indent plan and indent the drugs. This software also facilitates monitoring of stock position in all the 2940 health institutes and enables issue of only standard drugs and freeze that are not of standard(68, 69).

Despite such progressive improvements in the overall drug logistic management system, several challenges exist within the system that are barrier in providing free drugs to the needy individuals. Studies have reported stocks-outs and non-availability of drugs in the health centers and only little more than half of the essential medicines are available in the health facilities. Non-existent or poor stock control including poor forecasting are the major causes of stock-outs and shortages reported at the health facility level when stock is available at the central or depot level. It is also important to note that drug stock outs are observed at the central drug store or in the warehouses which reflects poor management practices at the central level. The Karnataka Accountant General's (General & Social Sector Audit), audit report in 2018 recorded poor quality assurance by the Karnataka State Drugs Logistics and Warehousing Society while procurement and distribution of drugs, inordinate delay in communication of Non-Standard Quality drugs to warehouses/ hospitals resulting in distribution of non-standard quality drugs to health facilities across Karnataka(70).

A performance audit of the procurement and distribution of drugs by the Society undertaken by the Karnataka Accountant General's during 2007-12 revealed the following: a) flaw in tender evaluation, b) Drugs procurement lacked planning, resulting in chronic delay in finalizing the rate contracts for supply of drugs resulting in non-availability of sources for procurement of drugs during certain calendar time, c) certain drugs are purchased at higher rates when compared to other states, d) procurement of drugs, especially IV fluids, had not been based on estimates of actual need and drugs had been procured far in excess of requirement, creating storage problems in the warehouses and health institutions. These excessively procured drugs had been stored in garages, toilets, corridors etc in health institutions, e) Drugs are procured with lower shelf life and f) the quality assurance system was not effective(71).

According to 7th common review mission of NRHM in Karnataka following were the issues with respect to drug management and storage at the health facility level- a) drug storage was found poor (lack of space, racks, shelves, ventilation at the store houses, no systematic arrangement of drug storage e.g. alphabetical ordering, labeling etc), b) record keeping was found weak and c) had poor update of stock registers(72).

22. Health Legislations

- Large scale capacity building activities should be undertaken in health, law, police, welfare and related sectors to develop sustainable mechanisms for implementation of public health and related legislations.
- All legislations and regulatory acts that were framed before the year 2000 should be reviewed by a joint expert committee for its scope – reach – coverage – procedures and recommendations of this committee to be used for amendments.
- The implementation of existing legislations in health. Safety and wellness in all settings should be scaled up uniformly across the state in a uniform and visible manner along with provision of resources at different levels.
- The impact of public health legislations should be measured at periodical intervals by health and safety experts and academic institutions in collaboration with legal and enforcement officials at regular intervals.

Public health legislations are an important tool to improve service delivery mechanisms, create health promoting environments, promote safe behaviours and to safeguard societal interests(73). The public health acts are related to "legal powers and duties of the state to assure conditions for people to be healthy and also to constrain the autonomy, privacy, liberty, propriety or other legally protected interests of the individual for protection and promotion of community health"(74). The health-related legislations broadly include health and social care, regulatory acts, acts that minimise health-related risks and those applied during disaster epidemic situations.

It is commonly observed that despite the presence of good knowledge and service availability, health behaviours are not widely adopted by individuals and organisations as they are subject to a wide variety of internal and external influences. It's well proven that educating people alone or providing information or formulating guidelines or mere advocacy activities may not effectively result in behavioural change necessitating the need for legislative and regulatory interventions. Regulatory mechanisms are also important to safeguard societal interests. Effective implementation of legislations and acts is based on the spirit of

implementation, probability of being penalised and the deterrence of punishment. Visible enforcement of laws, randomness in its coverage, stiff penalties for violators and uniform application to all, brings in larger public health benefits.

Number of public health legislations has been enacted by the Government of Karnataka or at times, judiciary has provided directives. The intervention of the judiciary during the recent Covid pandemic is an example to show that legislations are a powerful tool to direct governments and control institutions by forcing the government to act. There is also need to revisit legislations for its role and use overtime as some may become outdated and at times even pose danger. Recently many regulations have been either amended or modified to bring in changes as per current requirements, like the Indian Motor Vehicles Act(75). Implementation of legislations is the key to success but is fraught with several challenges like lack of intersectoral coordination, nonuniformity of guidelines, misinterpretation of the regulations by the public and the media, institutionalisation of implementation, minimum use of technology applications and others.

23. Intersectoral Coordination

- In the state, health sector policies, programmes and action plans should be agreed upon and supported by a high level intersectoral committee from the early stages, duly represented by all concerned departments at the highest level, from the planning to implementation levels for consensus building, resource allocation and coordinated execution.
- The Head of the state should review all health programmes once a year to facilitate ISC at all levels for effective monitoring and resource allocation.
- A District Health Implementation and Monitoring Committee, chaired by the District Commissioner and coordinated by Zilla Parishad officer, that also includes senior officials of all departments should oversee implementation of all programmes to measure progress, efficiency, effectiveness and resource utilisation based on a set of agreed upon indicators.

Joint action(s) taken by departments of health with other government departments, and at times with private, voluntary and non-profit groups to improve the health of population is commonly referred to as intersectoral collaboration. In simple terms, it means working together across sectors to improve health and influence its determinants to achieve health, economic and social improvements(76). As health is multicausal in nature, the response should be multisectoral.

Intersectoral action on health provides a solution when governments have to implement programmes or formulate policies that overlap to achieve a common goal of health benefits and beyond, but that are administered across a number of departments. Implementing intersectoral policies and action plans include self-assessment, assessment and engagement of other sectors, stakeholder and sector analysis followed by analysis of the area of concern, use data in all engagements, select an engagement approach, develop an engagement strategy, identify a common framework and Monitoring and evaluating(77).

Securing high-level political commitment to an inter-sectoral initiative is a major requirement and can pose a primary challenge. However, the major problem associated with ISC in Karnataka lies with the scantiness of documented systematic programmatic experiences thus making the processes and outcomes of intersectoral work more challenging. For example, Road safety is a shared responsibility of several departments in the state. The earlier state Road Safety Council (all departments included) was more of an advisory body and implementation was slow. The constitution of a state road safety authority with representation of police, transport, health, law and infrastructure departments is a step towards ISC for developing programmes for implementation(78). However, equipping this agency with knowledge and skills, resources, action plans and tools for implementation still remains a challenge. Constitution of district level road safety agency can greatly facilitate implementation at district levels. Examples are in plenty like suicide prevention, tobacco and alcohol control, violence prevention, disability care and welfare, etc., requiring intersectoral coordination across departments from planning to implementation stages.

In practice, this is a very challenging area as both horizontal (within ministry or department) and vertical (across ministries/departments) are required for joint activities. To overcome such challenges, it is important that the state leadership (like Chief Minister) or the senior most officer (like Chief Secretary) takes control of overseeing implementation (ex., road safety, several health determinants, environment health etc.,). This is also

a common practice followed in many High Income Countries. The success of this approach has also been evident in Covid – 19 pandemic in the state In India and Karnataka, the judiciary has directed the governments to enhance coordination for smooth delivery of services or implementation of activities as seen during recent Covid pandemic. Implementing policy frameworks is another method for ISC. Health sector being responsive to initiatives led by other sectors and inviting other sectors to participate in health sector activities provide opportunities for improving health, enhance cooperation and coordination that is often more effective, efficient and sustainable, than could be achieved by the health sector acting alone.

24. Advocacy, Community engagement and IEC

Advocacy for Health

An active engagement of all stakeholders in public health advocacy should be strongly supported by the state to benefit health and safety of people and should not be restricted to selected days in a year, but should be an on-going and continuous process.

Public health advocacy is a process of educating and encouraging elected officials, organisations or influential members of community to support, formulate, enact and/or adopt policies that will inform the community, protect health and promote safety(78). Public health advocacy ensures access to care, generate resources and campaigns to eliminate existing inequalities to get new measures like legislations and other mechanisms in place. Advocacy is undertaken by large number of NGOs, advocacy groups, coalition groups, students associations, workers unions, media houses and several others and these grass root efforts help in achieving several requirements required for healthcare.

Karnataka has been a leader in advocacy campaigns because of the active participation of many health interested groups. Many successful examples are available in HIV AIDS, disability, mental health, child labour and several others. Advocacy campaigns related to alcohol control, tobacco and road safety and others have ensured the government to implement several programs. Several groups are actively engaged in advocating for the rights and health of vulnerable populations without adequate health care. Stronger advocacy efforts are required to bring change.

Community Engagement

The state government should facilitate capacity building of community engagement process by strengthening all panchayats and other existing local committees in district - taluka levels and in urban areas in health care delivery process. NGOs can also be actively engaged in such capacity building programs.

Bringing public health to people involves bringing public to public health. The collective involvement of local people in assessing their needs and planning strategies to meet those needs is a fundamental requirement for the success of public health programs. This has been adequately emphasised since 1978, through the Alma – Ata declaration which emphasised the role of primary health care approaches and community participation(3).It emphasises the involvement of individuals, families and community members in promotion of their own health by participating in planning, organisation, cooperation and control of healthcare activities making fullest use of all available resources.

Based on the initial success of a pilot project on 'Community Action for Health' in 1620 villages across 36 districts of nine states in 2009, the implementation of our ASHA schemes and formation of Village Health Sanitation and Nutrition Committees (VHSNCs) and Rogi Kalyan committees were implemented under the NRHM program which has become a key strategy for engaging the public (80). These agencies along with citizens charters, community-based planning and monitoring and untied funds for the Arogya Raksha Samitis, have formed important components of the communitization process under NHM with engagement of local agencies and functionaries drawn from the villages(81). People are empowered to take leadership in health matters to strengthen health care at local levels. Many successful examples (GRAAM) and during Covid times adopted this process for effective actions(82).

Community engagement and participation is well-known to result in dissemination of information, improved organisation of services, delivering more acceptable and relevant services, increasing community satisfaction, use of resources and increased community responsibility for their own health(82) . However the process includes mobilising communities, formation of committees through a democratic process, capacity building and community action. During the process of community engagement several lessons have been learnt that needs to be adopted in different places. Several challenges have been identified in engaging with communities for a number of reasons.

IEC Activities

The state IEC cell/partners in the health/other organisations should run systematic campaigns in a scientific manner based on data and evidence in prioritised health areas and on focused topics in the district and taluka levels at the beginning of a program or before targeted interventions or prior to introduction of new schemes for maximum impact. Most importantly effectiveness of such campaigns should be evaluated on defined para meters.

Information, education and communication (IEC) and Behavioural change communications (BCCS) are very powerful tools to change/ reinforce health-related behaviours in populations regarding a specific problem using a wide variety of communication channels. It aims to instil positive knowledge for appropriate health and safety behaviour and a variety of methods are employed to undertake IEC activities. IEC activities inform people about the benefits of various schemes/programs, strengthen health seeking behaviour and increases utilisation of services. Experience in the recent Covid 19 pandemic has demonstrated that public education on a continuous basis along with availability of vaccines helped in decreasing the vaccine hesitancy and encouraged people to get vaccinated whenever it was available and demand when not available . It also empowers people to make right choices for bringing social change and development as well as exercise their rights. Social media platforms are a powerful media for education, but should be employed judiciously.

Box 5: Campaign for helmet use and no-drunk driving

The Helmet wearing and No-Drink and drive campaigns run by Bangalore city police , NGOs, citizens group and coordinated by NIMHANS during 2006 – 09 is a well acknowledged programme(83). Started in Bangalore city, the campaigns were extended to several districts in the state following the notification of helmet legislation on Nov 6, 2006. Starting with data collection from city police and 8 hospitals on road crashes, information was analysed and key points of communication were identified. Various health education messages were finalised based on the analysis and implemented through print and visual media. Feedback was obtained from public and contents modified based on suggestions. Helmet use and drink driving rates were measured in hospitals, in road accident records and through field observational surveys up to year 2013 under the Bangalore Road safety programme (6). In effect, helmet use rates increased from 5 – 10 % before legislation to 60 – 70 % after legislation. Drink driving reduced following enforcement by police authorities. The introduction of Motor Vehicle Act in 2019 has further increased safe behaviours in these areas through increased penalties and higher enforcement in recent times.

Lessons learnt included – campaign's need to be sustained, scientifically designed, right communication channels to be chosen, technology to be used and measured for its impact.

However, it needs to be recognised that an individual's behaviour is shaped by social, cultural, economic and political influences along with a combination of many intrinsic and extrinsic factors. While a one-time behavioural change as in the case of vaccination is easy to achieve through IEC methods, many changes required in the health promotion practices towards control of chronic diseases requires building/creating health promoting environments along with education of people. IEC programmes should be participatory and include feedback which is a vital component of the entire process.

Many successful campaigns in number of health areas have been undertaken in the state of Karnataka by the department and individual organisations. Major limitations has been the isolated nature of activities, vague message deliveries, timing of the campaigns, lack of feedback from the public and at times non-imaginative methods of campaigns. Using data to formulate campaigns is a major requirement.

25. Public Health Research

- The state government should give importance for public health research which requires – identifying priority areas, developing a state research agenda, dedicated funding (core funding from state, corpus funding, pooled funding, CSR funds, industry investments, etc.,), networking of institutions in different areas for developing research outputs.
- A state agency needs to be constituted in RGUHS to strengthen research in medical colleges and other healthcare educational institutions. Health universities, medical colleges and NGOs should collaborate with various state departments to develop improved mechanisms for undertaking research in their districts for all activities.
- Health impact assessments should be focussed in DoHFW by creating a small dedicated unit to undertake research.
- Future research should focus on NCD's and health determinants and strengthening health systems by developing a systematic research agenda and also undertake state NCD and this factor survey at periodical intervals.

Health research reflects to the fact that improving health outcomes requires a continuous understanding of factors that influence health and disease and generating new knowledge to bring about improved outcomes (84). Research aims to understand the impact of policies, programs, processes, actions and help in developing interventions. Public health research should be interdisciplinary moving beyond a particular discipline and can use mixed method approaches as only quantitative or qualitative research will not be an appropriate mechanism. Translational research, interventions research, implementation research, systems research, operations research and health impact assessments are gaining prominence to increase research applications in improving health systems and to strengthen healthcare delivery. Technology applications are enabling more systematic research to be undertaken in areas where it was not possible earlier.

In the state, there is no dedicated research wing to prioritise and coordinate research activities. District level initiatives and capacity to undertake public health research are minimum. Many challenges exist for undertaking public health research including its neglect, absence of focus, lack of institutions and researchers, funding issues and utilisation of research findings. However there are few institutions in the state that are actively engaged in research over a period of time.

Life Course Perspective

- The state should shift focus and priorities from vertical and silo programmes to integrated systems and programmes based on a life course perspective. Consolidating activities, convergence across programmes and coordination across partners are obvious advantages and saves resources. The vertical nature of some programmes should be retained at the top in select areas under national and state programmes.
- In this direction, the state should establish 5 centres of excellence in the areas of – health determinants, child health, youth and adolescent health, middle aged and elderly health. This institutional mechanism should provide guidance and support to the government for policy support, capacity building and training, developing common platforms, funding mechanisms, implementation tool kits, monitoring, evaluation and research inputs.

Health in a life course perspective recognises that both past and present experiences are shaped by the larger social, economic and cultural context in which the person lives. Understanding the influence of these factors that operate across the lifespan at different phases of pregnancy, childhood, adolescence, young adulthood, midlife and elderly is of extreme importance to improve people's health. A life course approach recognises the importance of several factors that shape an individual's health in that phase of life or into the later stages of life because of the interaction and interconnectivity of these factors, thus helping in development of appropriate health policies(85).

For example, children with early childhood traumatic experiences are more likely to have mental health problems in later stages of their life. On the contrary, children growing in more stable and protective environments are more likely to be happy and healthy at later stages of life.

This understanding of a life course perspective helps in identifying various influences, enablers, facilitators and barriers to good health or to disease at key stages of an individual's life. Recognition of these factors is important to make changes in health policies and programmes and for empowering people to promote health and prevent disease. The advantages of a life course approach are that it - (i) helps in recognition of specific factors that operate at different stages of life, (ii) facilitates developing appropriate policies and programmes as applicable to particular age groups, (iii) promotes integration of different programs based on commonalities and (iv) developing implementation mechanisms in different settings- schools, colleges, work places, youth centres, etc., (v) can be monitored and evaluated using common indicators and (vi) saving resources by avoiding duplication of efforts.

Health in a life course perspective

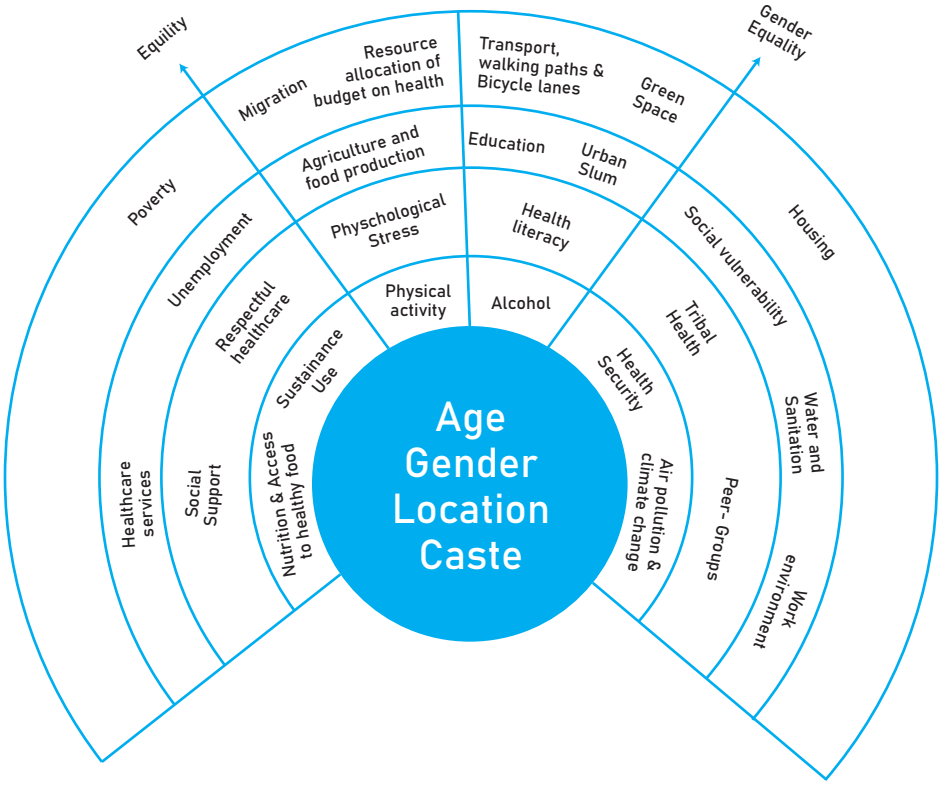
26. Health Determinants

- Health department should play a strong role in advocating for addressing health determinants across sectors on a continuous basis and should generate the requisite data for policies and programmes.
- The Karnataka Health Steering Committee headed by the leadership at the highest level should be constituted by including all concerned departments for effective collaboration and coordination to review action plans, provide funding and monitor progress by providing leadership and governance.
- Existing institutional mechanisms should be strengthened and new agencies to be established in select areas for continuous work
- The district health teams capacity should be strengthened with training and resources to undertake mapping of determinants and to develop vulnerability index for populations along with prioritising interventions.

As per WHO, the determinants of health include the social environment, physical environment and persons with individual characteristics and behaviour(86).The context of where people live, work, play and engage in other activities determines their health and, individuals on their own are unlikely to be able to control the influence of some of these determinants. In Karnataka majority of the resource allocation to health is towards secondary and tertiary care with little emphasis on addressing the determinants. Several determinants of health lie outside the health sector and strategies to address the need should be multidisciplinary and intersectoral in nature(85).

Many factors that influence health like nutrition, urban planning, environmental pollutants, socio demographic determinants, tobacco, physical inactivity and several others needs to be addressed in a much stronger way to promote health and prevent disease. The subcommittee on the determinants of health using the Dahlgren and Whitehead model informs that factors that have a direct impact on health or at close proximity to the individual can be addressed by people, while those with progressively indirect effects need societal / governmental interventions (Figure 17).

Figure 17: Determinants of health (adopted from Dahlgren and Whitehead model)



Application of this model resulted in identification of 24 determinants with specific reference to Karnataka that are critical and should be addressed for improving health of the population. Most of these determinants influence health of people on their own and by their interaction with other health determinants. For example, while alcohol use is prevalent among 16% of males, driving a motorcycle under the influence of alcohol results in about a fifth of emergency registrations(87).Similar associations exist between depression and obesity, poverty and violence, low-income and use of tobacco, lack of access to safe water and communicable diseases and several others. The extent, nature, pattern and impact of these determinants are different across geographical regions and in districts across Karnataka, calling for state-level policies and strong local actions.

Data is extremely limited in the area of health determinants. Essential to note that, mere data on the prevalence of these determinants is helpful to a limited extent and information is required on the interactions, policy frameworks, action programs, advocacy, health promotion strategies and several others. Global and national evidence indicates that a substantial health impact and disease burden can be reduced by addressing health determinants. Significantly, policies and programmes from outside health sector do not keep health in the centre of their policy works, while health sector has not evaluated the impact of various policies / programmes on health of people. These determinants can be addressed through a variety of cost-effective policy and programme interventions.

Addressing each of these determinants requires a set of integrated actions, implemented at population levels with an agreed-upon goal and measurable indicators(86, 87). Actions in the area of tobacco and alcohol control, road safety, violence prevention, mental health, air pollution and several others is the joint responsibility of several ministries/departments and requires a strong policy framework, state action plan, data information, advocacy and awareness, strong legislation, building safe environments, taxation measures, public and school education, enforcement, technology use, health sector mobilisation, monitoring and several others. Establishing a strong intersectoral coordination mechanism to address the challenge of multisectoral determinants is urgently required in the state. Strengthening institutional mechanisms with adequate authority, funding and responsibility can greatly enable strategies to address health determinants. Developing a health Charter in addition to advocacy awareness and education plays a significant role in many of these activities.

27. Health Promotion

- Develop a strong framework for implementing health promotion activities under NHM
- Build data driven strategies along with monitoring, evaluation and feedback to all partners to strengthen such activities
- Health promotion activities in facility based settings like all educational institutions, work places, family settings , health care institutions should be systematically planned, implemented and monitored by DoH.
- Adopt an approach of one health in all policies rather than just the health policy

Health promotion, often used interchangeably with health education is different from health education. It is a combination of health education and healthy public policy(88).Health promotion ideology recognises that only informing / educating people in the absence of support systems and environments has limited impact, as health is not only an individual issue, but also a social responsibility to change the underlying socio economic and other determinants to achieve equity in healthcare(89). This approach moves from 'victim blaming' to 'people's empowerment'.

Health promotion includes building public health policies, creating supportive environment, strengthening community for action, developing personal skills for change and reorienting health services. Many high-income countries have been able to reduce the burden of NCDs and injuries through strong health promotion strategies that have addressed the root causes rather than merely touching the surface. Implementing health promotion strategies require strong intersectoral coordination mechanisms in collaboration and with the active participation of sectors outside health. Since the health sector faces a huge burden of health conditions, health department has to advocate for strong integrated policies and programmes that can reduce this burden and work towards achieving health goals.

Developing joint action plans and overseeing implementation by concerned sectors is a very useful mechanism. This process requires capacity building of all sectors, including health to develop such mechanisms. Similarly, developing institutional mechanisms (e.g., Karnataka Road

safety authority with health, police, transport, IT and education; Setting up Yuva Spandana Kendras (Youth guidance centres for health promotion under Yuva Spandana program through the Department of Youth Empowerment and Sports) in select areas of high public health importance can facilitate this process. Few good examples exist in the state as in the case of tobacco control, but is lacking in many other areas. The state has poor health promotion frameworks for implementing activities under NHM and needs strengthening. Building strategies based on data and evidence along with monitoring, evaluation and feedback to all partners can strengthen such mechanisms.

Several challenges need to be overcome in health promotion activities starting from behaviour modification of people in the society. Inequity in healthcare is another major problem to be tackled. Political action needed for health promotion is central for social development, public health and for health promotion for improving people's health.

Settings for Health promotion

- Schools and colleges
- Workplaces
- Health and wellness centres
- Family settings
- Health care facilities

28. Women's Health

- Based on the available data and death audits, identify districts and talukas within districts performing poorly on MMR with concomitant mapping for complete RCH resources for strengthening maternal health programs on priority.
- Strengthen essential and emergency obstetric care services across the state and close the disparity gap between districts by strengthening the public health care facilities with adequate resources (including human resource, financial resources and others).
- Upgrade maternal ICU, HDU with 1:1 staff nurse/ANM facilities as per NHM recommendations. Develop and implement SOP for Labour ward, Operation theatres, HDU and ICU in accordance with standard protocols recommended by NHM/WHO. Establish State of art genetic center and fetal medicine unit with lab at 3-4 medical colleges in the state.
- Establish Level 3 referral ICU in all medical colleges in all districts with Dialysis unit and specialist services (obstetric medicine).
- Continually upgrade the skills of health workers in providing emergency obstetric care and life support and also in identifying and managing high risk pregnancies.
- Strengthen monitoring mechanisms and undertake concurrent evaluation of the program and activities on a yearly basis to delineate areas that require improvement.
- Focus on improving overall health of women by adopting life course approach and by addressing all health concerns of women like anaemia, cancer, domestic violence, gender disparity etc. (Ex: Address anaemia among women through broad based approaches like providing IFA supplementation across the lifecourse, improving nutritional services under ICDS scheme, Kishori shakthi yojana and SABLA scheme, ensuring food security, improving literacy and by reducing poverty among women).

Globally and in India, women are an important pillar of our society and are the primary caretakers, but still, they suffer more and have poorer health outcomes - with repercussions not only for women, but also for their families and society. Globally, about 800 women die every day of preventable causes related to pregnancy and childbirth, and 20 per cent of these women are from India (90). India's anaemia burden among women is widespread, with

53.1 per cent of non-pregnant women and 50.3 per cent of pregnant women being anaemic as per the NFHS-4 in 2016, despite having various programmes and policies for the past 50 years. Women also bear exclusive health concerns, such as breast cancer, cervical cancer and menopause apart from higher rate of heart attack deaths, depression and anxiety, suicides, urinary tract conditions, sexually transmitted diseases. Women's health are influenced by various factors like role of women in our society, gender disparities, poverty, illiteracy, early marriage, dowry system, domestic violence, sexual abuse, nutrition, access to quality healthcare and affordability and several others.

Maternal health has been a priority public health problem for decades in the state of Karnataka. Initiatives like Janani Suraksha Yojana, Janani Shishu Suraksha Karyakaram, LAQSHYA and NQAS programmes involving upgradation of labour ward, operation Rooms and other wards, and several other programs implemented in the state have overall resulted in considerable gains in terms of improvements in maternal health. Karnataka's Maternal Mortality Ratio (MMR) declined to 92 per one lakh live births in 2016-18 from 97 per one lakh live births in 2015-17 (91). The total fertility rate is 1.7 children per women, which is below the replacement level of fertility (91).

Despite certain improvement in women's health in the state, several other health concerns of women remains far from being achieved or addressed. Prevalence of anaemia among women in the age group of 15-19 years has increased to 49.4% during 2019-20 from 45.5% during 2015-16. Utilisation of public health facilities for delivery has not improved over years. According to NFHS-5, only 64.8% of delivery in the state is taking place in public sector which was a marginal increment when compared to NFHS-4 (61.4%). Utilisation of public health facilities for delivery in urban area is very low (56% according to 91). Percentage of deliveries undergoing caesarean section has increased in the state, though the reasons for the same are largely debatable. Between NFHS-4 and NFHS-5, percentage of caesarean section increased from 23.6% to 31.5% respectively. In addition, wide disparities in women health indicators between regions and districts of Karnataka also remain unaddressed.

Notwithstanding the major investments into RCH programmes, there are several major barriers and challenges to be overcome in implementation of programs and activities. Some of these include - acute shortage of trained and skilled human resources, regional disparities in infrastructure and manpower, non uniformity in implementation of programmes, poor maintenance of records at all levels, minimum availability of standard simulation labs for acquirement of competency, disproportionate demand-supply of beds and non-uniform admission-discharge policy at public hospitals resulting in overcrowded public hospitals with reduced satisfaction among patients, difficulty in sustaining programmes like LAQSHYA and NQAS, problems in use of digital technology, lesser focus on health education of public regarding safe sex, contraception, family planning and emergency care life support, data management issues and nonuniformity in adaptation of strict protocols for referrals and others.

While the primary answer to issues with women's health is the gender inequality, there are others which also include the poor healthcare systems. Despite taking necessary action to improve health indicators and providing healthcare for all, the government must also focus on the implementation, monitoring and evaluation of programmes for coverage and quality of services. Apart from health sector, departments of women and child development, rural development, education, welfare and others need to establish strong intersectoral mechanisms with a focus on health and social determinants to correct inequalities for better health outcomes. There is also a need to work on bringing awareness in the society about gender equality and equal opportunity for education, health, and work for women. Achieving sustainable health through investment and priority-driven approach in strengthening and expanding healthcare services and creating awareness on women's rights will effectuate in achieving Universal Health Coverage in Karnataka. Women's empowerment, mobilisation and engagement in health care programmes is vital to bridge the gaps. A life course approach with women given importance at all stages as a child, as an adolescent, working and family member and in later years needs a focus, integration and an investment.

SDG goal related to Women's health(92)

- By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
- By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes.

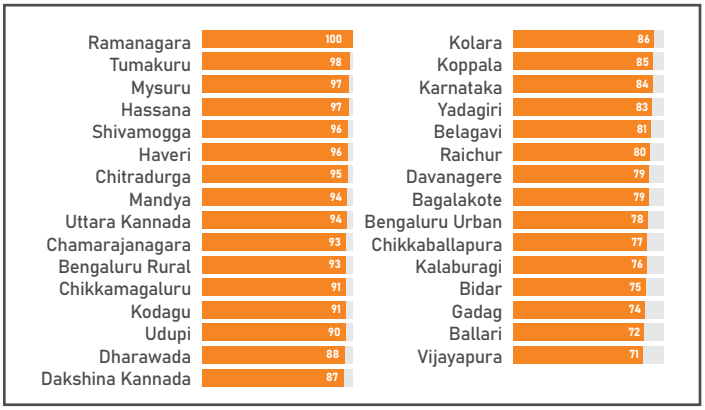
29. Child Health

- Constitute an independent task force to examine the district level variations and deficiencies to strengthen regionalisation of child health care services to reduce inequities and variations for setting up specific strategies for aspirational and low performing districts.
- Implement a decentralised action-oriented approach at the district level for effective data management under the district health information system for early decision-making at the district, sub district and community levels.
- Further scale up new-born and child health care services through evidence-based interventions, improved intrapartum, postpartum and follow-up services with a focus on early intervention through screening and effective referral linkages.
- Enhance quality and monitoring through establishment of standard protocols, quality parameters, quality monitoring, nutrition audits, mentoring programmes and accreditation systems.
- Transform paediatric care units and bring them to the same level of infrastructure, staffing and clinical standards or new-born care using standard facility based paediatric care packages.
- Develop a model for reinforcement and reorientation training, soft skills development and sharing of good practices for improved childcare services.
- Strengthen state level and district level convergence committees and establish institutional mechanisms for convergence of activities by the Departments of women and Child development, education, social justice and empowerment for early childhood development and nutrition programs.
- Develop and implement IT solutions for improved documentation and digitalisation of registers to support various programs and to link all related software under different activities.
- Promote a network of health promoting schools through development of framework, standards and accreditation system.
- Life skills training and counselling services should be mandatory in all schools to promote social and emotional skills as well as mental health of children.

The vision group envisions that every child in the state should have a healthy survival, optimal development and reach their full potential as happy and productive adults through a responsive, assured, affordable, accountable and high-quality healthcare system. Karnataka is home to 23 million children below 18 years of age (> 27 % of the projected population in 2021) spread over 31 districts. With policy reforms, strengthening of infrastructure in maternal and child health care services and programme implementation, there has been a decline of child mortality and morbidity rates (Figure 17) overtime, but challenges still exist due to regional disparities in infrastructure, coverage and quality deficiencies. In order to move forward towards the state commitment to the global agenda to end preventable deaths of new-borns and to achieve a single digit neonatal mortality rate by 2030, there is need to augment and innovate through intensified actions.

Child health programs are delivered under the Reproductive, Maternal, Newborn, Child Health and Adolescent Health (RMNCH +A) strategy of the National Health Mission through integrated interventions. The program supports improved child health, nutrition status and addresses several factors contributing to neonatal, infant, under five mortality and others. The state has implemented several initiatives through evidence-based interventions like facility based new-born care,(new-born stabilisation units, new-born care Corner), home based new-born care, Janani Shishu Suraksha yojana, child death reviews, Kangaroo care and lactation clinic, integrated management of neonatal and childhood illnesses and intensified the area control fortnight programs. Further, under Rashtriya Bala Suraksha Karyakrama (RBSK) interventions to address birth defects, diseases, delays and deficiencies are delivered. The basic vaccination coverage in the first year of life has increased from 63% to 84% between NFHS 4 and NFHS 5 surveys. Acute respiratory infections, childhood diarrhoea, other childhood infections are being addressed through several programs along with strengthening breast feeding practices, young child feeding practices and covering micronutrient deficiencies like anaemia and others.

Figure 18: Percent coverage of all basic vaccinations among children aged 12-23 months by district, NFHS-5



However, variations across districts are recorded varying from 100 % immunizations for less than 1 year old in Ramanagaram to 71% in Bijapur with also a higher coverage in the rural areas as compared to urban areas (Figure 18)(28).Regional variations in child nutrition, child immunisation, coverage under different programs have been documented as revealed by NFHS-4 and 5 surveys (57, 91, 93). As a decline in infectious, communicable and nutrition disorders are registered, there is also a growing burden of emerging conditions like anaemia, over nutrition, gender-based violence, injuries, disabilities, autism and delayed development disorders, onset of NCD factors, technology addiction, early marriage and pregnancy, lack of nutrition awareness, poor healthy behaviours, academic stress, poor health seeking behaviour and poor compliance to Iron and folic acid supplementation in the 10 to 19 years age group. The school health program though existing far more than a decade, needs greater focus and scale of implementation to achieve maximum benefits. Several field level challenges exist for improving child health in the existing programs of Karnataka.

Despite significant effort and progress, the child health outcomes in Karnataka still lag behind neighbouring States like Kerala and Tamil Nadu. The state needs to expand and strengthen the focus from survival to intact survival and thrive agenda (early child development, early intervention) by strengthening child health services for equity and quality through systems and life-course approach, augmenting infrastructure and motivated human resources at all levels for better service delivery, and setting up multisectoral coordination and collaboration for implementation of programmes. Health sector reforms and strengthening programs are urgently required to scale up activities, improve healthcare services to bring further reforms for improving child health in Karnataka. It is most important to focus on districts that are poorly performing to strengthen activities in this area. A district wise mapping would be helpful to identify specific pockets for providing in-depth inputs.

Peer Educator programme under RKSK

The Peer Educator programme aims to ensure that adolescents or young people between the ages of 10-19 years benefit from regular and sustained peer education covering nutrition, sexual and reproductive health, conditions for NCDs, substance misuse, injuries and violence (including Gender based violence) and mental health. This is eventually expected to improve life skills, knowledge and aptitude of adolescents. Four peer educators per village (1 male and 1 female for schools and 1 males and 1 female to cover out of schools) selected based on the recommendation/ nomination of ASHA and the school teacher are expected to perform a range of activities like sensitization, education and referral activities.

Box 6: Health promoting schools

Schools are important spaces for promoting child and adolescent health. More children than ever are now attending school and the school has become a natural entry point for reaching children and adolescents with health education, health promotion and health services. Schools present the ideal ecosystem for students to learn, adapt and practice. Thus, developing a positive school climate through the health promoting Schools approach creates conditions that are conducive to better health and educational outcomes and influences health behaviours to the benefit of children and adolescents, school personnel and also to the broader community.

Health promoting Schools model uses six strategies to promote good health: school-level policies, the physical environment, the social environment, the health curriculum, and linkages to community and health services. School health services under Health-Promoting Schools ensures that all students have access to comprehensive school-based or school-linked health services through a range a preventive, promotive, curative and rehabilitative services along with regular health appraisal of school children.

School-based interventions for promoting adolescent health programme (SEHER) in Bihar were first of its kind in India to demonstrate the effectiveness of school-based intervention to improve adolescent health outcomes. Activities of SEHER included establishment of a School Health Promotion Committee comprising students, teachers, parents and school management; awareness-raising activities; a suggestion and complaints box; a wall magazine; competitions; and the adaptation and adoption of policies on bullying and substance use. The success of SEHER provides an immense scope for improving children and adolescent health though intensification of school health activities under Ayushman Bharat in the state of Karnataka.

In Karnataka, school health services are implemented by a team concept , with each team having doctors and nurses visiting schools on a regular basis. Implemented under RBSK, and even upto taluka levels, opportunities are in plenty to promote healthy schools. Can this programme be scaled up with a clear focus and programme outline with monitoring and evaluation ?

30. Adolescent Health

- A landscape analysis of the current status of adolescent and youth health and well-being should be performed to clearly understand the current status of programs, services and schemes to develop a baseline district level youth line and adolescent development index for a long-term perspective
- Adolescent and youth health and well-being programs should clearly focus on the identified seven areas of nutrition, mental health, gender and sexuality, injury and violence, leadership and communication, physical health and well-being as well as education and life skills.
- Create enabling environment that promotes health and well-being of adolescents and youth in educational institutions, health and wellness centres, youth guidance centres adolescent health clinics, yoga and meditation centres, community amenities like playgrounds, stadiums, parks and other green spaces.
- Establish and enhance robust inter-and intra-department collaboration mechanisms between the departments of health and family welfare and other departments for promotion of schemes for vulnerable adolescents and youth
- Develop technology-based and technology enabled programmes for youth that can integrate solutions
- Enhance social protection programmes/ schemes for vulnerable populations including the urban poor, migrant communities, homeless adolescents, tribal and backward area members and for children living with widowed/single mother/ gender sexual minorities and others
- Enhance skill development, empowerment and leadership opportunities by engaging with different organisations and state-level youth Federation through the departments of health and other relevant agencies
- Establish strong monitoring and surveillance systems for health seeking, morbidity and mortality among adolescents and youth by creating family linked and facility based records in all ongoing programs and services under the National Digital Health Mission and Ayushman Bharat schemes.

The vision group envisions that every adolescent and youth (10 – 30 years) should achieve positive health, a healthy lifestyle and well-being with the potential to live without any disease or disability in Karnataka. Adolescents and youth in the age group of 10 to 30 years is a transitioning period in everyone's life and is associated with significant physical, mental, social and emotional changes during this phase. Many NCD risk factors take their origin during this time. This is also the phase when many life changing events such as education, marriage, childbearing and childcare occur. The growth spurt and hormonal changes including development of secondary sexual characteristics creat demand for better and adequate health.

Despite the significant progress made in reducing the prevalence of Iron deficiency among adolescents in Karnataka, about 30 micronutrient deficiencies have been observed in this group. The double burden of over nutrition and under nutrition is prevalent among 31% of adolescents in India and Karnataka may not be an exception(93). The prevalence of mental morbidity among 13 to 17 years and 18 to 29 years was 7.3% and 7.5%, respectively, with depression, anxiety and suicidal ideations(94). Nearly 42% of the total 11288 suicides were in less than 30 years age group, more among women(95, 96).The national NCD monitoring survey showed that physical inactivity, tobacco use, raised blood pressure, and alcohol use was common in this age group; likely to be similar in Karnataka with minor variations(93). Among the 10958 road accident deaths in the year 2019, 4.1% and 19.1% was in the age group of 0 - 17 years and 18 to 24 years, with one out of four road deaths among individuals less than 25 years(96). Unintentional injuries and violence is also more in this particular age group. Data from the Yuvaspandana program reveals that a large number of young people have low self-awareness, emotional issues and low self-esteem and were in need of services for specific health concerns(97).

Seven select areas have been identified in the overall health, well-being and development of adolescents and youth in Karnataka. These are (1) nutrition, (2) physical health, (3) psychological well-being, (4) education- life skills and employability, (5) gender- sexuality and gender-based violence, (6) injury and violence and (7) leadership and communication. Data is scant from Karnataka in these areas as there are no large-scale population-based youth health surveys in the state; when included in larger surveys disaggregated data is not available.

The seven areas identified above for preserving and promoting health are important and needs to be addressed and previous efforts through RKSK has had limited success for variety of reasons. There are evidence-based and cost-effective sustainable interventions (Table 10). A review of the ongoing programs in the state clearly indicate that programmes specific to youth are either absent or limited to pregnant and lactating mothers, along with lack of awareness about health and youth issues, stigma associated with help seeking, dependence on others for providing help apart from absence of data in the specific areas.

Many policies and programmes of both GoI and GoK have a focus on health of young people. In the state, there are nearly 400 schemes and programmes across all government departments catering to the needs of youth. Huge variations are seen with regard to the implementation of these programs in different departments in different districts with different goals and objectives as well as financial arrangements..

Table 10: Cost effective programmes, strategies and solutions for health and related problems among youth.

1) Nutrition	ICDS, Mid-day meal program, village health nutrition and sanitation committees, WIFS, Annual deworming program, National Iodine Deficiency initiative, Anemia control during pregnancy through Iron and Folic acid supplementation program
2) Physical Health and Well-being;	Stronger focus on health promotion aspects of National Program for control of NPCDCS, promotion of physical education in education systems, effective implementation of anti-smoking laws, prevention of alcohol use, and anti-substance use laws along with networking and standardization of existing de-addiction centers for early rehabilitation.
3) Mental health and psychological well-being;	Implementing and promoting School mental health program, Yuva Spandana program, online tele-counselling and support services, Youth helpline, Sneha clinics (adolescent health and wellness clinics) throughout Karnataka.
4) Education, life skills & employment	Promotion of National Service Scheme, National Cadet Corps, Bharat Scouts and Guides, life skills and counselling services program.
5) Gender, Sexuality and Gender based violence;	RMNCH-A+ program, RKSK, Adolescent reproductive and sexual health clinics, urban wellness centers , gender sensitization and gender equality programs, Spoorthi program
6) Injury and violence	Use of helmets, seat belts, no-drink drive, less speeding, ban on cell phone use, good pedestrian behaviors and implementation of these laws ; mental health promotion – building resilience-control of substance use – mental health services ; ensuring women's safety – one stop centres-other violence prevention measures – school safety programmes
7) Leadership and Communication	Promoting GoI's Skill India and Atma Nirbhar Bharat initiatives, Youth empowerment programs, empowering youth clubs within the state for sustained economic and social stability

31. Health of The Middle-aged

- Karnataka should establish an autonomous Occupational Health Authority as an umbrella autonomous organisation to plan, supervise, implement, monitor and enforce occupational health services across multiple sectors
- A state-level task force should be constituted to review existing health and related programs, services and legislations to recommend changes to address changing health priorities in workplaces
- A state Institute of occupational health is necessary to advise the government and coordinate activities of capacity building, research, diagnostics, surveillance and policy analysis in occupational health
- A robust and reliable occupational health information system which collects data from different sectors on a regular basis is required for reporting, notification, monitoring and surveillance of health of workers
- Pilot demonstration models for integrating basic occupation health services into primary healthcare in three different districts in the state should be facilitated by the government.
- Sustainable capacity building programs to bridge the deficiencies in qualified occupational health professionals should be started in different areas of occupational health including training for primary healthcare staff at taluka and district levels
- Workplaces provide an excellent opportunity to strengthen health promotion and screening activities for control of NCDs, NCD risk factors, mental disorders, injury prevention, safety promotion and should be implemented in all workplaces.
- Most importantly, it is crucial to recognise and implement basic occupational health services for those in the unorganised sector which include screening, health protection, guidelines and linkages with existing national and health and welfare programs.

Ensuring that the population in middle aged groups are provided basic health services in organised and unorganised work sectors to achieve optimum level of physical, mental and social health is the vision for the state. Nearly 45% of the 62 million population of Karnataka (27.9 million) are classified as working population and their health status is likely to impact the overall health, economy and productivity of the state. Most significantly, children, women and elderly in their families are dependent on this productive section.

Figure 19: Evolving work environments

Nearly 92 % of the workers are employed in the unorganised sector with minimal and health welfare benefits : several factories and industries employ significant numbers. With most of the industries concentrated in places like Bangalore Rural, Bellary, Mysore, Kolara and Tumkur (75% of all industries), people in this age group work in the unorganised sector(11). In cities like Bangalore and few other places, a large population works in IT and BT sectors with significant numbers from outside the city.

The work environment, pattern, nature of work and life styles have changed significantly over time. Health priorities of working populations are rapidly evolving but occupational health ecosystems has not evolved at the same pace to address the fast changing health risks among workers (Figure 19). Workers today face a quadruple burden of occupational diseases, communicable diseases, noncommunicable diseases and injuries. In this age group, apart from the major occupational disorders like silicosis, pneumoconiosis, musculoskeletal injuries, pesticide poisoning and noise induced hearing loss, emerging health problems like NCDs and their risk factors are highly prevalent. Substance use and mental disorders are a major problem in and outside work places (Table 11). Injuries account for a major share of morbidity, mortality and disability. Most significantly, NCDs are not covered by existing legislations in occupational health services and programs.

Table 11: Occupational diseases, NCDs, Psychological problems in workplaces(97)

NCDs, Psychological problems in workplaces	Prevalence
Diabetes	8.1%
Obesity	30.9%(men), 32.8%(women)
Overweight	33%
Hypertension	11% - 31%
Tobacco, Alcohol use	31% , 27.7%
Psychological distress	23%
Work stress	10 - 11%

Among women, health problems related to reproductive child health are still prominent in rural areas despite the progress made in our MCH programs. Specific problems of women include noncommunicable diseases and substance use disorders, especially consumption of tobacco and its products in rural areas. Anaemia (46 %)(91), depression and anxiety (3 - 4 %)(99), diabetes (2.5%)(100), hypertension (11.5%), obesity (11.2%)(100) and others placing a significant burden on women and their families. In Karnataka, nearly 20.8% of deaths among women aged 15 to 49 years was due to self-harm followed by deaths due to ischaemic heart disease(11.7%), maternal causes (4.37%), tuberculosis (4.1%) in 15 to 49 years(91, 101).Women living in underprivileged areas, urban slums, marginalised communities, tribal areas, migrant populations have a disproportionate health burden and also cannot afford proper healthcare due to several reasons.

People working in unorganised sectors are not healthy either, apart from their lesser exposure to environmental toxins and formal work environments. The fragmented and scattered nature of this sector makes it challenging to track their health issues in the absence of well conducted population-based health surveys. In addition to several health problems, people in this age group also face number of family, social and economic problems. The recent Covid 19 pandemic is a living testimony revealing a combination of health, social, economic and psychological problems amidst situations of uncertainty and increased stress. In the absence of proper social protection mechanisms this population is highly vulnerable to many influences including health. There are several programs and schemes for safeguarding health of the workers which is implemented in Karnataka. Some of them like Rashtriya Swasthya Bima Yojana , ESI scheme for wide range of workers, Karnataka Labour welfare board schemes, construction workers welfare board benefits, and individual schemes operated by departments covering maternity benefits, disability benefits, accidental death benefits and even funeral assistance for individuals and families and others.

A review of the current occupational health services indicates their presence outside the health sector and primarily in the Department of labour. Even within the Department of labour they are mainly for the organised sector workplaces covered by specific health legislations or by the respective global health policies. The Indian Factories Act is applicable to all registered factories and, occupational health services are provided by occupational health units, established in the premises based on number of employees and the nature of the industry. The act prescribes the need for occupational health clinic in all hazardous industries with 50+ workers governed by state-level inspectorate. ESI scheme provides both curative services and other benefits to enrolled workforce. Mines, plantations, cinemas, tobacco workers and several others have health systems-based separate acts for their group of workers. In 2020, 13 such labour laws were replaced by the occupational safety, health and working code to integrate several of the schemes under one umbrella(102).Consequent to such diversified range of activities, many other components of integrated healthcare like training, technology use, service delivery are also split across different sectors with no uniformity in services. Hence, policy and legislative reforms are urgently required along with changes in health systems and services for working populations along with strong advocacy measures.

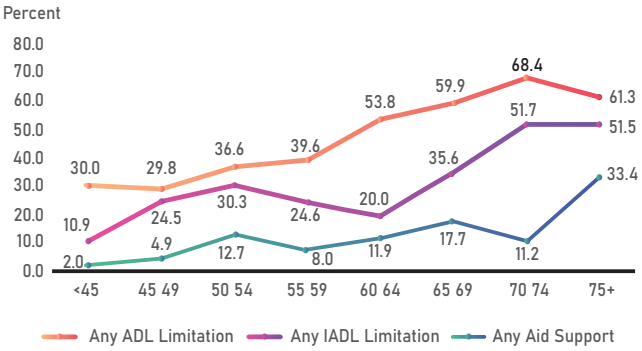
32. Health of the elderly

- Delivery of wide range of preventive, promotive and welfare services for elderly with adequate protection mechanisms by developing an ecosystem for geriatric health and care in the decade of healthy ageing 2021 – 2030 and beyond
- Training personnel for elderly healthcare activities with the development and adaptation of eight modules for different categories of health personnel as suggested by the subcommittee on elderly health.
- Enhance clinical and related care through effective implementation of NPHCE, strengthening of activities in health and wellness centres, geriatric care clinics in all medical colleges at the district level, including packages under the ABArK schemes .
- A comprehensive plan for elderly care in the state needs a task force to be constituted with experts drawn from health and all related sectors to examine issues beyond medical care, including areas of assistive living, adult day care, long-term care, residential care, hospice care and home care to develop integrated models of comprehensive geriatric care in both urban and rural areas and for both the rich and poor people through a hub and spoke model, juxtaposed with primary health care centres as a add-on service component.
- set up a state geriatric Institute to provide standardised academic and research activities in every medical College with a central monitoring and evaluation framework.
- Community-based services which are well designed, and monitored with stringent regulations and legislations as required for elderly and this requires innovation for providing assistive devices for the disabled population among the elderly.

The subcommittee of the vision group for care and support of elderly envisions an independent, healthy and secure living for all senior citizens in the state to live a life with dignity till the end. The goal is to promote healthy ageing for all people to lead a healthy and happy life.

The phenomenon of population ageing considered as unprecedented global demographic transformation is a major concern all over the world. The requirements of the elderly are complex and belong to multiple domains of physical, mental, social and economic spheres. The determinants of elderly health pervade beyond the confines of health and are reflected in the SDGs in 10 different areas. Protecting and promoting positive health among elderly should be an area of highest priority. Elderly suffer from multiple and chronic diseases and need long-term and constant care. Their health problems also need general and specialist care from various disciplines in the medical field. The immobile and disabled elderly need care closer to their homes and all these not just in the range of services but also in terms of quality.

Figure 20. Health status of elderly, LASI study



Elderly account for 8.6% of the total population in 2011 and is projected to be 20% by 2050 in India (12).The number of elderly in Karnataka is nearly 6,000,000 (9.1 %)(11, 103) and greater than the national average. The NSSO 2019 report indicates that 27.7% of the elderly reported ailing in the 15 days reference period with an equal proportion among males and females(91).The vulnerability of elderly increases across economic levels and in other dimensions such as place of residence, gender, caste, marital status, living arrangements, children and economic dependence.

As per the recent Longitudinal Ageing Study of Indians study, more than two thirds had sought outpatient care in the past year and from a private facility. Expenses of the private facility were double then what was usually in a public facility. Less than half were reporting satisfaction with their own life and 1/10 reported poorly on self-rated health. Ten percent of the elderly reported any experience of ill-treatment in the last one year. Limitation in activities of daily living was reported by 18.7 % and nearly half required assistance for day-to-day activities with the trend increasing with age(103) (Figure 20).

The National Programme for Health Care of the Elderly (NPHCE) is the single most comprehensive and dedicated program for elderly in India. In addition, National Programme for Palliative Care, NPCDCS, National Programme for control of blindness, National Programme for Preventing Deafness also address issues and concerns of the elderly. Karnataka government is implementing the NPCHE programmes across all districts in the state since 2019 and infrastructure strengthening has been a key focus. Apart from conducting geriatric clinics and providing facilities at times of need the program is essentially supply side driven and does not answer the demand related questions. In a recent review of the NPHCE programme in Kolar district many challenges with regard to implementation of the programme has been observed(104).

The existing services in the state addresses select health conditions as per funding and manpower availability. There are several challenges like accessibility and availability of services, fragmented family structure, costs for additional support, health economic dependence of the elderly, integrated rehabilitation services, absence of continued support, patient given education is only cursory and end of life care is scant in both qualitative and quantitative terms. Support programs for elderly are unmonitored in its true sense at the district and sub district levels. In addition to all these, the inadequately trained staff at all levels and failure of convergence and linkages between silo programs remains a major challenge.

The principles of elderly care are – recognise them young for effective preventive care, plan for a comprehensive range of services for every elderly person, incentivise service delivery at all possible levels, support collaborative care and involve family members, and arrange services for 60 + and for those below 60.

33. Health Status And Burden

Policy reforms by successive governments, moderate investments in infrastructure and manpower and strengthening programme implementation have brought positive changes in the state amidst sociodemographic and epidemiological transition. In the year 2017, Karnataka became first among all states in India to set forth a comprehensive plan for UHC in line with achieving SDGs by 2030(1).

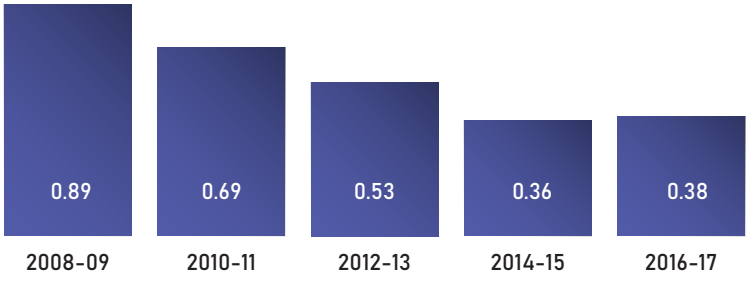
As per NITI Aayog health index ranking, the state has moved from 9th to 6th position in terms of overall rank as well as in incremental rank between the base year (2015-16) and reference year (2017-18)(3). Karnataka state was 'one among the top ten performer Front-runner Larger States', with a progress in performance score in health outcomes domain (incremental change= 2.75) while there was a decline in performance score in key inputs/processes domain (incremental change= -2.81) between the base year and reference year(13)

The National Family Health Survey (NFHS) data of 2015 - 16 indicates that Karnataka has performed relatively well in the area of maternal and child health. The fertility level , the birth rate (per 1000 population), the death rate (per 1000 population) also decreased from 7.4 in 2008 to 6.3 in 2018 along with increase in number of child immunization, number of mothers receiving antenatal care and number of institutional deliveries are documented over the past decade. The Infant Mortality Rate (IMR) and Under Five Mortality Rate has declined over the past decade(91) as well as maternal mortality (Figure 22). Life expectancy has also increased in the last 2 decades (18, 54, 91, 105) (Figure 19)

Success has also been documented in the fight against a few of the communicable and infectious diseases. The state has implemented all national programmes over time jointly with the central government along with its own resources, programmes and efforts. Consequently, the burden due to some infectious diseases like Tuberculosis, Malaria, HIV/AIDS (Figure 21 & 22), and others are on the decline due to rigorous implementation of disease control programmes, while Leprosy is on the verge of eradication as per official data sources(28). The burden of few localised diseases like encephalitis, AFS, KFD and others have been controlled and mortality has been reduced.

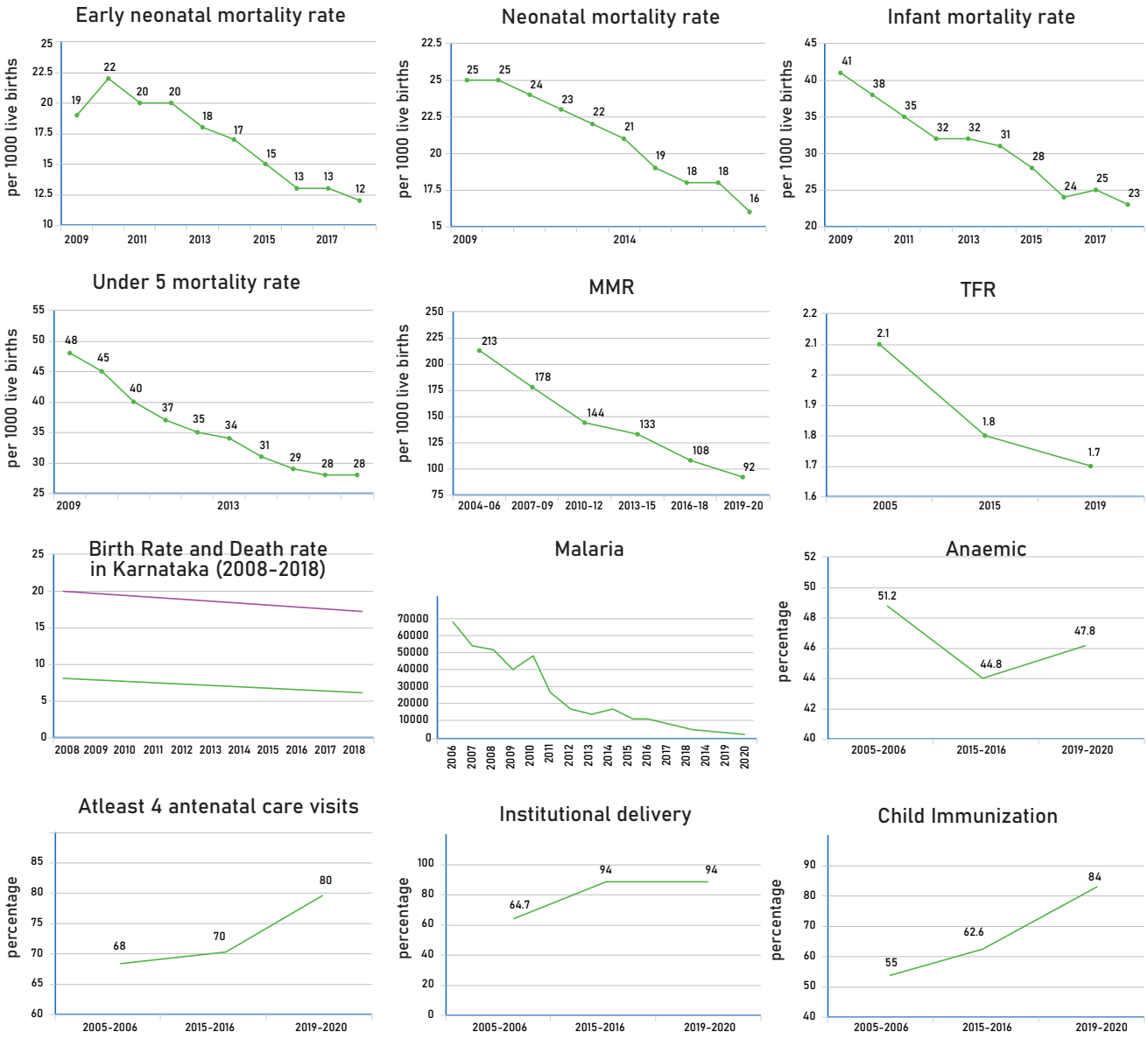
Few childhood infectious diseases like polio, measles and others are also on the decline and continued efforts are required for further success. The coverage of immunization increased from 63 % to 84 % between NFHS –4 and NFHS – 5(91). The coverage of immunisation varied from as high as 100% in Ramanagara to as low as 71% in Bijapur (Figure 18). Urban areas had poor coverage when compared to rural areas. NFHS-5, also highlighted the poor help-seeking behaviour and poor practices related to ARI (acute respiratory infection) and childhood diarrhoea.

Figure 21: HIV Prevalence levels among ANC clinic attendees in Karnataka



Amidst this changing scenario, it is to be realised that progress made in some of the areas highlighted earlier is not uniform across the state. Disparities and variations exist between regions, between urban and rural areas, across various districts and even within districts.

Figure 22: Trends of early neonatal, neonatal, infant and under 5 mortality rates since 2008.



- According to the Epidemiological Transition Level grouping by India State-Level Disease Burden Initiative, Karnataka comes under higher-middle category. In the year 2016, the proportion of total disease burden in the state was highest from Non communicable Diseases (62.0%), followed by communicable, maternal, neonatal, and nutritional diseases (25.1%) and injuries (12.9%)(11). NCDs, particularly cardiovascular diseases are leading cause of deaths in those aged above 40 years along with respiratory disorders and cancers(15) (Figures 20 – 25).
- The leading causes of DALYs in the state in 2016 were Ischemic heart disease (11%), followed by COPD (4.9%) and self-harm (4.3%). The contribution of Diabetes towards DALYS increased significantly from 1.1% in 1990 to 3.4% in 2016(101).
- Mental and substance use disorders account for about 10 % of total morbidity in the state population(99).
- Neurological disorders in the state account for 2.52% of all deaths and 3.4% of total DALYs(101, 106) with stroke being the leading contributor of mortality as well. About 41564(106) and 700,000 (107) deaths were due to stroke in Karnataka and India respectively in the year 2019.
- In 2019, about 10,000 persons, majority in young and productive age groups and often men, died in road crashes(96). With increasing urbanisation and unsafe environment in homes, schools and work places, fall injuries has become a major cause of deaths and hospitalisations. Burns, drowning, mechanical injuries, and agricultural injuries have increased in last decade contributing for a greater share of hospital admissions and disabilities. Suicide (often cutting across mental

health and social issues) and violence among children, women and elderly are becoming major health and social concerns.

- Among all the risk factors, high blood pressure (10.5%) contributed highest towards DALYS in the state in 2016, followed by dietary risks (9.6%), high fasting plasma glucose (8.3%), tobacco use (5.5%), high total cholesterol (5.4%) and alcohol and drug use (4.1%)(101). Among the risk factors for NCDs and RTIs, unhealthy diet, high blood pressure, high blood sugar, high cholesterol, and overweight together contribute for about a quarter of the total disease burden in India. Karnataka was one among the states with high proportion of these risk factors leading to cardiovascular disease, diabetes, stroke and cancers (Figures 26 and 27).
- Amidst these existing and established problems, many emerging health conditions and concerns present greater challenges for the coming years. An elderly population with multiple physical, mental, neurological conditions ; dementia and Alzheimer's among elderly: suicide in multiple segments of society, especially among women and younger age groups ; poisoning with a variety of products ; depression – anxiety and other disorders; substance use problems with drugs – alcohol – tobacco – other addictive substances ; child obesity and coexistence of malnutrition; COPD – asthma – allergic conditions due to air pollution; technology addictions among youth ; stress and its consequent effects ranging from sleep disorders to cardiac events; sports injuries; disasters of varying nature; localised epidemics and moving pandemics as in Covid-19 ; new suspected zoonotic infections; and others are a few examples of emerging health conditions

that are at the central stage today. Health sector needs to respond to these challenges and be responsive for all existing and emerging health conditions in both rural and urban areas.

- The various innovative efforts undertaken by the State Government has resulted in reduced morbidity and mortality in some areas accounting for partial success. Both NRHM and NUHM and various activities in both schemes have made progress in implementation across the state. Expansion of water and sanitation to village level has shown remarkable success. The Yeshasvini Co-operative Farmers Healthcare Scheme is a largest self-funded healthcare plan in Karnataka and also in India, completing 15 years of successful implementation(15). Establishment of Suvarna Arogya Suraksha Trust(SAST) to deliver the Vajpayee Arogyashree Health Assurance Scheme to BPL families in the state and its expansion to tertiary and secondary care is another novel programme in the state (16). More such examples in individual areas are provided in later sections of this report.

Figure 23: Life expectancy at birth in Karnataka

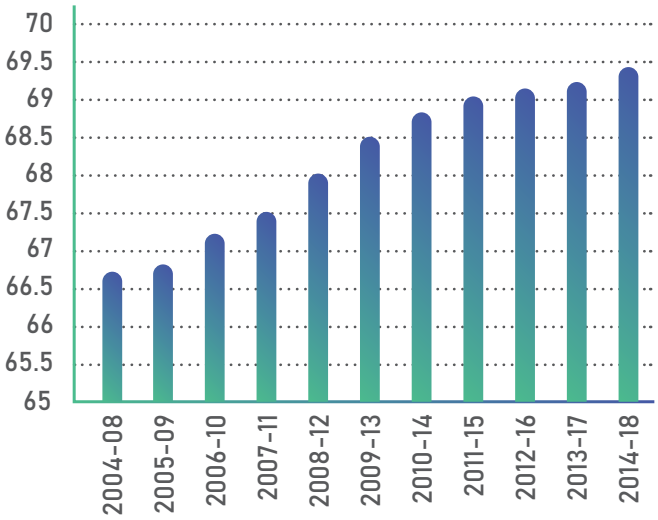
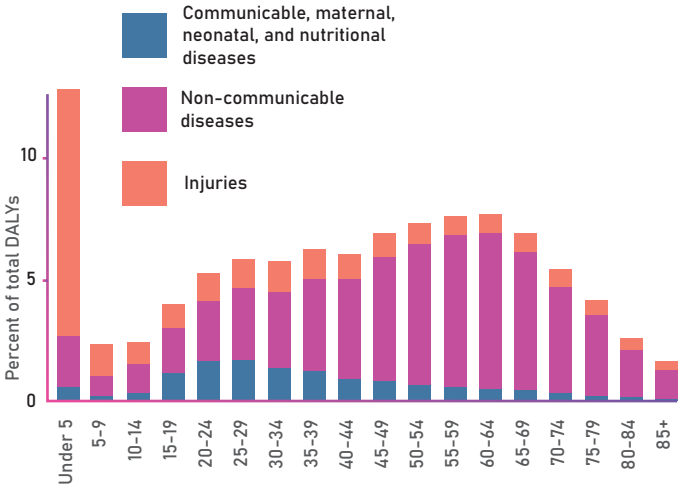
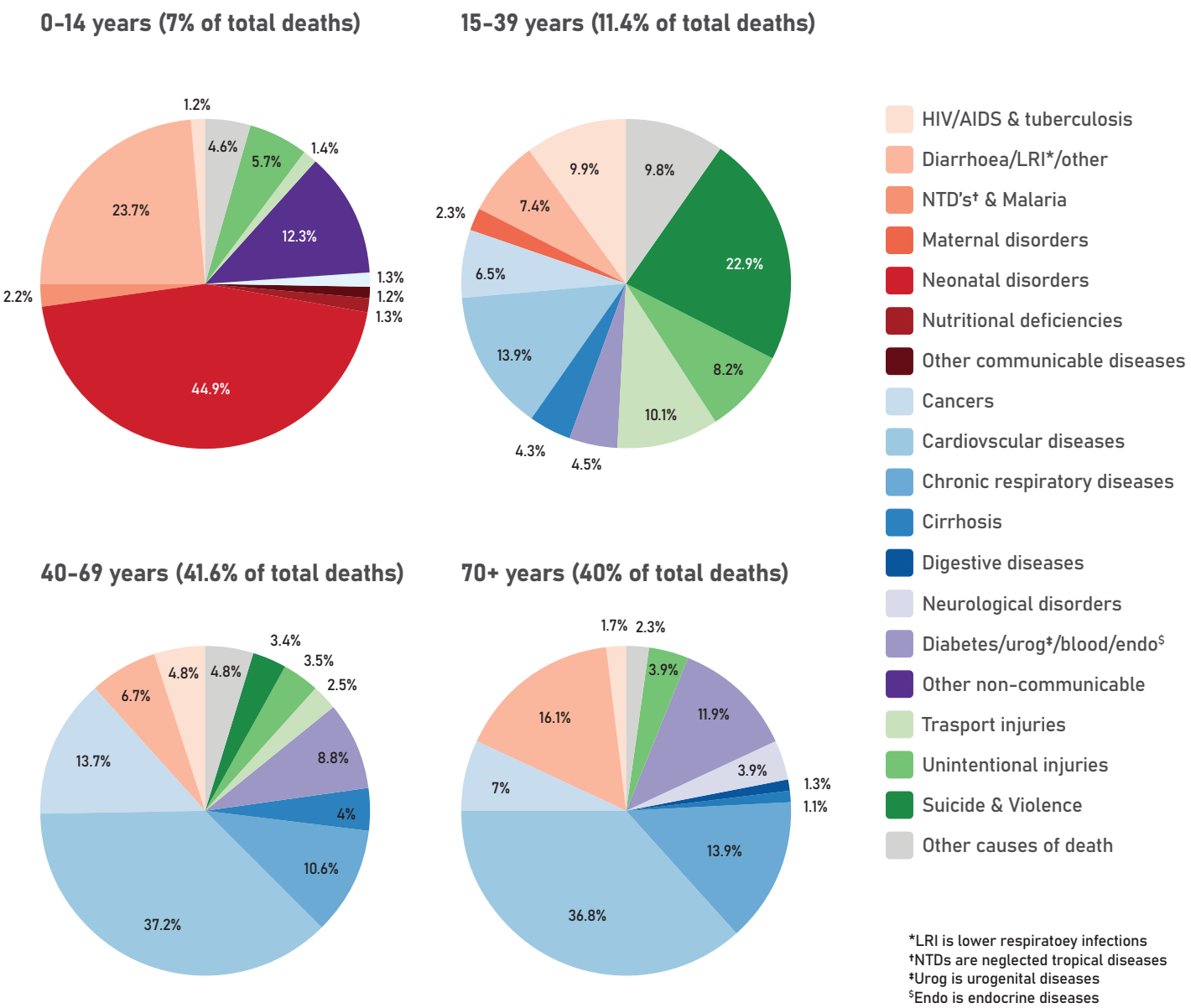


Figure 24: Trends of DALYs due to various diseases in different age groups



- The changes in disease burden over time are influenced by a wide range of health, social, economic and environmental determinants that influence the origin, burden, progress and outcomes of these conditions. Factors linked to access, availability, and utilisation of health care services broadly influence the outcomes and financial impact of all health problems. Understanding the overall disease burden and its determinants is a necessary step towards bringing for working towards improving health outcome.
- In this complex and changing scenario and because of these emerging challenges and issues, the state has a long way to go in achieving standard health outcomes. The health department has to understand the nature and size of problems, have the resources to address problems, design and implement solutions uniformly across the state in an equitable and sustainable manner, ensure well-functioning health service delivery system and monitor and evaluate programmes.

Figure 25: Major disease burdens across age groups in Karnataka.



*LRI is lower respiratoey infections
†NTDs are neglected tropical diseases
‡Urog is urogenital diseases
$Endo is endocrine diseases

Figure 26: Leading causes of DALYS in Karnataka in 1990 and 2016.

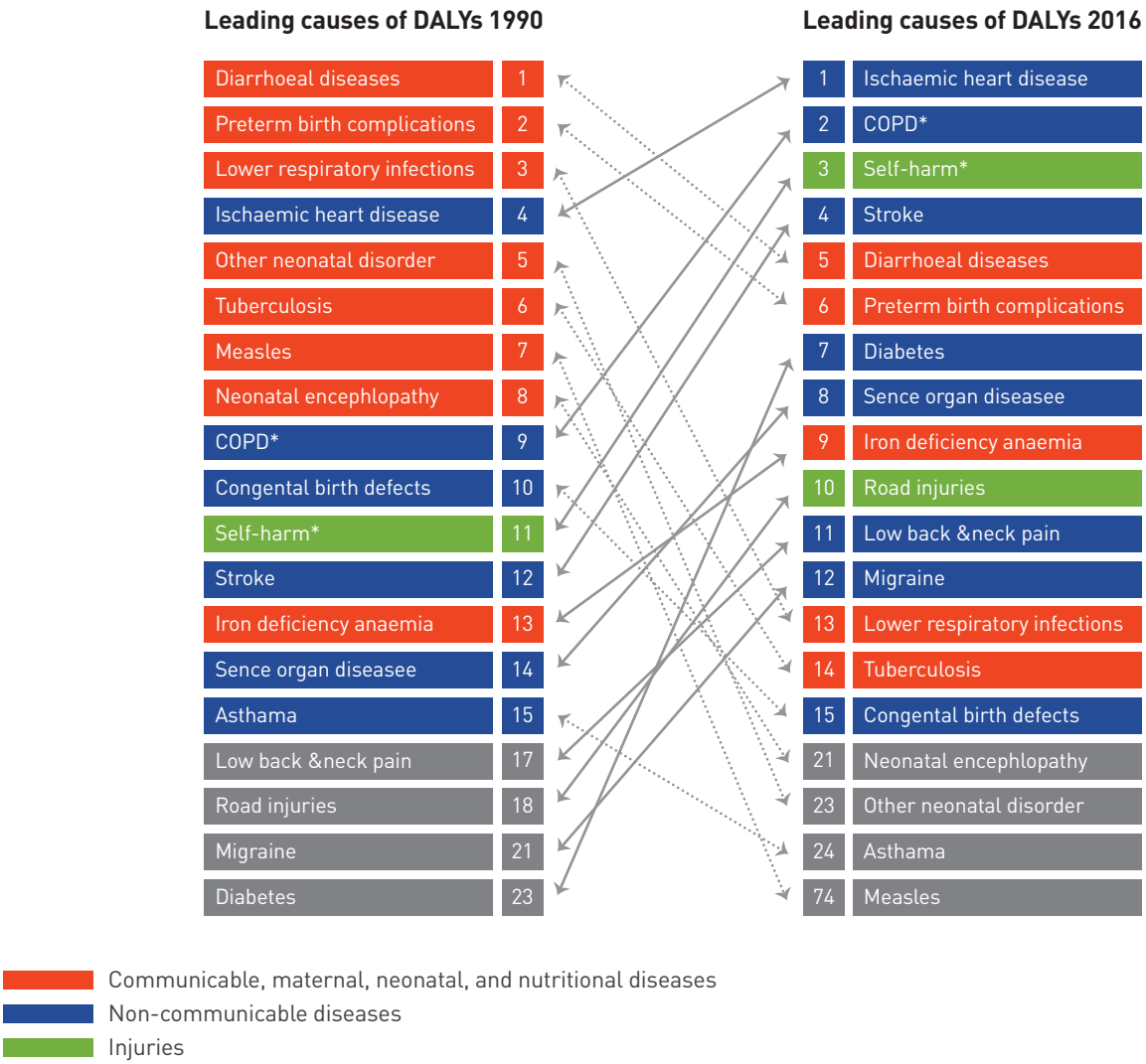
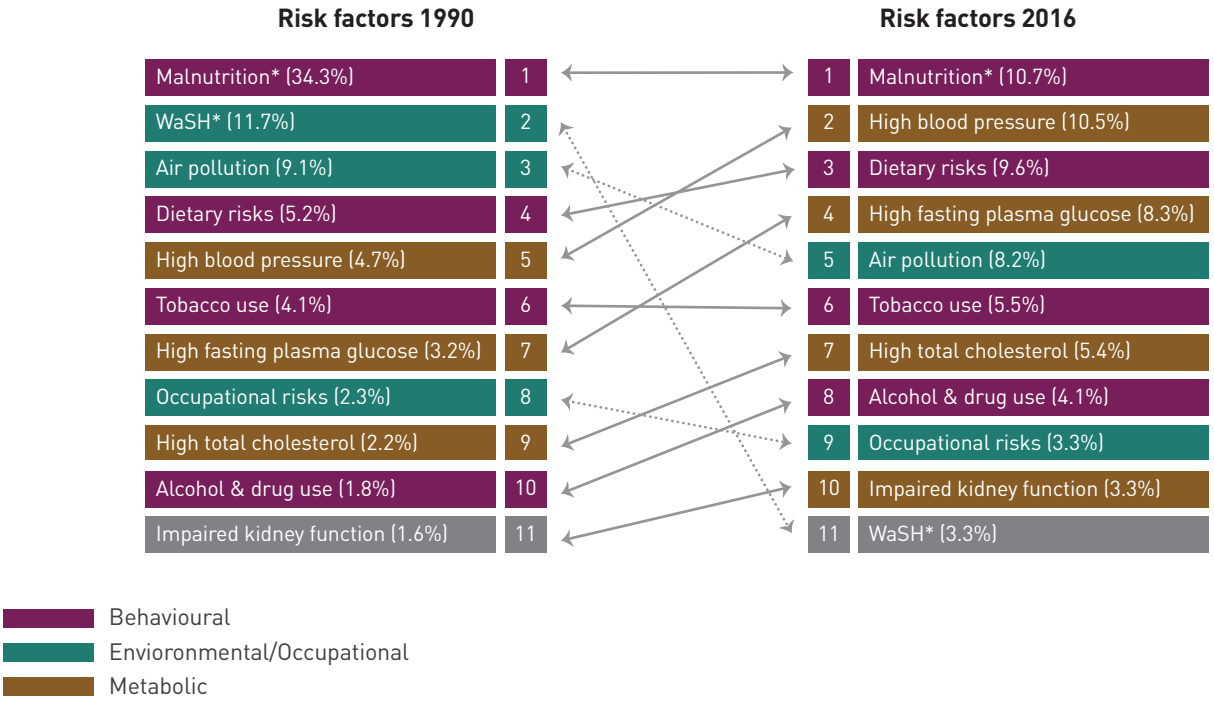


Figure 27: Trends of risk factors from 1990 -2016.



34. Infectious and Communicable Diseases

Ten strategic action areas to address the last mile journey of Communicable and infectious diseases.

- The last mile journey in prevention / elimination has to be driven by good quality data using GIS software to focus on high geographic locations for area specific control measures for individual diseases.
- Capacity strengthening of state and district officers along with engagement of Junior Health Assistant (Male MPW) with supervision and monitoring of his work at village level is crucial.
- High incidence /prevalence report should be developed / shared on a periodical basis with the nodal officers of various districts for monitoring control measures.
- IDSP should share the surveillance data with all the programme officers with the creation of . User id and password credentials for taking timely action.
- Epidemiological investigation of all individual disease cases is a must at district / taluka levels with action reports to state programme officer.
- Screening of migrant people is a priority action area to check import of new cases of relevant communicable diseases like malaria, filariasis, etc.in select districts on a regular basis
- As the state moves steadily towards elimination of diseases like malaria, filariasis, leprosy etc. the last mile efforts require high quality surveillance. Peer review or expert group review is required in those districts which are to be certified for elimination.
- Accreditation of health care institutions and laboratories has to be done regularly along with Quality assurance of diagnostic tests at sentinel laboratories.
- Greater coordination and collaboration between health department and medical education department institutions has to be ensured.

Karnataka has made significant progress in the control and prevention of major communicable and infectious diseases with an impressive decline in the incidence and prevalence during the last decade. State is committed to the implementation of national programs and to achieve the goals set out under the National Health Policy 2017(18).The landmark programs of the state like the "state Framework for Malaria Elimination" and "Kshaya Mukta Karnataka" (Tuberculosis free Karnataka) are major programs along with Leprosy and HIV/AIDS. Expansion of programmes and decentralisation of diagnostic laboratories, from the times of H1N1 outbreak to recent Covid pandemic, and the excellent work done by ASHAs are well appreciated(108).

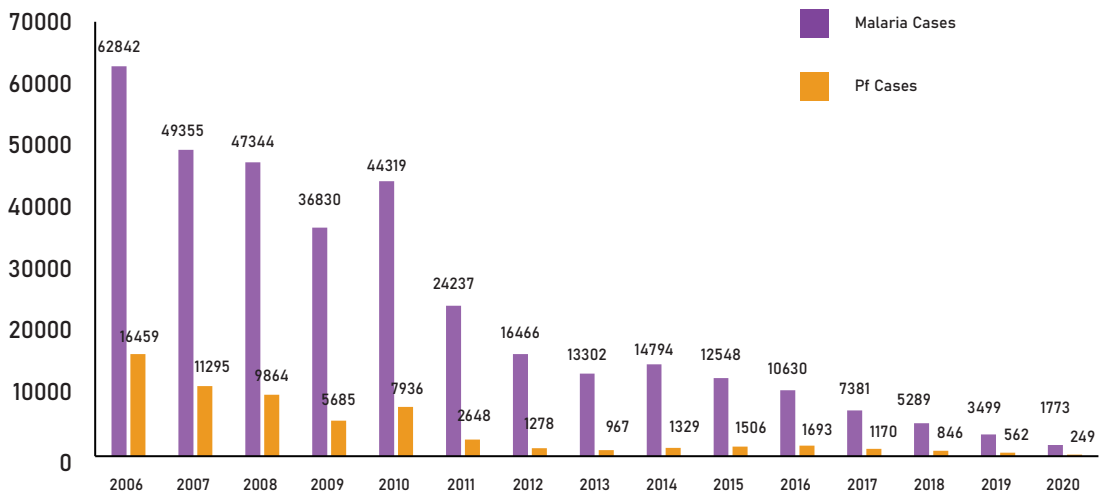
A steady decline in the incidence of Malaria has been observed throughout the state by interrupting the indigenous transmission of cases (Figure 28). Digitised smart surveillance and micromanagement has resulted in a decline in cases along with the enhanced private sector participation. Similarly, the incidence of Japanese encephalitis is steadily decreasing primarily due to scaled up immunisation programme undertaken in 10 endemic districts which include Bellary, Kolar, chickaballapur, Mandya, Raichur, Koppal, Chitradurga, Davanagere, Vijayapura. Some progress has been achieved in management and control of Dengue, chikungunya and Lymphatic Filariasis, despite the presence of local outbreaks.

Tuberculosis is a major public health problem in Karnataka and the state has achieved impressive achievements in prevention care and control. The National Tuberculosis Elimination Programme has taken major steps like decentralised TB diagnosis, testing of HIV for tuberculosis and active case detection. Every year, the state TB programme tests more than 10 lakh people and treats approximately 64,000 patients and the total TB case notification has increased steadily during 2015 to 2019 (Figure 29).

"Education is the most powerful weapon which you can use to change the world"

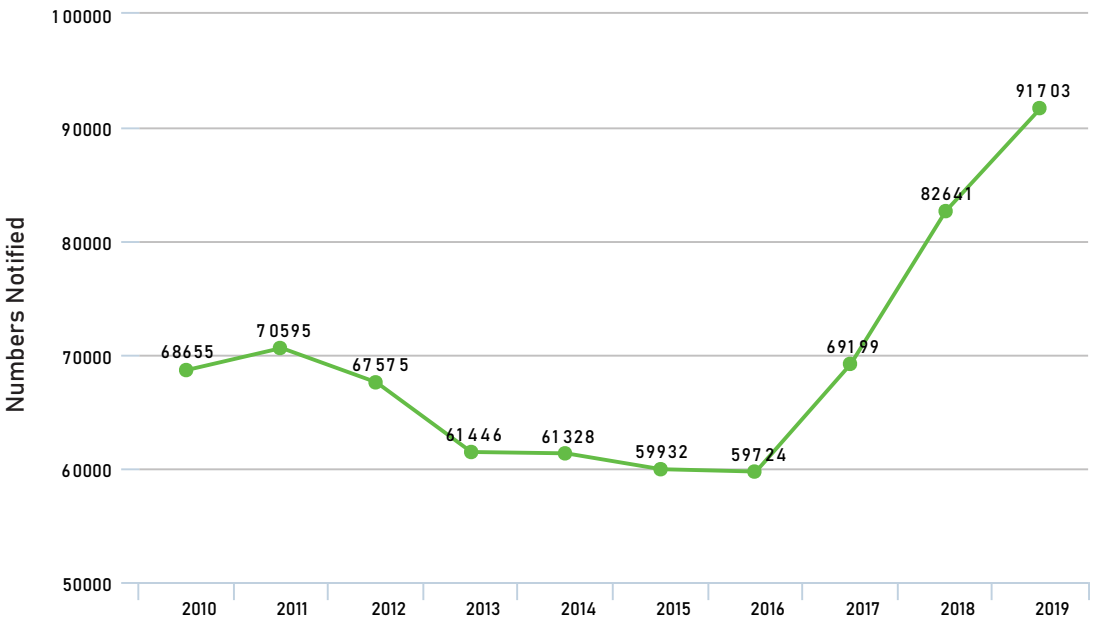
- Nelson Mandela

Figure 28: Trends in Malaria and PF Cases, 2006-20



The state has been a pioneer in active case finding in the last four years. By linking the program to Arogya Karnataka, treatment costs are significantly reduced.. The engagement of the private sector in active case detection and management is a positive step. The state has decentralised the diagnosis of tuberculosis and 1893 diagnostic Centres are operational and nearly 10 lakh patients have been tested using microscopy and active case detection. Six medical colleges are fully functional. Drug resistant TB centres are providing DRTB services to patients and few of them have culture and DST facilities certified under the NTEP(109).

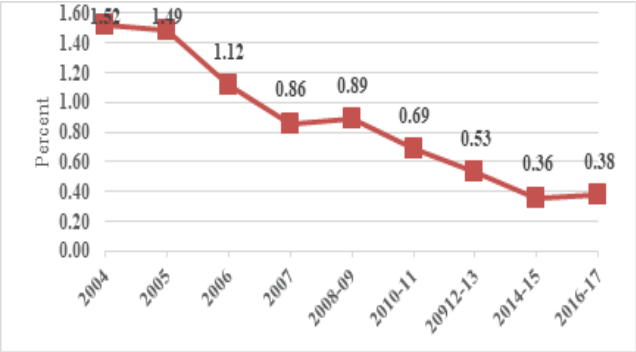
Figure 29: Trends of total TB Patients notified for treatment, 2010-19



Leprosy is seeing a downward trend in the last 10 years. The annual new case detection rate is at 3.88 per thousand and the deformity rate is 2.96 per thousand population(110).Special surveillance activities for intensified active case detection, improved leprosy care through advanced diagnosis and treatment protocol are in place. Sustained efforts for continued care with social support, enhanced supervision and monitoring along with increased funding have been recommended towards the last mile efforts for elimination of leprosy in the state.

HIV work in Karnataka is well recognised with the state recording a 46% decline in new infections as compared to the national average of 26%. As per NACO, prevalence rate of HIV adults in Karnataka is 0.47% as against the national average of 0.22%(110) (Figure 30). The observed HIV prevalence among ANC clinic attendees has shown a declining trend and close to 98% of positive pregnant woman are placed on ART treatment. The state has been a leader in conceptualising convergence of NHM with NACP along with universal screening for HIV in all health care facilities including 2433 PHCs. Counselling services and testing is strongly established all over the state.

Figure 30: Trends of Observed HIV Prevalence among ANC clinics



Many of the Vaccine Preventable Diseases (VPDs) has shown a decline with increasing immunisation coverage for children. The state has a goal to maintain its polio free status and to achieve measles elimination and rubella control by the year 2023. A high rate of immunisation and active surveillance contribute in a significant way. In addition to community case detection, laboratory linked VPD surveillance is in progress for polio, measles, diphtheria, pertussis and neonatal tetanus along with AFP surveillance. Integrated Disease Surveillance Programme is a major activity undertaken for communicable disease surveillance in the state. The Integrated Health Information Platform has been implemented that provides real opportunity for reporting all individual case-based information. A strong infrastructure for implementing IDSP with augmented human resources, training, technology and field supervision has been created in the state.

The success achieved in control of many communicable and infectious diseases as well as the progress towards elimination of certain diseases are in line with the national goals and now require the last my efforts for elimination of conditions like malaria, TB, leprosy and HIV. Regional and inter – intra district variations are present in different programmes. At the same time, emerging infections are a matter of concern as seen during COVID – 19 pandemic. Undoubtedly, challenges exist with regard to skilled manpower, lack of preparedness, delayed investigation of outbreaks, decreasing community involvement, poor reporting practices, delays in screening and diagnosis, inequalities in accessing services, resurgence due to recent ecosystem changes, greater engagement of laboratories in new activities and other factors.

The success achieved and progress made in Communicable disease control should be sustained and strengthened to complete the last mile journey for achieving desired goals. The vision group recommends building strong decentralised programs at the district and taluka levels, strengthening health infrastructure for service delivery, continuing research in communicable disease control and establishing multisectoral coordination and collaboration along with monitoring and surveillance as the pillars for effective control of communicable diseases in the coming days. In addition, specific activities listed under the national programmatic guidelines need to be implemented for effective control. The focus should be on effective prevention, screening, diagnosis, case finding, notification and early management especially in districts and talukas which are considered as difficult and hard to reach and with poor performance. In the long run, genotypic research needs to be strengthened along with norms and standards for regular monitoring of the program. The IHIP needs to be scaled up in its capacity for effective data monitoring. The district level committees should be actively involved in planning several activities required for effective disease prevention and control. More detailed recommendations for individual programmes are available in the accompanying main report.

35. Noncommunicable Diseases

- The state leadership has to give highest importance to NPCDCS programme implementation with multipronged approaches and integrated coordination mechanisms. The state NCD team in DoHWF should be strengthened with the addition of trained professionals and district implementation mechanisms.
- A comprehensive state action plan that includes prevention, screening, diagnosis, referral and rehabilitation should be developed with clearly outlined implementation processes at district, taluka and village levels.
- All 31 districts of the state should have an integrated NCD programme with facility level activities delivered through competent teams starting from health and wellness centres to district hospital levels.
- Four regional NCD Centres of excellence should be established in the next 1 year for implementing coordinated activities in multiple areas. All medical colleges and apex institution should fully participate in program development and implementation in the areas of capacity building, training, screening, service delivery, referral, monitoring, evaluation and research.
- The state should make strong investments in addressing health determinants and risk factors through a robust intersectoral mechanism between different departments with a focus on health promotion activities. A district level intersectoral committee should ensure and implement activities with better coordination and implementation adequately facilitated by the state.
- A set of 30 measurable indicators should be developed by the state to ensure systematic monitoring of the programme in view of the increasing burden of NCDs
- Capacity building of policy makers, administrators and professionals at different levels and training of all categories of health staff through the higher academic institutions, state training centre and district training institutes should be undertaken with active engagement of medical colleges.
- All health and wellness centres should become fully operational in the next 2 years and focus on increasing awareness in the community, promotion of healthy lifestyles, screening, referral and follow-up activities.
- As ASHAs and peripheral health workers are overburdened due to their engagement in multiple programmes, segregating a section of frontline workers exclusively for NPCDCS program would be advantageous. In addition a dedicated nurse and a counsellor should be available in all district and taluka hospitals.
- All existing legislations for control of tobacco, alcohol, food security should be implemented along with creating new mechanisms for promoting physical activity at district and taluka levels.
- Standard protocols for screening of risk factors and diseases among 30+ individuals, counselling and regular follow-up services should be followed in all educational institutions, workplaces, community settings and in healthcare institutions at district and taluka levels. Education and counselling services should be made available in all public health facilities and Ayush doctors should be actively engaged in health promotion activities for behavioural change, counselling and towards developing healthy lifestyles.
- Secondary and tertiary care services under the NPCDCS program should be strengthened with availability of defined clinical services, laboratory and referral services.
- Opportunities should be explored for integration between NPCDCS and NPHCE for early recognition and management of NCDs. Record maintenance, surveillance, monitoring should be given importance at the district and taluka levels to establish systematic linkages and for uniform record-keeping.
- The role of technology needs to be explored to develop sustainable surveillance activities under NPCDCS especially for surveillance, monitoring indicators and evaluation at the district levels.
- Research should be strengthened in the area of NPCDCS in all required areas and 4 – 5 medical colleges should be given responsibility for continued research in all areas from epidemiology to evaluation in collaboration with state level academic institutions.

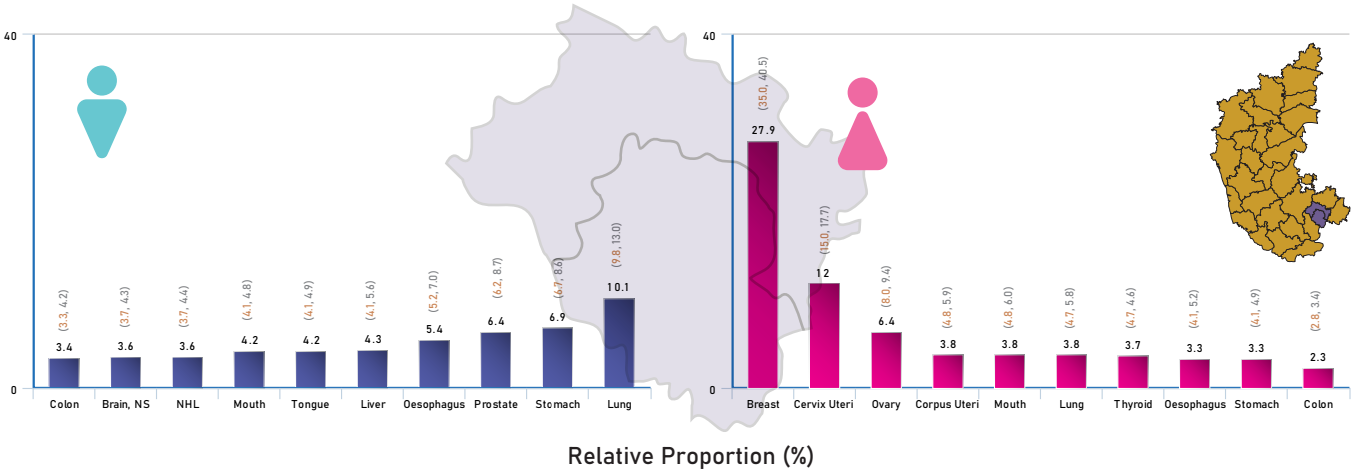
Since 2015, the state is on its way to address the growing burden of Noncommunicable Diseases (NCDs) with the targeted reduction of 50% by 2030 to reduce the burden of mortality, morbidity, disability and socio economic losses from NCDs through combined and integrated preventive, promotive, curative services. NCDs are due to a complex interaction of genetic, physiological, environmental, social and behavioural factors and require multi-pronged approaches to address the problem. NCDs are characterised by some common risk factors, complex aetiology, slow onset in progress, non-reversible pathological alteration, greater morbidity, residual disabilities, prolonged course of illness, high mortality along with significant OoPE and poor quality of life(111).

NCDs include a number of conditions and CVDs, Cancer, Diabetes Mellitus and Stroke top the list along with mental disorders and injuries; the first four are included under the NPCDCS programme. State-level data with regard to each of the NCDs is not available. Valid, reliable, representative and real-time data with regard to NCDs is extremely limited due to absence of good quality research, NCD surveillance, population-based surveys and disease specific registries. Population data of hospital based information required in terms of prevalence, incidence, risk factors, care pattern, referral pathways and course of illness at the state and district levels are not available. In addition, data from the private sector and from the non-health sector departments is not routinely available. Extrapolating from smaller research studies can be misleading. The program implementation is in the early stages and efforts are now initiated to collect good quality data.

Many risk factors operate in the causation of NCDs and some of them like elevated blood pressure, increased blood glucose levels and cholesterol, obesity, physical inactivity, unhealthy diet, tobacco use, alcohol use, stress and others are eminently amenable for prevention programs and risk reduction activities: For NCDs there is no cure, but only care. With epidemiological and demographic transition, the burden of NCDs is increasing in the state. Many of the risk factors and the NCD conditions have moved up the ranks contributing for a significant proportion of deaths and DALYs as per India GBD study(15) (Figures 23 – 27 earlier). In 2016, NCDs contributed for 62%, communicable diseases for 25.1% and injuries for 12.9% of the total disease burden in Karnataka. The NCD burden continues to increase from the age groups of 30 years, both genders are equally affected, primarily affect lower and middle income sections of society and in both urban and rural areas. The economic impact of NCDs is phenomenal due to the increasing costs of care as well as the need for continuity in care(112).With only 28% of the population covered under any health scheme, the costs towards consultation, diagnostics, drugs procedures and long-term care is significant, more in urban areas and in the private healthcare facilities, in the state with 20% of the population living below the poverty line(113).

Cardiovascular diseases (CVDs) are a leading cause of death in the age group of 40 years and above. The prevalence of Diabetes Mellitus (DM) in Karnataka is reported to be 7.7%, while the prevalence of prediabetes is 11.7% as per the findings of India Diabetes study(115).The prevalence of Stroke in the population is reported to be 150 / 100,000 in urban and rural Bangalore(114). Cancer contributes for 8.1% of total deaths with a rate of 126 per million populations(116).Cancer cervix, breast cancer and oral cancer are the leading cancer conditions in the state. The National Cancer Registry data indicate that nearly 36% of all cancers among males will be due to lung, oral cavity, prostate, and stomach cancers, while cancer of the breast, cervix, ovary, corpus uteri will predominate among females for 53% of all cancers(116)(Figure 31). Despite these alarming numbers, the number of persons requiring NCD care in a district is not available.

Figure 31: Top ten leading sites of cancers in Karnataka state,2020



The state has to take a stronger and proactive role in the prevention, surveillance, care delivery and other aspects of NCD prevention and care by building on the principles of universal coverage, equitable distribution, affordable healthcare and a strong intersectoral collaboration. The actions for NCD control should focus on interventions to reduce NCD risk factors and key metabolic risks by creating a larger ecosystem on a framework of political, policy, administrative and legislative mechanisms. Several proven to work evidence-based interventions focusing on health promotion and early identification, early referral, cost-effective care, availability of drugs and diagnostics delivered through public owned or regulated health system is very much essential. Setting-based health promotion activities in workplaces, educational institutions, community organisations should be implemented. The 10 Best buys for intervention for prevention and control of NCDs are given in box 1 and the global targets to be achieved are also given in box 2.

Box 7: Best buy interventions for prevention and control of noncommunicable diseases

Intervention domain	Number	Intervention
Tobacco use	1	Increase excise taxes and prices on tobacco products
	2	Implement plain/standardized packaging and/or large graphic health warnings on all tobacco packages
	3	Enact and enforce comprehensive bans on tobacoo advertising, promotion, and sponsorships
	4	Eliminate exposure to second-hand tobacco smoke in all indoor workplaces, public places, public transport
	5	Implement effective mass media campaigns that educate the public about the harms if smoking tobacco use and second-hand smoke
Harmful use of alcohol	6	Increase excise taxes on alcoholic beverages
	7	Enact and enforce bans of comprehensive restrictions on exposure to alcohol advertising (across multiple types of media)
	8	Enact and enforce restrictions on the physiclal availability of retailed alcohol (through reduced hours of sale)
Unhealthy diet	9	Reduce salt intake through the reformation of food products to contain less salt and the setting of target levels for the amount of salt in foods and meals
	10	Reduce salt intake through the establishment of a supportive environment in public institutions such as hospitals, schools, workplaces, and nursing homes, to enable lower sodium options to be provided
	11	Reduce salt intake through a behavior change communication and mass media campaign
	12	Reduce salt intake through the implementation of front-of-pack labeling
Physical inactivity	13	Implement community-wide public education and awareness campaign for physical activity which includes a mass mesia campaign combined with other community-based education, motivational, and environmental programs aimed at supporting behavioral change of physical activity levels
Cardiovascular disease and diabetes	14	Drug therapy (including glycemic control for diabetes mellitus and control of hypertension using a total risk approach) and counseling to individuals who have had a heart attack or stroke and to persons with moderate (>20%) and high risk (>30%) of a fatal and nonfatal cardiovascular event in the next 10 years
Cancer	15	Vaccination against human papillomavirus (2 doses) of 9-13-year-old girls
	16	Prevention of cervical cancer by scanning women aged 30-49 years, either through Visual inspection with aceetic acid linked with timely treatment of precancerous lesions Pap smear (cervical cytology) every 3-5 years linked with timely treatment of precancerous lesions Human papillomavirus test every 5 years linked with timely treatment of precancerous lesions

Source: https://www.who.int/ncds/management/WHO_Appendix_BestBuys.pdfsource

Box 8: Voluntary global targets under global action plan for the prevention and control of noncommunicable diseases 2013-2020

- A 25% reduction in risk of premature mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases
- At least 10% reduction in the harmful use of alcohol
- A 10% reduction in prevalence of insufficient physical activity
- A 30% reduction in mean population intake of salt/sodium
- A 30% reduction in prevalence of current tobacco use in persons aged 15+ years
- A 25% reduction in the prevalence of raised blood pressure
- Halt the rise in diabetes and obesity
- At least 50% of eligible people receive drug therapy and counseling (including glycemic control) to prevent heart attacks and strokes
- An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities

Source: https://www.who.int/publications/i/item/9789241506236

Karnataka is implementing four major NCD national programmes, namely, NPCDCS, NPHCE, National Palliative Care Programme and National Fluorosis Control Programme along with National Mental Health Programme. The NPCDCS program is the flagship program for Karnataka from 2015 onwards and implemented across 14 districts with expansion in recent times. A major focus of the program is on screening all individuals above 30 years for Hypertension and Diabetes in the NCD clinics of district and talukas, and recently through population screening by ASHA workers. The 2319 centres along with 347 NCD clinics have been operational at district and taluka levels. Under the programme, capacity building, training, health education, opportunistic and population screening for hypertension and diabetes for 30+ population, early detection, NCD surveillance and cost-effective treatments are being provided. The state is also making efforts to provide advanced care in specialised centres across the state and, new regional centres are under the consideration of the government to provide care for CVDs, DM and cancer. In addition, all private hospitals and medical colleges provide basic and advanced care for different NCDs in the state.

Despite its commitment and a renewed focus for implementation of NPCDCS, there are several implementation challenges in the area of NCDs. The absence of clearly defined action plans and program implementation strategies, lesser importance given by other sectors for health and for NCD prevention control, working with the private sector, poor regulatory measures, lack of dedicated staff for NCD activities, isolated IEC activities, poor community mobilisation, high costs and difficulties in care continuity - referral and absence of systematic monitoring and evaluation are a few of the major limitations.

The state should establish Centres of Excellence to develop new knowledge, develop and strengthen human resources, undertake research, support policies, develop standards – guidelines – protocols, identify package of interventions, monitor implementation status, conduct evaluation and demonsrate cost effectiveness.

- Centre for health determinants
- Centre for work safety
- Centre for Human resource quality development
- Centre for health technology
- Centre for urban health
- Centre for road safety and injury prevention
- Centre for rehabilitation medicine
- Centre for poison prevention
- Centre for AYUSH services
- Centre for elderly health

Cardiac Care

Management of Acute Myocardial Infarction (heart attack) and strengthening critical care in semi-urban and rural areas through HUB AND SPOKE MODEL

Approximately 8-10% of the population suffer from Cardiovascular Diseases, particularly Ischemic Heart Disease. Around 1-2% suffers from Congenital Heart Disease and Rheumatic Heart Disease. Acute Myocardial Infarction accounts for most of the cardiovascular deaths. Since Tertiary care centres are located mainly in one and two tier cities, management of heart attack and heart failure in Taluka hospitals has to be strengthened to reduce mortality, hospitalisations, complications and consequences. In addition, greater emphasis has to be placed on heart health by addressing risk factors like tobacco use, alcohol, unhealthy diet, physical inactivity along with control of hypertension, diabetes mellitus and dyslipidaemia.

HEART ATTACK MANAGEMENT IN RURAL AREAS

- For every 30 minutes of delay in initiating treatment for heart attack, the risk of death increases by 7%. Hence there is a need to provide treatment at the earliest by establishing heart attack management programme at Taluka hospitals as well as in District hospitals.
- Thrombolysis therapy or giving clot dissolving medicines is effective if implemented within first 6 hours of onset of symptoms of heart attack and should be made available in all taluka hospitals(spokes)
- Doctors in rural hospitals (MD qualified physicians are already trained to treat heart attack patients by thrombolysis) with an MBBS qualification can be trained to treat heart attack patients. Necessary training packages have to be developed centrally at the state level.
- Heart Attack management kits have to be provided to Spoke Hospitals and can be taken up using either Telemedicine network or on Digital Platform, where an ECG taken at the Spoke hospital is automatically transferred to specialists in the tertiary care hospital through Network heart attack management. Once the diagnosis is confirmed, treatment is initiated in peripheral hospitals to avoid unnecessary delays.
- After initial stabilisation of the patient, he /she can be shifted to tertiary care hospitals in Districts, either Government or Private hospital, for Coronary Angiogram and Angioplasty Stenting procedures at the earliest within 24 – 48 hours (hubs).
- The protocols of management of heart attack at taluka and district levels have to be developed – validated - circulated and all these doctors have to be trained. Training can be provided to doctors and all supportive staff through digital platform and wherever possible by organising workshops.
- In this context, it is essential and imperative to have 5 bedded cardiac ICU in Taluka hospitals and 20 bedded ICCUs in District hospitals. The Taluka hospitals have to be mapped to tertiary care hospitals in every district at the vicinity for this Spoke and Hub model.
- The equipment's and manpower for setting up an ICCU at a district level have to be procured – installed – maintained and operated through skilled resources.
- The training, monitoring, supervision and transfer responsibilities of patients from Spoke to Hub Hospital have to be evidence based and protocol driven.
- Simple data management protocols have to be developed and analysed regularly to assess effectiveness of the hub and spoke model.
- Emergency 108 Ambulance services are to be functioning and integrated into this system for timely transfer of patients.
- Jayadeva Hospital has branches in Kalaburgi and Mysore apart from Bangalore Centre. Demonstration projects can be initiated in the next 12 months in these 3 sub-divisions.

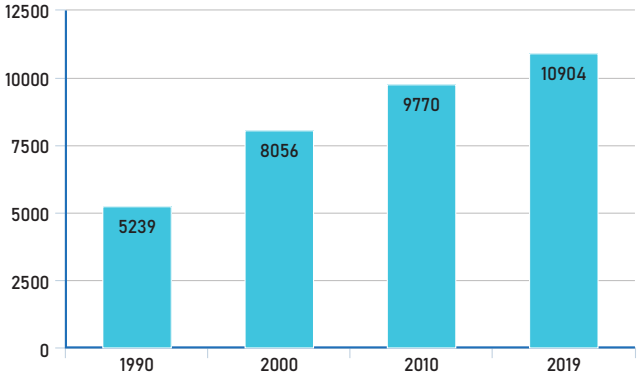
36. Injury and Violence

- The Karnataka Road Safety Authority established in 2017 should be strengthened with adequate manpower, technology, funding and should develop defined action plans for district level activities to achieve the 50% reduction of deaths as per the SDGs and global road safety targets. The state agency should undertake intersectoral arrangements, coordination, funding, implementation, monitoring, evaluation required for implementing road safety policies and programmes as road safety is a multisectoral problem.
- A multisectoral state action plan for reducing road crashes with a focus on strengthening monitoring and evaluation systems should be drawn up and implemented at state and district levels.
- A district level road safety program anchored by the district road safety councils should be piloted in four districts of the State in a scientific and systematic basis in next 2 years.
- Implementation of all legislations under the Indian motor vehicles act towards the use of helmets – seat belts – child restraints – pedestrian safety- drink-driving – speeding – mobile phone use should be enforced in a uniform – random – visible manner to achieve a minimum 80% compliance among road users at the district level and in urban areas.
- Data collection mechanisms by using digital and innovative techniques should be put in place (on similar lines of Tamil nadu) along with developing a district injury and road safety surveillance program in at least four districts before state-wide replication.
- Systematic training of all police, transport, health and road development officials to adopt and integrate modern principles of road safety should be facilitated by the Karnataka road safety authority.
- Scientific design of roads as per IRC guidelines and ensuring mandatory audit of roads soon after completion and at periodical intervals for safety parameters should be implemented.
- Post-crash care should be scaled up in a scientific and systematic manner at district and taluka levels for managing trauma patients (for more details see the section on trauma care services).
- In the long run, investing and strengthening mass public transport systems across the state will reduce the exposure of people that would also reduce the use of personal modes of transport.

36.1 Road Traffic Injuries

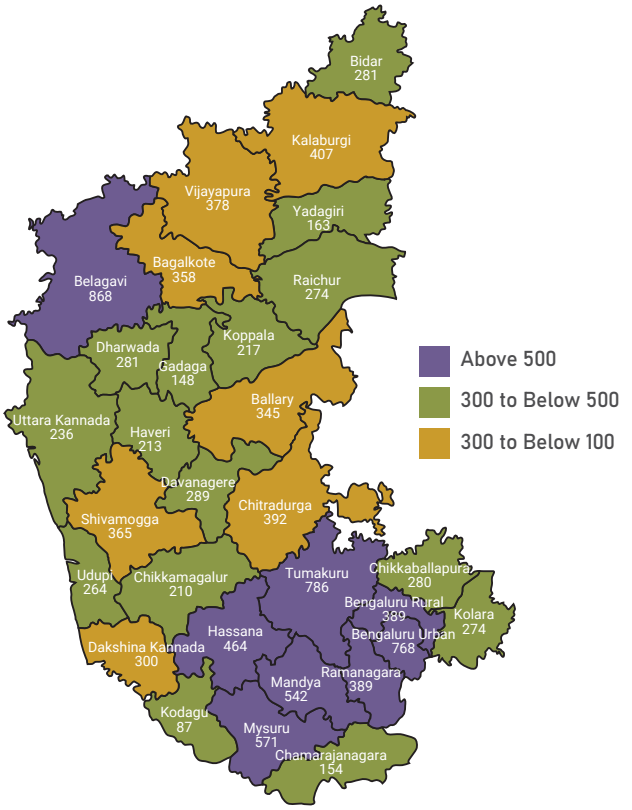
Road Traffic Injuries (RTIs) and deaths have been increasing at an alarming pace in Karnataka since accelerated motorisation occupied centre stage amidst poor safety environment (Figure 32 & 33). The state ranks 4th in the country for the number of fatal road crashes(94). RTIs occur predominantly in the age group of 15 to 45 years, males, in economically productive populations and in the poor and middle-income sections of the society. with increasing industrialisation, motorisation, urbanisation, and economic growth, the exposure of people to complex and unregulated traffic environments has significantly increased, resulting in increasing number of road deaths, injuries and related disabilities.

Figure 32: Trend of RTIs in Karnataka, 1989 – 2019



After adjusting for underreporting for the State Crime Records Bureau (SCRB) data, it is estimated that nearly 13,000 deaths, 400,000 severe RTIs and nearly 10,000,000 mild injuries occurred in the state in 2019(96, 117) . RTIs place a huge burden on the health systems for care and rehabilitation services for the affected persons. Nearly 65% of road deaths in Karnataka occurred in the age group of 18 to 44 years and among the younger and productive sections of the population(95). Nearly 80% of crashes and 88% of deaths occur in the rural parts of the state indicating the need for strengthening road safety mechanisms at district and taluka levels (Figure 33). Studies undertaken by the WHO collaborating Centre at the NIMHANS clearly indicate that 3 out of 4 deaths and injuries are among pedestrians, two wheeler riders and pillions and bicyclists(118).

Figure 33: RTIs in Karnataka

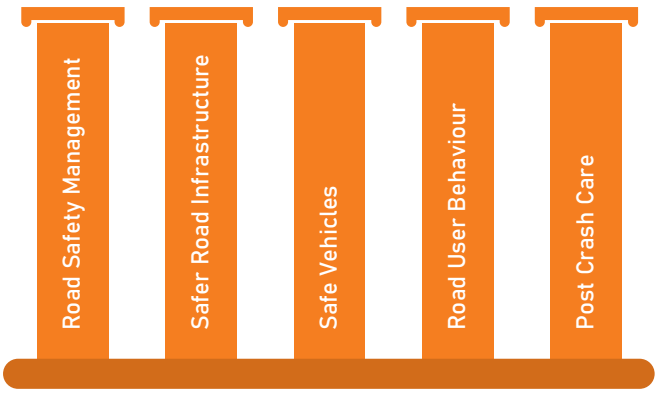


The Karnataka Road Safety Authority was established in 2017(78) and the Karnataka Road Safety Policy was notified in 2015(119) with a vision to achieve a safe road environment for reducing road crashes by 25% and fatalities by 30% by the year 2030 ; goal is yet to be realised. Under the road safety policy, establishing a multi-road safety lead agency at the state and district levels, strengthening road crash database system, developing a safe road infrastructure, regular road safety audits, increasing road safety awareness, enhancing enforcement levels, timely medical services and increased financial protection for survivors have been proposed. However several implementation delays have halted the progress.

The condition of roads are still at a very high risk level with most of the roads not even achieving a three star rating and hazard mapping is still in continuation. Nine districts of the state have identified 80 accident prone areas. The safety of the vehicles that is available in the state are to be assessed even though the national ratings indicate a poor performance. The prevalence of helmet use, seat belt use, child restraint use remain at moderate levels (higher in urban central areas) while drunk-driving, speeding, use of mobile phone and poor pedestrian road safety behaviours are on the increase. The post-crash care is a fragmented and a fractured system with deficiencies in early care, referral of patients, availability of definite care services at district and taluka hospitals and poor rehabilitation services(117, 119).

The five pillars of road safety focusing on road safety management, safe road infrastructure, safe vehicles and improving road user behaviour along with post-crash care are to be implemented in all seriousness to achieve success in road safety in the state (Figure 34).

Figure 34: Five pillars of road safety.



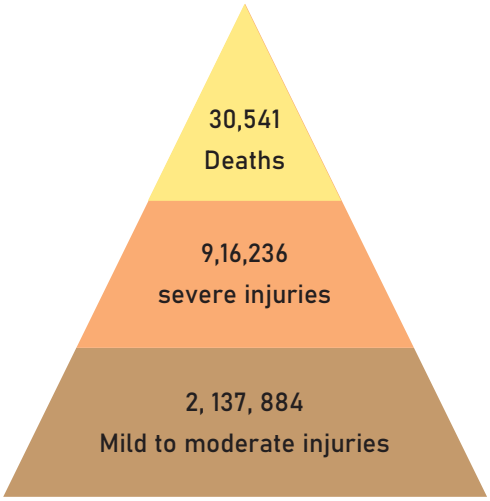
International Coordanation Strengthening Global Architecture for Road Safety

36.2 Unintentional Injuries

- A state task force should be constituted to formulate comprehensive injury prevention policy and an action plan with defined programmes and intervention - implementation strategies through convergent mechanisms.
- Formulate and implement a pilot district action plan and a program in four districts of the state covering major causes of injuries in the next 2 years.
- Plan and implement innovative technology driven enforcement to increase awareness and compliance to existing rules and regulations under various provisions and legislations.
- All known and proven interventions for prevention of falls, burns, poisoning and drowning should be enlisted, reviewed by a state technical committee and implemented at required places.
- Develop a comprehensive and integrated injury surveillance system to provide reliable data regarding injury distribution, risk factors, high-risk areas and trends overtime with a focus on risk factors.
- All implementing officers in health, police in law, transport, urban development and several others should be systematically trained through institutional mechanisms for implementing injury prevention programs.
- Safety audits in all schools, workplaces, high rise buildings and commercial places should be mandated on a regular basis

One out of every 10 deaths in the state is due to an injury in Karnataka. In 2019, nearly 30,000 persons died, 1 million people were seriously injured and hospitalised, and 2 million people received care for minor injuries due to all unintentional injuries in Karnataka as per estimates by the WHO CC at NIMHANS (Figure 35)(117).

Figure 35: Burden of injuries in Karnataka, 2020



These injuries include falls, burns, drowning, mechanical injuries, poisoning, injuries in disaster situations and several others. Systematic and good quality data to quantify the burden of deaths and hospitalisations due to unintentional injuries is not available for the state of Karnataka as injury surveillance programs are not in place and the official reports are an underestimate of the real burden of injuries(117). Among all other causes of deaths, apart from RTIs, 8.4% of deaths were due to drowning, 6.1% due to poisoning, 3% due to falls, 3.3% due to burns and 1.9% due to electrical and fire injuries as per data from SCRB(95).Most deaths and injuries occurred in the younger age groups, among males, in rural areas and in poorer sections of the society.

The global advancements in the field of injury prevention and care inform that many evidence – based and cost effective interventions can reduce the burden of injuries. However, these are not implemented in India or in Karnataka. The key gaps in injury prevention are lack of a specific injury prevention policy, dedicated injury prevention centres, safety nodal officers, poor budget for prevention, limited intersectoral coordination, absence of safety assessments, lack of monitoring systems and others. Poor enforcement practices by all concerned departments are a cause for concern. Low safety awareness, lack of safety consciousness and community capacity to deliver effective first aid are some of the major gaps. Safety audits and lack of a social ecosystem to product safety is key to prevention.

36.3 Suicide

- Establish a state suicide prevention registry in three districts of the state to develop data driven programmes.
- Building up strong public health approach and advocacy through development and implementation of state-specific suicide prevention policy and action plan
- Developing and implementing timely and effective evidence-based interventions through establishment of robust surveillance and monitoring system for suicidality and suicide,
- Regulate the easy availability of pesticides and related products (ban those with high levels of toxicity) and over the counter drugs through regulatory mechanisms.
- Strengthen health infrastructure and other resources by establishing a state poison prevention centre to provide preventive, promotive, curative, rehabilitative training for doctors and nurses for better management of poisoning at all levels and research activities related to suicide prevention (Box).
- Supporting individuals and families with timely help and intervention for early recognition and care through organised mental health services in districts, talukas and primary health centre levels along with services in community-based settings
- Bringing a life-course perspective in suicide prevention by integrating suicide prevention interventions with the on-going national programmes to target multiple settings (schools, colleges, workplaces, etc)
- Establish a mental health help-line or liaison with existing helplines (e.g., SAHAI) for early help seeking for needy populations
- Increasing public awareness about suicide prevention, about early recognition at family and facility level and also educating media about sensitive reporting on suicides

While there is a common notion in the society that suicide cannot be prevented, there is ample evidence across the globe to indicate that majority of the suicides are eminently preventable. Neighbouring countries like Sri Lanka and Thailand have achieved significant reductions in deaths and hospitalisations due to suicide with implementation of scientific, integrated and coordinated programs.

Suicide is a serious public health problem in Karnataka (Figure 36). Suicide occurs throughout the lifespan and is the second leading cause of death among 15 to 29 year olds globally (120, 121). In India 150,000 persons die in a suicidal act and Karnataka state accounts for nearly 10 % of suicides(96, 122). The state reported 11,088 suicides in the year 2019 accounting for 8.1% of all suicidal deaths in India in 2019(96). Nearly 75% of the suicide was among males, 73% among married and 62% in poor and low-income households. About 42% of suicides were in persons less than 30 years and 32% in those aged between 30 to 45 years(91, 96).Suicides are more in Bangalore urban, Shimoga, Dakshina Kannada, Mysore and Bangalore rural districts (Figure 37). Due to absence of good quality research and surveillance, the precise number of suicidal deaths and hospitalisations are not clearly known in the state and the official police figures are an underreporting of the real situation.

Figure 36: Suicide rate per lakh population, India and Karnataka.

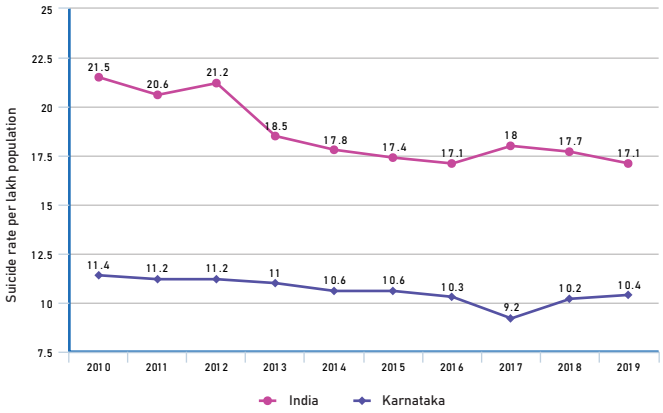
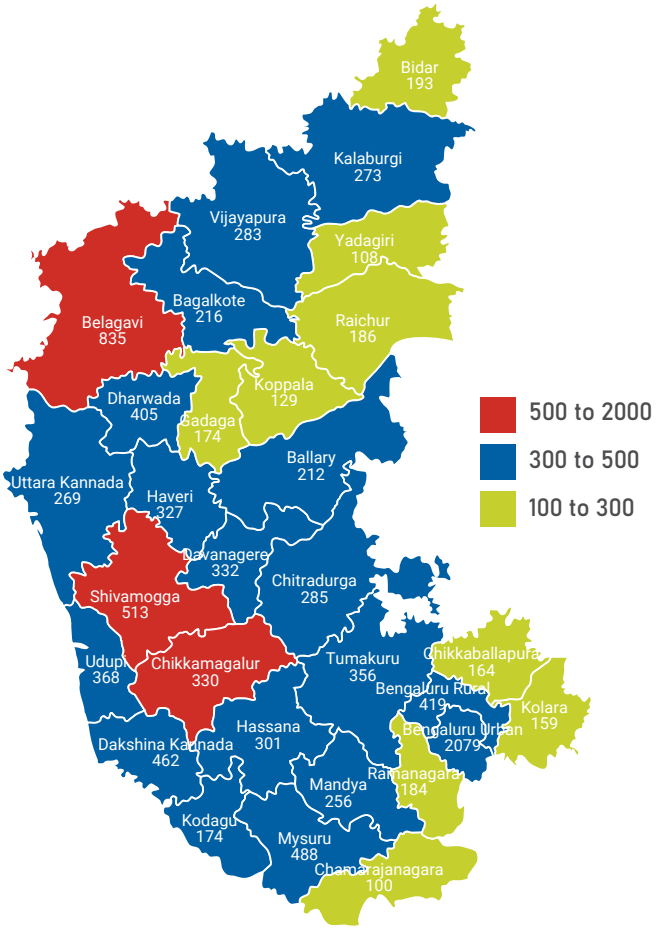


Figure 37: Distribution of Suicide in Karnataka, 2019



The most common mode of suicide in Karnataka are hanging, poisoning and drowning. Poisoning due to pesticides, herbicides, rodenticides and over-the-counter drugs are responsible for hospitalisation. The causes of suicide as provided in the NCRB and SCRB reports are vague and do not point to any specific mechanisms that can be used to develop prevention programmes. Studies undertaken by Nimhans indicate that history of alcohol and use of drugs, domestic violence, presence of a mental illness, history of suicide attempts in the past and absence of protective factors such as social support, lack of skills for crisis management and others are some of the important risk factors for suicide(123).

Despite the availability of knowledge, efforts towards prevention of suicide are scant and limited in Karnataka. Suicide prevention programmes are limited in the state due to absence of a specific suicide prevention strategy and an action plan, poor health system response and resources, lack of robust data and surveillance systems, unlimited use of pesticides, and the wide array of risk factors that exists in the society that are least understood along with poor health system response.

36.4 Violence Prevention.

The state should seriously address violence prevention by

- strengthening the role of health systems within the multisectoral response by developing and monitoring a state action plan in this area,
- fostering advocacy to integrate and strengthen violence prevention in social and educational policies thereby promoting gender and social equality,
- strengthening health information systems and the workforce to provide community-based support for reducing violence,
- establishing strong network of organisations and integrating programs with a focus on violence prevention,
- strengthening violence prevention interventions within the on-going national programs like RKSK, NMHP, NPHCE and others to target multiple settings,
- increase the capacity of the health sector to develop better quality data as well as support research to monitor the burden, identify changing patterns and to develop and evaluate culturally appropriate strategies, and
- investing in addressing determinants of health across the life span.

Violence is one among the leading causes of death for people aged 15 to 44 years(124).Violence has existed in society in different forms across the lifespan in various forms like child abuse and neglect, youth violence, intimate partner violence, spousal violence, domestic violence, sexual violence, elder abuse and self-inflicted violence. Health of people is seriously compromised in the presence of violence. Apart from deaths, majority of the violent acts result in injuries, mental health and reproductive health problems, sexually transmitted diseases and other problems for which health sector provides care for all these affected individuals; however, focus on violence prevention is missing in the society.

Availability of good quality data remains a major challenge for violence prevention. The official figures are highly underreported as many people do not report violence because of stigma and several other factors. Violence against children is a serious public health problem and Karnataka recorded a high rate of children under the Protection of Children from Sexual Offences Act (POCSO).Violence in children increases the risks of injury, HIV and other sexually transmitted infections, mental health problems, delayed cognitive development, poor school performance and dropouts, early pregnancy, reproductive health problems and a host of communicable and noncommunicable diseases. Youth violence in the age group of 10 to 29 years includes a wide range of violent acts from bullying to physical fighting to more serious forms of assault and suicide. Girls and women are more likely to experience violence in this age group. According to NFHS-5, nearly half of ever married women and 6% of ever married pregnant woman aged 18 to 49 years in Karnataka experienced physical or sexual violence with an increase between the two rounds of surveys(91).

Abuse and violence against the elderly includes physical, sexual, and psychological abuse as well as neglect; these incidents are on the increase. One out of every 10 older men and women reported some type of violence from within or outside their family circles(124). The impact of violence on elderly is much more significant due to failing social support and fragile economic systems. In the state, risk factors for violence is least understood as it differs within population and settings and are closely linked to health determinants.

37. Disability and Rehabilitation

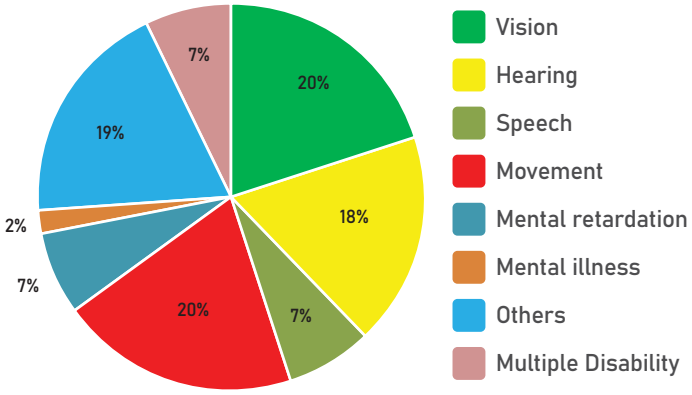
- Karnataka State Council for integrated rehabilitation and inclusion of disabled persons should be established for policy, planning, implementation, funding, coordination, monitoring and evaluation purposes.
- District disability rehabilitation centres should be elevated to district community-based rehabilitation centres with strong coordination mechanisms up to village level with effective use of VRWs, MRWs teachers, and Panchayat raj institutions.
- State Centre for Disability studies should be established in the next 2 years to develop academic, research and training programs for various categories of medical, non-medical and nonhealth professionals by linking RGUHS, SIHFW and other academic partners with the NGO sector.
- Multidisciplinary rehabilitation team comprising of a physiotherapist, speech expert, occupational therapist, psychologist and a social worker, who should in turn collaborate with medical professionals in the district and the medical College hospitals for both institution-based and community-based outreach activities should be promoted in district hospitals.
- Early childcare and developmental Centre in all district medical colleges should be facilitated for early screening of new-borns and for children with disabilities to institute interventions and follow-up activities
- Pilot demonstration projects for integrated rehabilitation services for PWDS in the three districts of Koppal, Ramanagaram and Udupi in the next three years should be facilitated for supportive, therapeutic, managerial, training and other activities.
- Access to assistive devices and assistive technologies for PWDs as per available guidance needs to be promoted through a single window facility at the state and district level
- A pilot district level registry of PWDs in at least two districts of the State, in Chickaballapur and Yadgiri districts, within the next two years should be initiated in the state.
- Increase awareness and empower the community on disability issues for inclusion of PWDs at different levels as per provisions of RPD act 2016 along with promoting self-help and mutual support groups by training for home care by utilising ASHAs and Anganwadi workers.

Available data indicate that there are 1.3 million persons with disabilities in Karnataka.

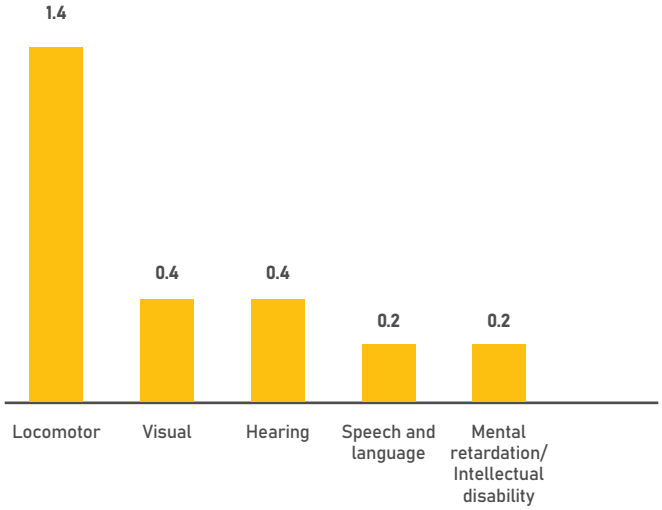
Disabilities are a huge challenge in the state of Karnataka. Rehabilitation programmes and services require multisectoral coordination for effective inclusion of people with disabilities in the societal mainstream. The field requires very strong implementation of programmes, interventions at different levels across the life span, within and outside the health department, integration of programs in health, welfare and other sectors, innovations for delivery of comprehensive services to disabled population, increase in investments both in financial and human resources, as well as the development of indicators to systematically monitor the progress made in disability programs in the state.

In Karnataka, data regarding the 21 type of disabilities is not clearly available. The Ministry of Statistics and Programme implementation, Government of India, reports that nearly 5 to 6% of the population are Persons with Disabilities (PWDs)(125-127). The 76th round of NSS in India reported that the proportion of persons with disabilities in Karnataka was 2.4%, higher than the national average of 2.2%(127). Locomotor disability prevalence was 1.9% and mental retardation/ mental illness were 0.2%. The National Mental Health Survey 2015 – 16 reported that nearly a third of persons with all illness have moderate to severe disabilities(128).The Brain injury registry at NIMHANS informed that 20% of injured had varying types of multiple disabilities(129) As disabilities occur due to a wide variety of causes ranging from many congenital conditions to injury and trauma,PWDs have multiple needs in health, education, social, employment and require support from professionals and family in all these areas along with timely interventions.

Figure 38: Proportion of different types of disabilities in Karnataka. n=1324205



Percentage of population with different disbailities in Karnataka (NSS, 76th round, 2018)



The Rights of Persons with Disabilities Act 2016 replaced the earlier Disability Act of 1995(130). The Department of Rural Development and Panchayat Raj issued an order for spending 5% of development budget for inclusion of people with disabilities and data is not available in the public domain to examine its full utilisation. Similarly, the National Education Policy 2020 has included disability issues to provide greater opportunities for this population. In Karnataka, the District Disability Rehabilitation Centres were started in the year 2000 with support from state and national government to implement disability related activities. In almost every village, a village rehabilitation worker is present under each gram Panchayat along with multipurpose rehabilitation workers at the block level. The primary services to be provided include meeting the needs of the persons with disability, counselling services, referral services and support to access for available schemes and provisions. The inclusive education resource teachers appointed by the education Department at the cluster level help in identifying children with disabilities in the school. The overall responsibility of rehabilitation services in a district lies with the District Disability Welfare Officer along with the support of village rehabilitation workers and multipurpose rehabilitation workers.

No comprehensive evaluation of programs in terms of coverage, quality, reach and utilisation of services has been undertaken in Karnataka. As in other program implementation areas, several challenges exist at the state, district and taluka levels and even in urban areas. These include lack of good quality robust data for evidence-based programming, greater reliance on institution based rehabilitation, limited understanding of all disabilities, lack of trained manpower, absence of a single window facility to get assistive devices and assistive technology and absence of accessibility audits. Limited technology applications in rehabilitation programmes are visible and glaring.

A major challenge in the field of rehabilitation is the lack of intersectoral coordination in implementation of programmes at state, district and taluka levels highlighting the need for a strong integrated platform for delivery of services. Even within health sector, childhood programs, deafness prevention program, mental health program, rehabilitation programs, NPCDCS and others work independently without any defined coordination mechanisms. Overall, the absence of a State Council for Integrated Rehabilitation has been a major deficiency for program implementation.

Speech Language and Hearing Disorders

Speech Language Disorders: For a plethora of speech and language disorders (developmental, neurological insults like stroke, trauma, neurodegenerative and psychiatric conditions) in children as well as adults and in late adulthood there are facilities for assessment and intervention in metropolitan cities, medical college hospitals and speciality institutions. Although some facilities have been created in district hospitals (under NPCDCS programs to deal with hearing disability), not much attention has been given to various other types of communication disabilities except for issuing disability certificates for availing government social and economic benefits.

Hearing Disorders: Multiple conditions like Congenital hearing loss secondary to birth trauma, heredity, Rubella, meningitis, neonatal jaundice, ototoxicity and idiopathic etiology, acquired hearing impairment secondary to traumatic brain injuries, brain lesions, ear infections, noise induced and aging (some medical conditions are treatable/preventable) are seen in all age groups and needs interventions to improve quality of life among those affected.

At a district level in Karnataka, there is paucity of human resources and diagnostic requirements. Many mild to moderate individuals often do not seek care and also resort to traditional therapies and interventions by quacks. Many medical colleges do not have departments of Speech Language and Hearing disorders and people are unable to afford and maintain continuity of services in private sector facilities in urban areas.

Schemes and Provisions: The Rights of Persons with Disabilities (RPWD) Act 2016 promulgated by Government of India encompasses all disabilities including communication impairments associated with many of the conditions. Several national level schemes are in vogue in this area like; i) National Program for prevention and control of deafness [NPPCD-(2007) 228 districts of 27 States /Union Territories]. The NPPCD scheme needs personnel at taluk hospital for hearing assessment and monitoring; Accelerated facilities for repair of instruments and their maintenance ii) schemes to provide hearing aids and Cochlear implants (ADIP Scheme), iii) RBSK scheme for identification, follow up and Cochlear Implantation surgery. However, these schemes require trained professionals, personnel at grass root level, screening, effective implementation and monitoring at taluka and district levels.

Universal new-born hearing screening for early identification, monitoring and rehabilitation should be initiated in Karnataka for early identification with the help of ASHA workers and other health personnel. Learning disability secondary to hearing/listening disorders (auditory processing disorders) should be made a part of school health programs. Other neurological hearing disorders are treated at specialized set-ups for both medical and non-medical eventualities. Other national schemes that can be extended to the area of communication disorders are a) National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke (NPCDCS) b) The National Programme for the Health Care for the Elderly (NPHCE) c) Ayushman Bharat (2018) d) Mission Indradhanush- IMI 2.0(2019).There is a need for implementing interventions, integration of different schemes, strong monitoring and hand-holding by an expert team at state level to develop cost effective and sustainable programmes for district level implementation along with engaging with family members, teachers and health professionals.

38. Mental Health

- Strengthen human resources at administrative level in the DOHFW - district and taluka levels.
- Constitute a separate committee or a task force for developing an action plan to monitor the essential mental health services at primary, secondary and tertiary levels including outpatient services, availability of drugs and outreach activities at the primary level, inpatient and rehabilitation services at the secondary level and mental health promotion services at the community level.
- Expand the Taluka mental health program to 100 talukas across the state in the next five years,
- Extend the scope, coverage and completeness of services with adequate resource supplies.
- Include and implement all social security welfare schemes for persons with mental illness and their families and facilitate implementation of rights of persons with mental illness.
- Foster multisectoral collaboration among all stakeholders like primary healthcare providers, ASHA workers, government agencies and different departments in the state for smooth provision of services.

The subcommittee of the vision group on mental health envisions that every citizen of in the state should receive quality and comprehensive mental health services including promotive, preventive, curative and rehabilitative services at affordable levels based on their needs across the entire lifespan. Karnataka will have about 200,000 people suffering from either mental illness or substance use problems. As per data from the National Mental Health Survey of India 2015 – 16, the prevalence of any mental morbidity was 10.6%(98, 127).Data from the state program department indicate that persons with common mental disorders (depression, anxiety, phobias and others: 34%), severe mental disorders(18.4%), substance use disorders (11.2%) along with nearly 30,000 people with suicidal thoughts received help in the year 2018 – 19. Significant variations in the burden and pattern of mental disorders have been observed across the state.

Karnataka is one of the leading states with a full-fledged District Mental Health Programme implemented across all 31 districts in all the urban agglomeration divisions. Recently, the state has started the Taluka Mental Health Programme in ten talukas with one psychiatrist and one psychiatric social worker with plans to extend for all taluka over the next few years. Mental health is also related to several national and state driven legislations, policies and programmes like, Mental Health Care Act 2017, Rights of Persons with Disabilities Act 2016, National Mental Health Policy 2014, National Health Policy 2017 and the Karnataka State Integrated Health Policy of 2014. Karnataka has also been a pioneer in implementing various innovative programs through Telemedicine Monitoring and Mentoring Programme, care at the doorstep, Manochaitanya program, Mansadhara programme, Manasa kendras, e - Manas and e-monitoring of DMHP by adopting technology in mental health care.

Despite the progress and expansion of the programme, several challenges still exist in implementation of the programme including the low funding for mental health activities. Others include fragmentation in advocacy, lack of clear and simple indicators to monitor progress of implementation, problems in integrating mental health into primary healthcare, absence of action plan, insufficient resources, poor mental health literacy in the population and associated stigma.

39. Neurological Services

- The stroke prevention, care and rehabilitation components under NPCDCS should be scaled up for delivery of services at district and taluka levels
- The state should undertake sensitisation of healthcare workers, ASHA workers about recognising neurological disorders at early stages which are already covered under the three national programs mentioned above.
- Training of primary and taluka level health care physicians in recognition and management of common neurological conditions like migraine, epilepsy and stroke should be undertaken along with establishing referral protocols with higher centres.
- Neurology units with dedicated beds, CT scan facility, required drugs and supplies should be made available in every district hospital to manage patients within a district.
- DNB programs in neurology can be started in select institutions with the help of regional and apex centres wherever neurologists or a neurology Department is existing
- Regional neurology services in the form of regional centres in 5 to 6 districts of Karnataka should be established with required infrastructure, manpower and laboratory support services .
- The available protocols for diagnosis, management, and referral should be employed in training of doctors and nurses for managing neurological disorders through short-term training programs
- Telemedicine and tele-teaching should be employed for training and management of neurological disorders at districts levels.

An estimated 7,00,000 persons require neurological services in the state. With 'Brain Health' occupying centre stage in recent times, promotion of brain health and preserving - protecting its functions along with care for neurological disorders is of utmost importance as people are living longer. Many neurological disorders are recognised as public health problems due to their high morbidity, mortality and disabilities. Epilepsy, Migraine, Dementia, Parkinson's disease, Brain damage due to injury and birth trauma, Neuroinfections and others are placing a huge burden on health systems, families and society due to limited services and high costs of care. Among these conditions, stroke has higher mortality and morbidity and many others are associated with significant morbidity and disabilities. Persons with neurological disorders also lead poor quality of life due to multiple disabilities with conditions like epilepsy associated with huge stigma and social problems. Many neurological disorders affect the middle-aged and elderly population (above 50 years) and are associated with significant economic burden on the family and society.

Despite its huge burden, neurological services have remained out of reach for a common man with total lack of services at village, taluka are district levels. Management of these conditions and the need for quick decision making in conditions like stroke need systematic planning at different levels of healthcare system. A crude calculation of the number of people requiring neurological services in a district reveals that in an average 2 million population of a district, there are likely to be 4000 persons with stroke, 14,000 persons with epilepsy, 4,00,000 individuals with headache disorders with 25% of them suffering from migraine, 50,000 persons with dementia and about 1000 people with Parkinson's disease (see main report for details)(115); most of these are not routinely picked up in basic healthcare services.

Neurological services are mainly available in urban areas and commonly delivered by neurologists or by trained physicians / paediatricians; of course by large number of quacks. In Karnataka, there are around 250 neurologists (2500 neurologists in India, with 40 to 50% of them concentrated in large cities), most of them in private sector, with majority of them in Bangalore and other cities; very few district hospitals have neurological services. There are very few stroke ready hospitals and rehabilitation centres in bigger cities. Organised neurological services are not available in rural areas; many affected individuals receive late care. Care in private sector leads also results in heavy OoPE to the affected individuals and families. In addition, as neurological diseases are chronic diseases, neuro rehabilitation or even general rehabilitation services are scant and limited.

Even though national programmes like NPCDCS, NPHCE and RMNCH have included few neurological disorders, its extent and reach is hardly noticed. Fundamentally, the absence of trained manpower at different levels of healthcare system is a major barrier with no training for physicians, medical

officers and healthcare workers along with lack of support services. However, it is well proven that majority of the neurological disorders, if detected early, can be managed at peripheral levels and within the existing healthcare systems. An organised network of service providers and health care facilities is required to manage these conditions.

- As stroke is already included under the NPCDCS program and because of its preventable / treatable nature, a stroke unit should be established in every district in collaboration with the local medical colleges. In order to examine the feasibility of this approach a pilot stroke prevention/ management/ rehabilitation program should be established in four districts of the state in two years. The management of stroke involves building specific components of prehospital care, acute management, having a post discharge plan and monitoring the progress of the patients in terms of recovery (details with regard to the same are given in table 1 below).
- Many preventive programs are well known to reduce the incidence of neurological disorders like addressing risk factors for stroke, helmet and seatbelt wearing for head injuries, improved antenatal practices for childhood neurological disorders and epilepsy. Health education and promotion programmes should include these aspects as well.
- The NCD wing of the DoHFW should take leadership role to develop pilot programmes in stroke prevention / management / rehabilitation

Management of Stroke in peripheral areas

- The acute management of ischemic stroke in window period of 4.5 hours requires organization of stroke services in the health delivery system of the state
- At village, PHC, Taluka level recognition of stroke and shifting the patient to nearest primary or regional stroke centre should be the priority.
- Doctors (MD qualified physicians are already trained to treat stroke patients by thrombolysis) with an MBBS qualification can be trained to treat stroke patients. Necessary training packages have to be developed centrally at the state level.
- The protocols of management of stroke at taluka and district levels have to be developed – validated - circulated and all the doctors have to be trained. Training can be provided to doctors and all supportive staff through digital platform and wherever possible by organising workshops.
- At district hospital primary stroke center should be established, with availability of stroke physician, 24 hour CT scan with Stroke ICU and with facilities for intravenous thrombolysis.
- Primary Stroke centers in a region of 3-4 districts should be connected to a regional centre where in addition to intravenous thrombolysis; cath lab with facilities for endovascular therapy for the stroke should be made available.
- It is essential and imperative to have 5 bedded ICU in Taluka hospitals and 20 bedded ICCUs in District hospitals. The Taluka hospitals have to be mapped to tertiary care hospitals in every district at the vicinity for this Spoke and Hub model.
- The equipment's and manpower for setting up an ICCU at a district level have to be procured – installed – maintained and operated through skilled resources.
- The training, monitoring, supervision and transfer responsibilities of patients from Spoke to Hub Hospital have to be evidence based and protocol driven.
- Simple data management protocols have to be developed and analysed regularly to assess effectiveness of the hub and spoke model.
- Emergency 108 Ambulance services are to be functioning and integrated into this system for timely transfer of patients.
- Telemedicine should be used to link all the centre and an apex centre who has experience in the stroke management should coordinate with adequate manpower with regional centre which in turn coordinates the primary stroke centers.
- NIMHANS can provide support to establish this Hub and Spoke model and Demonstration projects can be initiated in the next 12 months in 3 – 4 districts

40. COPD and Respiratory Health

Prevention, promotion, early diagnosis and management and, continued care of COPD persons should be strengthened by developing

- An expert committee to establish policies and norms to be followed at different levels of healthcare system for screening and management along with developing the requisite infrastructure support
- Norms and guidelines for management, follow-up and review at primary, secondary and tertiary care levels along with guidelines for home care management for individuals suffering from COPD.
- Mechanisms for linking COPD management under the existing national programs for continued treatment of patients to control the post illness sequelae.
- Training and education of all categories of health personnel including medical undergraduates and postgraduates by having compulsory posting in pulmonary medicine departments .
- Pulmonary function test centres in all PHCs, secondary health care facilities in district hospitals and in advanced diagnostic and clinical workup centres in medical colleges and district hospitals.
- Awareness in the population and to educate at risk individuals and groups.
- Research components in medical colleges for better understanding of COPD

Chronic Obstructive Pulmonary Disease (COPD) is defined as ' a common, preventable and treatable disease characterised by persistent respiratory symptoms and airflow limitation due to airway abnormalities caused by significant exposure to noxious particles or gases and influenced by a wide variety of host factors including abnormal lung development' (131) . The damage to the lungs resulting from COPD is irreversible and is therefore a serious illness causing long-term disability and early death. Individuals with COPD are also at an increased risk of developing various comorbid conditions in their life. As in other areas of public health, data to quantify the burden of COPD in Karnataka is not available. However, it is estimated that the prevalence varies from 2 to 22% in men and 1 to 19% in women as per various studies(106, 15, 132) ; valid and reliable spirometry based prevalence data for COPD is unavailable even though COPD ranked second in the top 15 causes of diseases and deaths in 2016 up from its nine position of 1990(101). The prevalence and burden due to COPD is projected to increase over the coming decades due to increasing risk factors due to genetics, exposure to noxious gases, tobacco smoke, outdoor pollution, occupational exposure and indoor air pollutants, airway hyper responsiveness and poor lung growth during childhood.

The state of Karnataka implements a few programs for prevention and control of respiratory illnesses like the National Tobacco Control Programme, National Tuberculosis Elimination Programme and National Programme for Control and Treatment of Occupational diseases and Injuries. There is no programme for COPD care and management as the importance given and coverage of services for COPD is extremely limited. Many other challenges for public health programs exist for COPD as well, ranging from funding insufficiencies to the availability of basic drugs and diagnostics at PHC levels with difficulties in implementation.

41. Oral Health

- Organise a state-level oral health survey to estimate the burden of oral disorders and to repeat the survey at periodical intervals to gather up-to-date information for planning oral health services.
- Constitute an oral health task force with experts drawn from government and private sectors to develop the state-level policy and programs as well as to oversee the implementation of oral health programs in the state
- State specific oral healthcare delivery models should be developed in select districts on a pilot basis to facilitate implementation and integration of different programs
- Create positions of Dental Chair assistant in all district and taluka hospitals to provide effective services.
- Epidemiological surveys of oral health conditions should be undertaken and integrated with other surveillance programmes along with establishing a Karnataka state oral healthcare information system.
- Establish a state Centre of Excellence in a dental academic institution for coordinating with government towards implementing oral health programmes in the state

Optimal oral health is important for overall health and well-being of individuals. As per the GBD study 2019, the prevalence of oral disorders in India was 46.6%, with data being unavailable for the state of Karnataka (Table 12) (106). Oral health is one of the most neglected public health problem at the policy level due to lack of real-time data and absence of qualified personnel. In addition, the absence of oral healthcare services at primary and secondary levels has been a major impediment to develop services. The dentist population ratio in the country is 1: 200,000 despite the high concentration of dental professionals in urban areas and in private healthcare settings(133). Many oral health conditions like dental caries, periodontal diseases, loss of attachment, oral mucosal conditions, malocclusion, oral cancer, fluorosis and eduntulousness are highly prevalent and contributes for significant oral morbidity.

Table 12: Oral Health Status of Karnataka (Age-wise)

Conditions	5 Years	12 Years	15 Years	35-44 Years	65-74 Years
Dental caries	40.5	22.3	33.1	63.3	81.7
Periodontal disease (Bleeding, Calculus & pockets)	46.5	8.7	86.8	94.3	77.2
Loss of attachment	NA	NA	4.8	33	47.9
Oral mucosal conditions	1.2	0.5	0.9	0.6	0.7
Malocclusion	0.3	19.4	18.5	26.2	NA
Oral cancer	1.2	0.4	0.9	0.3	0.7
Fluorosis	3	13.1	11	5.2	2.7
Edentulousness	NA	NA	0	2	122

The state has nearly 40,000 dentists registered with the Karnataka State Dental Council of which only a few have served in the public sector. A large number of dental health officer posts are lying vacant in the state and are to be filled. The dentist density for one lakh population is 3.8 in the state, substantially lower as compared to the WHO dentist population ratio recommendation of 1 : 7500.

The National Oral Health Programme(134) was launched in the year 2016 in the state. The program aims to strengthen public health facilities for an accessible, affordable and quality oral healthcare delivery. The National Oral Health Policy of 2021 is also under formulation. In addition, many other existing programs also support oral health services. The notable scheme of the Karnataka state ' Danta Bhagya scheme' supports patients from BPL families and those above 60 years, RBSK for oral health of children, National Programme for Prevention and Control of Fluorosis are also under implementation.. Many challenges as applicable to other public health programs exist in oral healthcare delivery as well, ranging from human resource deficiencies to low awareness levels in the community, maldistribution of the oral health workforce, poor perception of oral diseases in the community, miniscule budgetary allocation and lack of clarity on implementation of oral health programmes.

42. Eye Care Services

The subcommittee on strengthening ophthalmic care recommends an implementation framework for all state government schemes in consultation with expert committee to bring about integration of private and public health care facilities under the Ayushman Bharat scheme(62) with other existing schemes. The committee recommends that the government policy of 2017 should be implemented immediately for improving eye care services in the state. The committee recommends that

- Mandatory refractive eye status examination at school admission level and at annual promotion for subsequent classes should be undertaken in coordination with the Department of Education and Women and Child Development.
- A senior ophthalmologist should be appointed in all the districts for providing a wide range of clinical services who will also be responsible for training and capacity building activities at taluka levels.
- The licenses of all existing ophthalmic institutions should be periodically reviewed to ensure quality services. Eye banks should be promoted in all cities and districts along with information in all the medical death certificates to support eye donation programs
- ASHAs and health workers should be supported to update the village blind register and to refer required cases to the medical offices at the PHC levels
- All drivers above 50 years should be encouraged to undergo periodical eye check-ups especially those with comorbid conditions.
- Speciality care services in the area of eye trauma, retinal detachment, paediatric cataract, and other eye conditions should be made available for all needy persons in medical colleges, district hospitals and apex institutions.
- Human resources in ophthalmic care should be strengthen with training programs for people working in government services
- Financial support to be extended to all needy families and from poor income households to receive eye care services by bringing some of the existing schemes under the Ayushman Bharat Arogya scheme

43. Trauma and Critical Care Services

- A state level multisectoral and multidisciplinary trauma critical task force to be chaired by a senior official should be constituted with the responsibilities of providing technical support to develop state trauma and emergency care policy, trauma care, action plan and for assisting the government in implementing and monitoring the progress.
- The trauma care unit in the DOHFW should be supported with a fully trained and professional team to coordinate all activities at the state level.
- Sustainable, certified, need-based and effective training and capacity building programs has to be implemented in the state by creating a pool of certified first care responders from within the community; local medical colleges, district administration can train these people under the guidance of the Karnataka road safety authority or any other implementation bodies.
- The implementation of the Good Samaritan law needs a greater push from the state government with the active engagement of NGOs, media, health Department and can be done through larger CSR activities.
- The existing ambulance network should be strengthened with a state owned, integrated, geo-tagged and a single number with adequate fleet management services, required technology and call centre operations for early transport of injured and critical persons to the nearby definitive hospitals.
- An effective and functional district trauma and emergency care program (PHCs as first care centres, CHCs and taluka hospitals for secondary care and district hospital / medical college hospitals as tertiary care centres) should be implemented on a pilot basis in four districts of the state over the next two years with a designated nodal officer and a budget.
- All doctors and nurses should be trained in emergency and trauma care through a 2 week training programme in designated medical colleges of the state under RGUHS by using modules already developed by the state.
- Introducing a triage system with a designated nurse coordinator should be made mandatory in all taluka and district level hospitals.
- All designated trauma care facilities – proposed and those in development should be fully functional by 2022 with total availability of required manpower, functional CT scan and operational theatres in all district hospitals. In addition, all existing 30 district hospitals should be upgraded as integrated trauma and critical care centres.
- Telemedicine and Tele – teaching should be scaled up and effectively used for critical care management and a comprehensive plan should be drawn up by the department.
- In every district, 20% of beds in district hospitals and 10% in taluka hospitals should be converted to fully functional ICU and critical care unit. All private hospitals should extend trauma care services, irrespective of the injured person's ability to pay.
- The state should establish six regional trauma and critical care referral hospitals with each Centre covering neighbouring 4 to 5 districts for a population of ~ 10,000,000 to provide comprehensive trauma and critical care services
- Monitoring and evaluation mechanisms should be established in all trauma care facilities along with integrating HMIS systems for trauma related information. Trauma audits should be part of trauma care in all hospitals along with quality control and accreditation mechanisms.
- Departments of emergency medicine and trauma care should be established in all medical colleges and wherever facilities are available super speciality programs like DM critical care or DNB in critical care should be started at the earliest.
- A fully operational cashless scheme and flexible financing solution should be established to ensure that all persons with emergencies are protected by insurance in both public and private sector

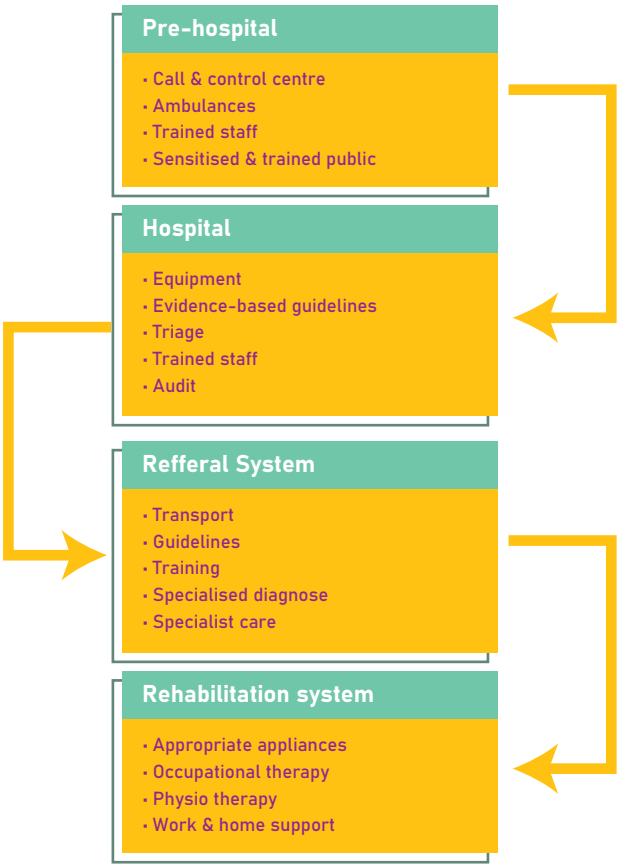
Injuries and acute medical/ surgical conditions are common reasons for hospital visits and admission to emergency rooms, hospital wards and critical care units. Due to lack of reliable state wide hospital reporting and surveillance systems, data is lacking with regard to number of hospitalisations, recoveries and deaths due to medical and surgical conditions in the ER and ICUs.

WHO and other international agencies indicate that efficient emergency, trauma and critical care services can reduce deaths by 25 to 30%(117, 135, 136). Even in Karnataka, a demonstration project undertaken in the districts of Mandya, Bagalkote and Belgaum during 2013 – 16 informed that an integrated and interconnected facility based and resource applied program can reduce trauma deaths(137). Based on available data and estimates, about 3 million persons with injuries and an equal number or higher number of persons with medical and surgical conditions need emergency and critical care services every year in Karnataka. The data from the five years of Bangalore Road Safety and Injury Prevention Programme revealed that among deaths, 1/3 occur at the injury site, 10 to 15% on the way to hospital, nearly 50% in the hospital and a small percent post discharge(83). Many of these can be averted with good trauma and critical care services. Information on deaths due to other causes and place of death is not readily available in the state.

The DoHFW is the lead state agency for implementing trauma and critical care services in Karnataka. Trauma care management in the state suffers from lack of a clearly defined policy, programmatic guidelines, organisation, skilled manpower, drugs, equipment's and supplies and poor coordination mechanisms at the state and district levels, in both urban and rural areas, due to slow-paced initiatives. An in-depth assessment of trauma care systems in the district of Kolar in 2017 indicated that there was no trauma care policy, SoPs, guidelines and trauma team concept. Only 40% of the doctors and 17% of nurses were trained in trauma care. The scoring of healthcare facilities and a comparison with WHO essential guidelines for trauma care revealed that none of the facilities from level 1 to level 3 had trauma care systems with more than 75% of the WHO expected standards. Only level 4 healthcare facilities had trauma care systems with more than 75% of the expected standards (30).

In sharp contrast, the system assessment of emergency care services in Tamil Nadu indicated that an appropriate combination of Triage, Training and Treatment (3 Ts) improved efficiency of trauma care services. Nearly 86% of the intervention hospitals had better treatment outcomes in spite of receiving more polytrauma cases and head injuries, as compared to hospitals without interventions. Nearly 85% of polytrauma patients improved in intervention hospitals as against 60% in the control hospitals. The most significant intervention in the facilities was the appointment and coordination by a dedicated trauma care nurse coordinator who in turn was able to train many other nurses(138).

Figure 39: Elements of effective Trauma Care system



Trauma care management is an integrated set of activities starting from management at the site till the discharge of the patient and subsequent rehabilitation measures (Figure 39)(139) .

The Covid 19 pandemic necessitated the government to act and make required arrangements in view of the increasing cases, emergencies and deaths. The government acting fast, scaled up manpower by recruiting doctors, nurses, specialists and all support staff, augmented critical care infrastructure by strengthening ICU facilities with equipment and supplies, provided training for all categories of health professionals, allocated greater funding for procuring drugs and other supplies, strengthened coordination mechanisms through regular meetings, introduced telemedicine facilities and state-level coordination mechanisms definitely improved to a greater extent. The judiciary also played a major role by issuing directives and the media highlighted the ground level realities. A combination of all these measures has helped in improving services in trauma and critical care units across the state. A real time evaluation is required to assess the sustainability and impact of these changes in due course of time.

Regional Care Centres

Emergency, critical care, acute care, speciality – super speciality services will be required for an unknown (or even unestimated) proportion of persons from paediatric to geriatric age groups with different health conditions who are in an advanced state of illness with co-morbidities and complications. The precise number of such persons in a district (~ 2.5 million) is difficult to estimate in the absence of good population based studies. Persons with diabetes, CVDs, stroke, cancer, renal diseases, trauma, acute medical / surgical emergencies, burns, and several others fall into this category. Most patients (especially these above 50 years) will have multiple comorbid conditions requiring inputs from multidisciplinary for management. In the current scenario, patients, families and hospitals make decisions of reaching such patients to advanced facilities, mostly to urban centres, based on access and affordability in the absence of specific protocol driven referral pathways. Referral from one hospital to another is a common phenomenon also resulting in high costs of care.

While it is ideal that district hospitals and medical college hospitals should provide advanced care (with dedicated 20 % and 10 % of beds in district and taluka hospitals, respectively along with systematic unpgradation of facilities and manpower), some may require care in apex tertiary care centres. At present, standalone independent speciality and super speciality centres, mostly in private sector and in urban areas are functioning in the state. The state government is considering establishing few such centres in cardiology, trauma care, cancer care, burns management and others in the state.

To provide specialty services for state citizens, the Karnataka government is planning to establish Intensive care units of 25 bed and 6 bed capacities in 19 district hospitals and 100 taluka hospitals, respectively, – unpgradation of primary health centres to model primary health centres, stage by stage to provide additional services and modern facilities- emergency treatment departments in Bengaluru, Mysuru, Ballari and Hubballi Medical Science Institutes - regional cancer treatment centres on the model of Kidwai Institute at Mysuru and Shivamogga - three well equipped mobile laboratories for cancer detection among women – a sub-centre of Jayadeva Institute of Cardiac Sciences of 50 bed capacity in Davanagere - a sub-centre of Jayadeva Institute of Cardiology at Bengaluru with 50 bed capacity and other facilities- a burn injuries treatment and plastic surgery division at Kalaburgi Medical Science Institute by Kalyana Karnataka Development Board – opening up of a trauma care centre in Mysuru Medical Science Institute – upgradation of DIMHANS at Dharwad to a well-equipped mental and neuro patients treatment centre - new multi-speciality hospital in North Bengaluru area to provide modern and specialist medical services to the poor and migrant workers – Operationalization of the Institute of Gastroenterology Sciences and Organ Transplant in Bengaluru - and other facilities with upgradation being a continuous activity (excerpts from the budget 2021 – 22 , Karnataka Government dated 8th march 2021) .

A closer examination of management of such persons reveals the need for a multidisciplinary team approach (team of specialist doctors like physicians, surgeons, orthopaedicians, cardiologists, endocrinologists, anaesthetists, radiologists and many others), advanced facilities (Operation theatres, ICUs, step down facilities, wards, etc.,) , a large team of support staff like (nurses, technicians, skilled team of support professionals) along with many other support systems (like blood banks, CT / MRI facilities, etc.,).Needless to say, the capital and recurrent expenditure of managing such centres on an year to year basis will be huge.

The state government should consider developing five such regional centres in different regions of the state to provide speciality multidisciplinary services (to manage many health conditions under one roof) considering regional distribution, geography, development status of districts, access, possibility of getting specialists in different specialities, operational costs, and likely benefits to people. Each centre can serve the needs of 5 – 6 neighbouring districts. These centres can be exclusive speciality HCFs located in proximity of a medical college or a district hospital or can be up gradation of select medical colleges. The obvious merits of this approach lies in – providing multispecialty care, sharing resources and reducing costs, and minimising patient inconvenience and multiple referrals. Apart from providing specialised care, these centres can also serve as excellent centres for - human resource development centre for speciality areas - research – protocol driven and evidence based referral systems - promotion of specialities - and state of the art facilities. Such centres can also have linkages with the district health systems with provision of serving poor and vulnerable communities. Telemedicine must be an integral part of such centers.

To help the government for identifying the need and scope of such services, a scientific study should be commissioned by the health department in 2 districts of Karnataka (one in north and one in south) to come up with a plan of implementation that is based on data and evidence.

44. Environment and Health

Recommendations:

SHORT TERM

I. Compliance of Environmental Laws

To address these challenges, the state has established various departments and agencies to coordinate the environmental protection and sustainability efforts. Karnataka has a dedicated Department of Forest, Ecology and Environment. Various laws and regulations have been adopted which include - The Environment Protection Act, 1986,The Air (Prevention and Control of Pollution) Act, 1981,The Water (Prevention and Control of Pollution) Act, 1974,The Karnataka Forest Act, 1963,The Wildlife (Protection) Act, 1972,The Forest Conservation Act, 1980,The National Green Tribunal Act, 2010.Strict implementation and compliance of these Environmental legislations are necessary to address Environment and health issues.

II. Training and Capacity Building

Capacity building programs for all the stakeholders/user agencies and departments on environment and health through online and offline modes and making it prerequisite for providing compliance certificates for agencies such as industries, slaughterhouses, blood banks, transport and other user agencies using policy guidelines to bridge the gaps and suggest required evaluation studies and capacity building is required.

III. Monitoring

Creation of Integrated Command and Control Information System to address the public grievances for all environmental and health concerned departments with a unified 3 digits user friendly toll free helpline number with multiple options to make voice calls, upload photographs with geographic location, send email etc., to register grievance along with a control room monitored by a dedicated officer, preferably senior administrator is an essential requirement.

LONG TERM

I. Implementation of Environment Management Plan (EMP)

To create an environment management division at each Local body level

II. Research and Technology

Promoting research of environmentally sound facilities for the treatment of Bio-medical waste, Hazardous waste, e-waste, construction waste, Solid waste, plastic waste, Air and water pollution for innovations is required. Development and Strengthening of research centers and build capacity of the health care providers/ Pourakarmika/ vulnerable groups to identify Occupational hazards and monitor the diseases that are attributed due to poor environmental conditions.

III. Financial Instrument

Prioritizing environment sectors and getting required budgetary allocations by considering various options like introducing environmental health cess in taxation policy, tapping CSR fund for Environment and Health under CSR rule, encouraging corporate companies to adopt villages, schools, anganwadis, and public infrastructures like sports stadium, parks, and treatment plants and ensure health and hygiene should be considered.

Preventive taxation policy for eg: to ease traffic congestion ; to control excessive use of chemicals, pesticides, herbicides in agricultural/ horticultural crops ; incentivizing eco-friendly material example: encourage cotton/jute bags ; elimination the single use plastic ;encouraging green infrastructure, smart city, and public transport through preventive taxation policy needs examination.

IV. Education, Sensitization and Awareness creation.

V. Policy Interventions & Evaluation and Social Audit

Creating sound environmental management system is a key for ensuring good public health, therefore it is important to make Environment and Health everyone's business! For this public awareness needs to be created to make it people's movement along with policy reforms.

Covid-19 pandemic situations have made us realize that it is important to prioritize Health and Environment by enhancing budgetary allocations and involving public participation to achieve required goals and targets of good health and well-being.

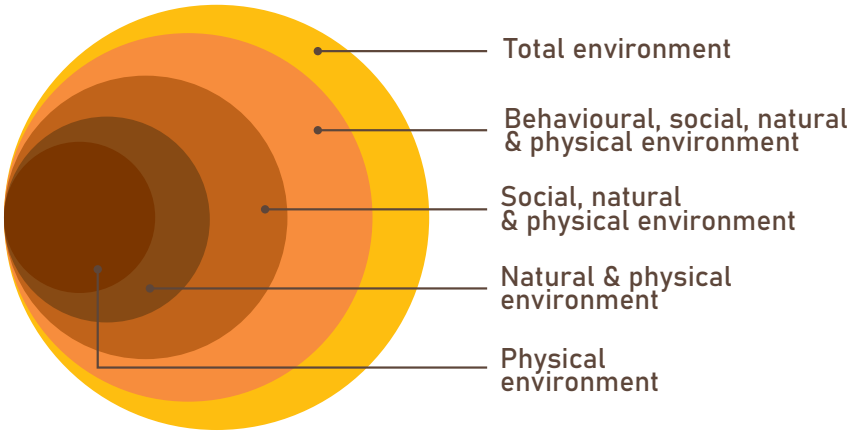
Health of individuals is related to the environment in which they live. Environment includes the surroundings, conditions or influences that affect an organism (Davis, 1989). Clean air, water, sanitation, green spaces and a healthy working environment is important for a society to ensure equitable and quality life and for women, men and children to be more productive and creative. The dangerous levels of pollution of water, air and soil, disturbances to the ecological balance of the biosphere and depletion of non-renewable resources are a matter of increasing concern in today's society. The improvement of public health also includes the protection and improvement of the total environment without which public health cannot be assured as shown in Figure 40.

- In Karnataka the number of deaths attributable to ambient particulate matter pollution (95% uncertainty interval) among females and males is 10,838 per annum (7,036 to 15,481) and 15,473 per annum (10,295 to 21,646) respectively. Similarly the burden of mortality attributable to household air pollution (95% uncertainty interval) among females and males is 17,716 (13,149 to 22,501) and 15,981 (11,552 to 20,778) respectively.
- At present existing treatment capacity of Sewage Treatment Plant is 2289 MLD, but capacity utilization is 1592 MLD in the state. Inadequacy in sewage treatment plants and underutilization of installed capacity lead to contamination of surface and ground water due to discharge of untreated sewage into environment media.
- The solid waste generated from the urban centers is about 11,085 TPD, and the amount of municipal solid waste collected is 10,198 TPD, the quantity of the solid waste processed is about 5,838 TPD.
- Total Hazardous waste generated in the state is 3,62,901 Mega Tones Per Annum (MTA) and Plastic Waste generation is about 627 Tons Per Day (TPD). Total Bio-medical waste generated in the state is 66 TPD besides a significant amount of COVID waste during the pandemic.
- The State Action Plan for Climate Change (SAPCC) has identified the following concerns: Climate change affects the social and environmental determinants of health – like clean air, safe drinking water, sufficient food and secure shelter. Between 2030 and 2050, climate change is expected to cause approximately 2,50,000 additional deaths per year, from Malnutrition, Malaria, Diarrhea, heat stress and related causes.

Existing/Ongoing Programs:

- National Clean Air Program (NCAP)
- National River Conservation Plan
- Green India Mission - National Afforestation Program
- National Action Programme to Combat Desertification
- Renewable Wind and Solar Grid energy, MNRG
- National Green Corps (NGC)
- National Health Mission
- National Vector Borne Disease Control Programme (NVBDCP)
- Family Welfare Sterilization Programme
- Integrated Disease Surveillance Project (IDSP)
- Mission Indradhanush
- United Nations Sustainable Development Goals (SDGs)

Figure 40: Levels of Environment



45. Urban Health

- A state urban health authority should be constituted for planning and coordination of all services across all sectors concerned with urban health as well as to regularly monitor and evaluate activities.
- An urban health task force should be established with representation of diverse stakeholders to support planning, designing and implementation
- Within the DoHFW, an urban health division should be established for undertaking all coordination, funding and collaborative activities with concerned departments and urban local bodies
- Resources for urban health should be clearly mapped and deficiencies in human resources and facilities should be clearly delineated for strengthening along with an increase in budgetary allocation.
- Each zone in Bangalore and all cities with a population of more than three lakh should be considered as separate units for implementing national health programmes with availability of all services and a 24x7 programme.
- Health promotion activities should be strongly supported in all educational institutions, offices, industries, workplaces, community agencies to encourage people to adopt healthy lifestyles.
- An urban health demonstration project based on the proposed urban health model should be piloted in one or two zones of Bangalore city to gather the learning's and experiences before scaling up activities.
- Health impact assessment should be regularly undertaken for all health and nonhealth sector related projects and programs including those falling under the smart cities mission and in urban areas of Karnataka
- Evidence-based urban planning should be undertaken to facilitate uniform and sustainable urbanisation.
- Engaging urban population and CSO's is critical for improving urban health with a focus on vulnerable populations.

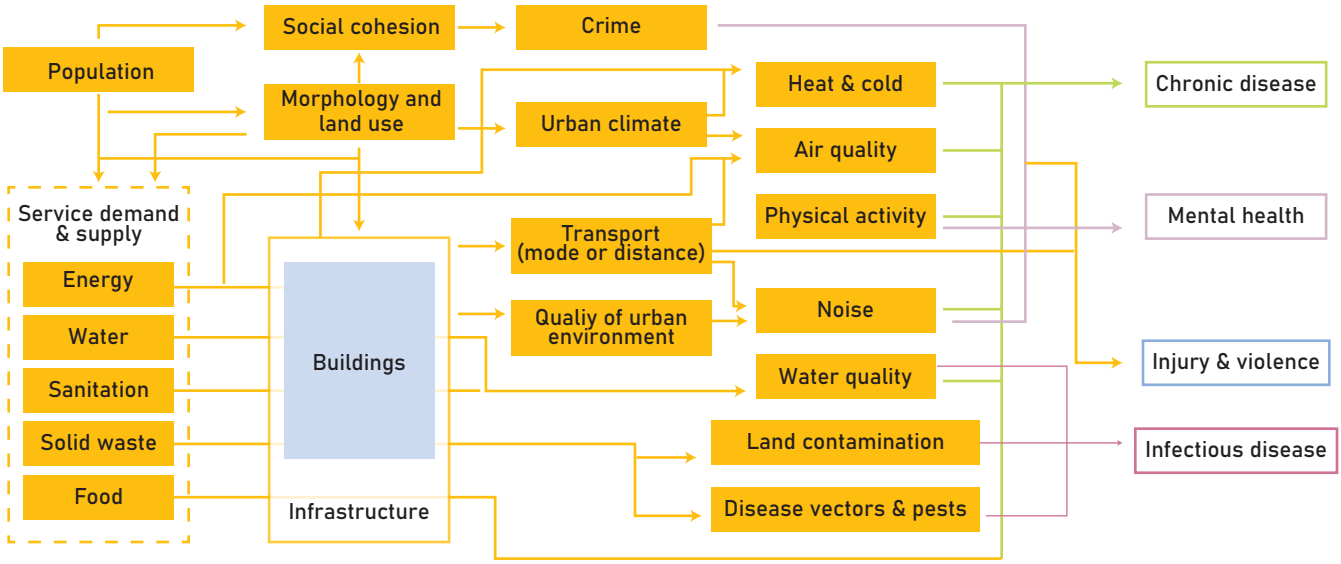
Urbanisation has had a huge impact in Karnataka with the proportion of urban population nearly doubling in the last five decades. It is estimated that the state urban population will be closer to 50% by 2030 from the current estimate of 43.6%(11). Health of individuals is related to the environment in which they live. Environment includes the surroundings, conditions or influences that affect an organism (Davis, 1989. The noticeable feature of urbanisation in the state's top-heavy nature lies with 70% of the urban population residing in class I towns and cities.

"Health care is vital to all of us some of the time, but public health is vital to all of us all of the time"

– C. Everett Koop

Undoubtedly, urbanisation has several advantages in terms of education, economy, living, accessibility to services and others. However, this urban advantage may get jeopardised due to unplanned growth and poor governing systems. The determinants of urban health are several and interact in many complex ways. Poverty, presence of slums, low literacy levels, lack of basic amenities in water – sanitation – housing, overcrowding, living habits, transportation, health care and costs, changing food habits, fast paced living, higher stress, increasing problems of substance and technology use, and poor safety nets contribute for the growing burden of a wide variety and nature of health problems, specially affecting the urban poor(140) (Figure 41).

Figure 41: Connection between health outcomes and the urban environment (140)



The health, social and economic problems in urban areas are also different as compared to rural issues. NCD's and injuries together contribute for nearly 70% of mortality in urban Karnataka. Many other communicable diseases also coexist in this scenario. One in eight individual suffer from mental and substance use disorder. While overweight and obesity is more prevalent in urban areas, child malnourishment is common among the urban poor. Mother and child related health problems are also higher among the urban poor in comparison to their rural counterparts. Air quality in most of the cities, the noise levels, waste disposal mechanisms, transportation crisis, safety concerns are all huge, leading to multiple health problems. Amidst the basic struggles of job, income, housing, education and survival, health is of concern and the place it gets in individual hierarchy depends on the importance given by governments, individuals and families.

The National Urban Health Mission (NUHM) launched in the year 2013 aims to improve the health and well-being of the urban poor by facilitating equitable access to quality healthcare through an upgraded public health system with the active participation of the urban local bodies(141). The program also covers all the district headquarters and other cities with population of 50,000 and above, while those below 50,000 are covered under NRHM. A wide range of preventive, promotive and curative services are covered under NUHM. One urban primary health centre is established for every 50,000 population and nearly 361 UPHCs are functioning in the state. Till date, no formal evaluation on input, process, outcome and impact of NUHM has been undertaken in Karnataka. NUHM has certainly contributed to improving resources for urban healthcare through increased funding, establishing UPHCs, strengthening existing health centres, recruiting more manpower, improving community participation, constituting Mahila Arogya Samithis and also by strengthening the laboratory services. However, many challenges exist in implementation of NUHM due to governance, coordination and funding issues. Most significantly, healthcare in urban Karnataka is also through a wide network of private healthcare providers. Utilisation of services from private care providers entail considerable OoPE and can be of catastrophic nature. Poor urban planning and adhoc-crisis oriented populist programs have failed to recognise the real burden of urban health issues.

The subcommittee of the vision group after examining details, has suggested a hub and spoke model for healthcare through a mix of public and private sector health care facilities and providers. The existing public urban health services in the state fall into three distinct patterns largely based on population size. Thus, the nature and range of services in Bangalore city with an estimated 1.7 crore population is likely to be very different as compared to other places in terms of the administrative arrangements. In cities with lesser population, there are UPHCs providing clinical and preventive services functioning under the District Health Officer of the *DoHFE*. Secondary and tertiary care services are provided through the district hospital and all medical colleges. In smaller cities, the district health office and the district health hospital are available for secondary health services. Based on the current understanding of the existing patterns the proposed urban health model should be examined by the government for its implementation.

With the launch of the NUHM in 2013 and also the smart city program implemented in select places the focus of urban health has shifted to a more integrated and inclusive model for healthcare delivery. For improving health and life of people, a coordinated assessment and regulatory frameworks needs to be established in its implementation.

46. Disasters, Epidemics and Emergency Preparedness

In recent times - disasters, epidemics, pandemics and other emergencies (eg., fire emergencies, building collapse) has become common in today's society. The health sector has a very significant role in protecting the health and well-being of populations, vulnerable populations in particular, from the impact of varied hazards in the state. Apart from providing emergency services in crisis situations, the health sector has a greater role in organising preventive and curative functions along with governance, guidance and regulatory roles. Disasters, pandemics and epidemics are known to widen the existing inequalities both within and between populations.

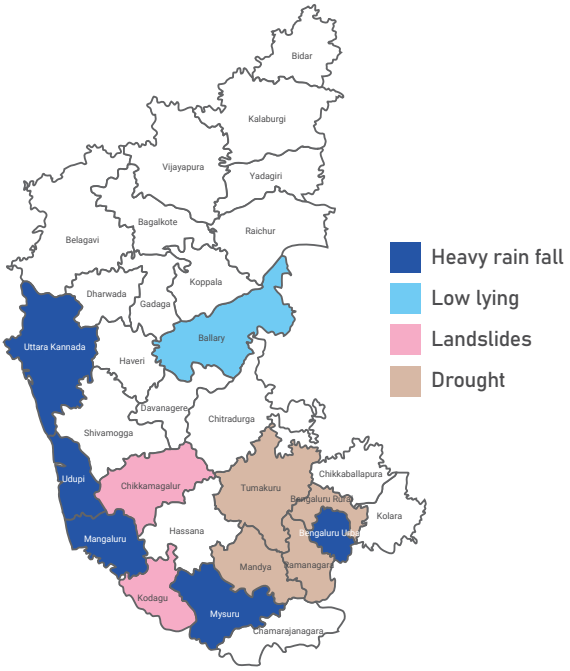
Karnataka faces draught landslides, disturbed rainfall, cyclones, flooding and local epidemics on a year-to-year basis, with Covid 19 pandemic added to this list ; all aspects of people's lives are affected in these situations. Most importantly, certain districts of Karnataka are draught prone while few other districts are disaster prone (Figure 42) . The health effects and consequences vary from short to longer durations and has varying impact on health of people.

The current disaster management policies of Karnataka outline an elaborate and comprehensive framework by covering wide range of services including emergency response. However, the importance given for mental health and psychosocial support services is only cursory in nature. While the comprehensive coverage of medicines, nutrition, food safety, shelter, transport and other areas exist, mental health has been the neglected part in disaster management situations. Though physical health is a fundamental dimension of well-being, mental and social health is equally important for creating the ability to lead a socially and economically productive life.

In line with the National Disaster Management Act 2005(142), the Karnataka State Disaster Management Authority has been established under the leadership of the Hon. Chief Minister of Karnataka(143). The different administrative bodies are entrusted with specific responsibilities to respond in disaster and crisis situations. The District Disaster Management Authority headed by the Deputy Commissioner of the district is the nodal unit for managing all activities at the district level along with development of the district plan.

The physical and psychosocial impact of disasters differ significantly in terms of acuteness and chronicity, nature of damage and hazard profiles, and are invariably associated with loss of lives and damage to property. Both the primary and secondary stressors play a significant role in affecting the physical and mental health of individuals. The district preparedness during

Figure 42: Map of Karnataka with disaster proneness and occurrence



disasters and epidemics require great communication, coordination and convergence of activities.

- A district directory of institutions, manpower and capacity along with referral pathways needs to be created as a ready reckoner or as a work card for emergency purposes along with maintaining a directory of evidence-based good practices based on learning from other places and lessons learnt from the past.
- The several sections of the disaster management act and state disaster management act have several provisions for implementation during epidemics and pandemics. All these require developing systems that can respond at early stages, maintain continuity of services, and ensure health and well-being of people as well as delivering the required social and economic support for the affected individuals. Both short term and long term psychosocial care is important in disaster situations.
- A greater investment has to be made in developing human resources of different types through continuous and on-going training programmes at different levels along with and capacity building of policymakers.
- The role of technology does not require overemphasis as communication and convergence of activities form the central pillars of relief operations in any disaster, epidemic, pandemic and other emergencies.

47. Tribal Health

The term "Scheduled Tribe" first appeared in the constitution of India. Article 366 of the Indian Constitution defined Scheduled Tribe as "such tribes or tribal communities or parts of or groups within such tribes or tribal communities as are deemed under Article 342 to be Scheduled Tribes for the purpose of this constitution. Currently, over 104 million tribal people live in India spread across 705 tribes, and account for 8.6% of the country's population. (144)

In Karnataka, Schedule Tribes account for 6.55 percent (3.46 million) of the total State population, which comprises 4.11 percent of the total tribal population of the country. Concentrated tribal areas termed as Integrated Tribal Development Project (ITDP) exist in 4 districts of Mysore, Chickmagalur, Kodagu, Dakshina Kannada and Udupi (South and Coastal Karnataka). There are 50 major tribes with 109 sub-tribes in the State (as of March 2005), according to the notified Schedule under Article 342 of the Constitution of India. From these, GoK has identified (i) Jenu Kuruba; and (ii) Koraga tribes as primitive groups (PTGs). Jenu Kuruba tribes are originally from Mysore, Chamarajanagar and Kodagu districts and Koraba tribes are from Udupi and Dakshina Kannada districts. In Chamarajanagar district, only Kollegala Taluk has PTG areas. PTGs constitute the most vulnerable among the all notified tribes. Bellary district has the highest concentration of Schedule Tribes (STs) in Karnataka. (145)

Tribal people have remained marginal- geographically, socio-economically, politically and therefore, health and healthcare in tribal areas remained unsolved problem. Large gaps in Human development indicators are observed between scheduled tribes and all category group. (146, 147) The total fertility rate of the tribal population is 2.48, while the national average 1.92; the child sex ratio 957 in 2011 higher than general population at 914 girls to 1000 boys. The literacy rate stands at 59 percent in 2011, as against 73 percent in general population. The life expectancy at birth for ST population in India is 63.9 years, as against 67 years for general population. The high maternal mortality can be attributed to early marriage, early child birth, low body mass index, and high incidence of anemia. Coverage of postnatal care remains poor, only about 37 percent woman receive the care. The estimated infant mortality rate, neonatal mortality rate and under-5 child mortality rate though declined over years has remained higher than the national average. The immunization coverage, infants fully immunized sands at 55.8 percent as against 62 percent of general population. The percentage of stunting, wasting and underweight in tribal children has reduced but malnutrition is still higher than in all population children. (144) (146)

Data with regard to specific burden of illness in tribal population is limited. The tribal population in the country faces triple burden of diseases. While malnutrition and communicable diseases like malaria and tuberculosis continue to be rampant, rapid urbanization, environmental distress and changing lifestyles have resulted in a rise in the prevalence of non-communicable diseases like cancer, hypertension and diabetes. To add to this the third burden that is the mental illness especially the addictions. (146) (147)

Communicable diseases - The tribal population bears a disproportionate burden of communicable diseases. The estimated prevalence of pulmonary tuberculosis in tribal community is significantly higher than in the rest of population at 703 as against 256 per 1,00,000 populations. In the year 2016-2017 about 18.9% of the newly detected leprosy cases were among scheduled tribes. Although tribal communities constitute only about 8% of the national population, they account for 30% of all the cases of malaria and as much as 50% mortality.

Non-Communicable diseases – The evidence of an early epidemiological transition in tribal areas and associated increase in the incidence of non-communicable diseases is being observed. One out of every four tribal adults suffer from hypertension and only 5% men and 9% women suffering from hypertension knew their hypertension status. Almost 72 percent of the tribal men in 15-54 years age group use tobacco as compared to 56 percent non-tribal men and about 50 percent tribal men consume some form of alcohol. The prevalence of genetic disorders like sickle cell diseases, thalassemia and others varies between one to fourteen percent. As tribal areas are surrounded by forests, animal bites from snakes, dogs and scorpions, the animal attacks and also violence in conflict areas are common.

The National Health Mission (NHM) is a major instrument of financing and support to the States to strengthen public health system and health care delivery and tribal health is given importance. The National Tuberculosis control program has started newer interventions viz. Active Case Finding to improve the case detection in hard to reach areas. To improve access to tribal and other marginalized groups, there is also provision for Additional TB Units and Designated Microscopy Centre's (DMC) in tribal/difficult areas, compensation for

transportation of patient & attendant in tribal areas, higher rate of salary to contractual staff posted in tribal areas, enhanced vehicle maintenance and travel allowance in tribal areas, provision of TB Health Visitors (TBHVs) for urban areas. Similarly, services under the National Leprosy eradication program include funds allotted to NGOs, who are encouraged to work in tribal areas for providing services like IEC, prevention of deformity, intensified IEC activities, and follow up of cases.

Under National Vector Borne Disease Control Programme, services for prevention and control of Malaria, Kala-azar, Filariasis, Japanese Encephalitis, Dengue/Dengue Hemorrhagic Fever (DHF) and Chikungunya, are provided to all sections of the community without any discrimination. However, since vector borne diseases are more prevalent in low socio-economic groups, focused attention is given to areas dominated by the tribal population in Karnataka. The National program for prevention and control of blindness and visual impairment has been strengthened in number of areas like Assistance for construction of dedicated Eye Units in hilly States. (146)

Various schemes and programs have been implemented in Karnataka to ensure the health and wellbeing of the tribal population ; these include The Navsanjivani scheme, special schemes on Matrutva Anudan Yojana, Pada Volunteer Scheme, Mobile Medical Squad, Compensation for loss of daily wages and Water Quality Monitoring. Many NGOs have focused their efforts on health and welfare of tribal communities.

Tribal development has been a challenge to the planners and policy makers since independence. This is mainly on account of their traditional life styles, remoteness of their habitation, dispersed population and displacement. Tribal sub-plan strategy now known as scheduled tribe component was adopted in the 5th Five-year plan for accelerated development of tribal people. Ministry of Tribal Afairs and Ministry of Health and Family Welfare are making efforts through tailored educational, infrastructural and livelihood schemes for the improvement in terms of various indicators relating to literacy, health and socioeconomic status etc.

Special provision has been made to scale up infrastructure under National Health Mission. (5) As per the present norms, tribal and hilly areas should have one health sub-center (HSC) per 3000 populations, one Primary Health Center (PHC) per 20,000 populations, and a community health center (CHC) per 80,000 populations. About twenty-seven to forty percent deficient in the number of health institutions in tribal areas across India could be noted. A huge gap in Human resources in health centers in tribal areas is attributed to reasons such as limited scope for professional interaction or growth for the staff, a feeling of social and professional isolation, weak human resource policies, poor working conditions and environment in the government health institutions, limited social infrastructure etc.

The Ministry of Health and Family Welfare and the Ministry of Tribal affairs constituted an expert committee on tribal health. The committee under the chairmanship of Dr. Abhay Bang, suggested following measures to improve human resources for tribal health (144)

a. The tribal society demands that the healthcare provider should be a local tribe.

b. A vibrant, responsive and accessible health workforce in tribal areas can be ensured through training local people and deploying them as the health force.

c. It is important to place the center of gravity of workforce closer to the communities and not at the top.

d. ASHA in tribal areas should have expanded role with different functions and four hours of work per day.

e. Mid-level care providers should be created through bridge courses and placed at sub-centers.

f. To provide doctors dedicated to work in tribal areas, the committee recommends creation of medical colleges in tribal districts exclusively for tribal students in the scheduled areas.

The global meanings of “development” or “progress” on tribal people do not make them happier or healthier. In fact, the effects are harmful. The most important factor by far for tribal peoples’ well-being is whether their land rights are respected. If they are to survive, indigenous people must control the changes they want to make to their own lives.

48. Conclusion and Way forward

The preceding sections highlight the importance, current scenario and action areas to improve and strengthen health systems and services in Karnataka. It is hoped that the DoHFW takes necessary steps to examine issues highlighted in this report and creates administrative, financial, regulatory and technical frameworks to integrate and implement activities along with required investments on a prioritization mode to strengthen and reform health systems. The vision group has outlined this road map with the strong understanding that robust and responsive systems are required in the coming days to improve people’s health in Karnataka.

Annexures

Annexure 1 - Government Order

ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ನಡವಳಿಗಳು

ವಿಷಯ: ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಹಾಗೂ ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಇಲಾಖೆಗಳ ಸೇವಾ ಸುಧಾರಣೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ವಿಷನ್ ಗ್ರೂಪ್ ರಚಿಸುವ ಬಗ್ಗೆ.

ಓದಲಾಗಿದೆ: ಮಾನ್ಯ ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಹಾಗೂ ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಸಚಿವರ ಟಿಪ್ಪಣಿ ಸಂಖ್ಯೆ:ಆಕುಕ&ವೈಶಿ /ಗೃಕ/1181/ 2020, ದಿನಾಂಕ:30-11-2020.

ಪ್ರಸ್ತಾವನೆ:

ಮೇಲೆ ಓದಲಾದ ಮಾನ್ಯ ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಹಾಗೂ ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಸಚಿವರ ಟಿಪ್ಪಣಿಯಲ್ಲಿ ರಾಜ್ಯದ ಜನತೆಗೆ ಅತ್ಯುತ್ತಮ ಆರೋಗ್ಯ ಸೇವೆಯನ್ನು ಒದಗಿಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಆರೋಗ್ಯ ಮತ್ತು ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಹಾಗೂ ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಇಲಾಖೆಯಲ್ಲಿ ಹಲವಾರು ಸುಧಾರಣೆಗಳನ್ನು ಜಾರಿಗೆ ತರುವ ಸಲುವಾಗಿ ಈಗಾಗಲೇ ಹಿಂದಿನ ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಹಾಗೂ ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಸಚಿವರ ಮತ್ತು ವೈದ್ಯಕೀಯ ಪದವಿ ಹೊಂದಿರುವ ಮಾನ್ಯ ಶಾಸಕರ ಸಭೆಯನ್ನು ಕರೆದು ಅವರ ಅಭಿಪ್ರಾಯಗಳನ್ನು ಸಂಗ್ರಹಿಸಲಾಗಿದ್ದು, ಆರೋಗ್ಯ ಕ್ಷೇತ್ರದಲ್ಲಿನ ವಿವಿಧ ಸೇವೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಆಯಾ ಸೇವಾ ಕ್ಷೇತ್ರದಲ್ಲಿ ಪರಿಣತಿ ಹೊಂದಿ ಪ್ರಸಿದ್ಧರಾದ ತಜ್ಞರನ್ನು ಒಳಗೊಂಡಂತೆ **ಆ ಸೇವಾ ಕ್ಷೇತ್ರದಲ್ಲಿ ಆಗುತ್ತಿರುವ ನೂತನ ಬೆಳವಣಿಗೆಗಳು ಹಾಗೂ ಆವಿಷ್ಕಾರಗಳ ಬಗ್ಗೆ ಬೆಳಕು ಚೆಲ್ಲುವುದಲ್ಲದೆ ರಾಜ್ಯ ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಹಾಗೂ ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಇಲಾಖೆಯಲ್ಲಿ ಮಾಡಬೇಕಾದ ಅಮೂಲಾಗ್ರ ಬದಲಾವಣೆಗಳ ಬಗ್ಗೆ ಸರ್ಕಾರಕ್ಕೆ ಕಾಲಾನುಕಾಲಕ್ಕೆ ಸಲಹೆ ಹಾಗೂ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ಮಾಡುವ ದ್ಯೇಯ ಹೊಂದಿರುವ** ಒಂದು "**ವಿಷನ್ ಗ್ರೂಪ್**" ರೂಪಿಸಲು ಯೋಜಿಸಲಾಗಿದ್ದು, ಅದರಂತೆ ವೈದ್ಯಕೀಯ ಕ್ಷೇತ್ರದ ಪ್ರಸಿದ್ಧ ತಜ್ಞರೊಡನೆ ಹಲವಾರು ಸುತ್ತಿನ ಚರ್ಚೆಯ ನಂತರ ವಿವಿಧ ಕ್ಷೇತ್ರಗಳ ಪರಿಣಿತ ತಜ್ಞರುಗಳನ್ನೊಳಗೊಂಡ ಒಂದು "**ವಿಷನ್ ಗ್ರೂಪ್**" ರೂಪಿಸಲು ಸರ್ಕಾರ ನಿರ್ಧರಿಸಿದ್ದು, ಅದರಂತೆ ಈ ಕೆಳಕಂಡ ಆದೇಶ.

ಸರ್ಕಾರಿ ಆದೇಶ ಸಂಖ್ಯೆ: ಆಕುಕ 641 ಹೆಚ್ಎಸ್ಹೆಚ್ 2020,
ದಿನಾಂಕ:31-12-2020.

ಪ್ರಸ್ತಾವನೆಯಲ್ಲಿ ವಿವರಿಸಲಾದ ಅಂಶಗಳ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಈ ಕೆಳಕಂಡ "**ವಿಷನ್ ಗ್ರೂಪ್**" ರಚಿಸಿ ಆದೇಶಿಸಿದೆ:-

ವಿಷನ್ ಗ್ರೂಪ್	
ಡಾ|| ಜಿ ಗುರುರಾಜ್, ನಿರ್ದೇಶಕರು,ನಿಮ್ಹಾನ್ಸ್ ಸಂಸ್ಥೆ	ಅಧ್ಯಕ್ಷರು
ಡಾ|| ಸತೀಶ್ ಎಂಡೋಕ್ರೈನಾಲಜಿ ಸೇವೆಗಳು	ಸಂಯೋಜಕರು

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1)ಸಾರ್ವಜನಿಕ ಆರೋಗ್ಯ ತಜ್ಞರು		
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2	ಡಾ|| ಗಿರಿಧರ್ ಬಾಬು 9845036197	ಸದಸ್ಯರು
2) ಹೃದ್ರೋಗ ಶಾಸ್ತ್ರ ಮತ್ತು NCD ಸಮೂಹ		
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4	ಡಾ|| ಸಿ ಎನ್ ಮಂಜುನಾಥ್ 9844006699	ಸದಸ್ಯರು
3)ಖಾಸಗಿ ಆರೋಗ್ಯ ಉದ್ದಿಮೆ		
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11	ಡಾ|| ಅರವಿಂದ್ ಶೆಣೈ, ಮಕ್ಕಳ ತಜ್ಞರು 9845692402	ಸದಸ್ಯರು
7)ನೇತ್ರ ಶಾಸ್ತ್ರೀಯ ಸೇವೆಗಳು		
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9)ಟ್ರಾಮ ಕಾಳಜಿ ಸೇವೆಗಳು		
16	ಡಾ|| ಪ್ರದೀಪ್ ರಂಗಪ್ಪ ಅರವಳಿಕೆ ತಜ್ಞರು 9611700888	ಸದಸ್ಯರು
17	ಡಾ|| ಗುರುರಾಜ್ ನಿರ್ದೇಶಕರು, ನಿಮ್ಹಾನ್ಸ್. 9448474451	-
18	ಡಾ|| ವಿದ್ಯಾಧರ ಎಸ್ ಸ್ಪೈನ್ ಸರ್ಜನ್ (ಆರ್ಥೋ ಸ್ಪೈನಲ್), ಮಣಿಪಾಲ್ ಆಸ್ಪತ್ರೆ, ಬೆಂಗಳೂರು	ಸದಸ್ಯರು
10) ನರವಿಜ್ಞಾನ (ಮಾನಸಿಕ ಆರೋಗ್ಯ)		
19	ಡಾ|| ಮುರಳೀಧರ್ ಮಣಿಪಾಲ್ ಆಸ್ಪತ್ರೆ 9845293221	ಸದಸ್ಯರು
11). ನೆಫ್ರೋ ಸೇವೆಗಳು (ಡಯಾಲಿಸಿಸ್)		
20	ಡಾ|| ಜಿ ಕೆ ವೆಂಕಟೇಶ್ (ನಿವೃತ್ತ)ಬಿಎಂಸಿಆರ್‌ಐ. 9986038124	ಸದಸ್ಯರು
12). ಸಾಂಕ್ರಾಮಿಕ ರೋಗಗಳು		
21	ಡಾ|| ರವಿ ನರರೋಗತಜ್ಞರು, ನಿಮ್ಹಾನ್ಸ್ 9343602246	ಸದಸ್ಯರು
13. ಯೋಗ		
22	ಡಾ|| ಹೆಚ್‌ಆರ್ ನಾಗೇಂದ್ರ ಸ್ವಾಮಿ ವಿವೇಕಾನಂದ ಯೋಗ ಅನುಸಂದಾನ ಸಂಸ್ಥಾನ, ಡೀಮ್ಡ್ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಜಿಗಣಿ, ಬೆಂಗಳೂರು. 9986810423	ಸದಸ್ಯರು -
14. ಹೊಮಿಯೋಪತಿ		
23	ಡಾ|| ಐಸ್ಯಾಕ್ ಮಥಯ್ ಸೌಖ್ಯ ಆಸ್ಪತ್ರೆ, ಬೆಂಗಳೂರು. 9845007800	- ಸದಸ್ಯರು

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24	ಡಾ||ಮುನೀರ್ ಅಹಮ್ಮದ್ .ಆರ್ ಪ್ರಾಧ್ಯಾಪಕರು, ಸರ್ಕಾರಿ ಹೊಮಿಯೋಪತಿ ಮಹಾವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು. 9448080577	ಸದಸ್ಯರು
15. ಆಯುಷ್ ವಲಯ ವಿಷಯಗಳು		
25	ಡಾ|| ಅಮಿತ್ ಅಗರ್‌ವಾಲ್ ನಿರ್ದೇಶಕರು, ನ್ಯಾಚುರಲ್ ರೆಮಿಡೀಸ್ ಪ್ರೈವೇಟ್ ಲಿಮಿಟೆಡ್, ಬೆಂಗಳೂರು. 9845008951	ಸದಸ್ಯರು -
16. ಯುನಾನಿ		
26	ಡಾ|| ಮೊಹಮ್ಮದ್ ಸಯೀದ್ ಪ್ರಾಧ್ಯಾಪಕರು, ಸರ್ಕಾರಿ ಯುನಾನಿ ಮಹಾವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು 9845580540	ಸದಸ್ಯರು
17. ಆಯುರ್ವೇದ		
27	ಡಾ|| ಅಹಲ್ಯಾ ಶರ್ಮಾ ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗೂ ಪ್ರಾಂಶುಪಾಲರು, ಸರ್ಕಾರಿ ಆಯುರ್ವೇದ ವೈದ್ಯಕೀಯ ಮಹಾವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು. 9845458563	ಸದಸ್ಯರು
28	ಪ್ರೊ|| ಡಾ|| ಬಿ ಟಿ ಚಿದಾನಂದ ಮೂರ್ತಿ ಮುಖ್ಯ ವೈದ್ಯಾಧಿಕಾರಿ, ಜಿಂದಾಲ್ ಪ್ರಕೃತಿ ಚಿಕಿತ್ಸಾ ಸಂಸ್ಥೆ. 9655591855 : 9811907711	ಸದಸ್ಯರು
18.ಔಷಧ ತಯಾರಿಕಾ ವಲಯ		
29	ಡಾ|| ರಾಕೇಶ್ ಬೊಂಜೈ ಮುಖ್ಯ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಧಿಕಾರಿ ಹಾಗೂ ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು, ಮೈಲಾನ್ ಔಷಧಿ ಸಂಸ್ಥೆ. 9845000355	ಸದಸ್ಯರು
19. ಸಂಬಂಧಪಟ್ಟ ಇಲಾಖೆಯ ಹಿರಿಯ ಅಧಿಕಾರಿಗಳು:-		
30	ಅಪರ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಗಳು ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಇಲಾಖೆ.	ಸದಸ್ಯರು
31	ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿಗಳು, ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಇಲಾಖೆ	ಸದಸ್ಯರು
32	ಆಯುಕ್ತರು ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಸೇವೆಗಳು.	ಸದಸ್ಯರು
33	ಆಯುಕ್ತರು, ಆಯುಷ್ ಇಲಾಖೆ.	ಸದಸ್ಯರು

34	ನಿರ್ದೇಶಕರು ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಇಲಾಖೆ.	ಸದಸ್ಯರು
20. ಶ್ರೇಣಿ ಮಾನದಂಡದಂತೆ ಉತ್ತಮ ಆರೋಗ್ಯ ಸೌಲಭ್ಯಗಳು:-		
35	ಡಾ|| ವೀರಭದ್ರಯ್ಯ ಜಿಲ್ಲಾ ಶಸ್ತ್ರ ಚಿಕಿತ್ಸಕರು, ತುಮಕೂರು. 9448943064	ಸದಸ್ಯರು
36	ಡಾ|| ಸ್ವಾತಿ ತಾಲ್ಲೂಕು ಆರೋಗ್ಯಾಧಿಕಾರಿ, ಚಿಂತಾಮಣಿ. 9108293483	ಸದಸ್ಯರು
37	ಡಾ|| ರವೀಂದ್ರ ವೈದ್ಯಾಧಿಕಾರಿ , ಸಮುದಾಯ ಆರೋಗ್ಯ ಕೇಂದ್ರ, ಕಂಪ್ಲಿ,ಬಳ್ಳಾರಿ ಜಿಲ್ಲೆ. 9481568123	ಸದಸ್ಯರು
38	ಡಾ|| ಎಸ್ ಡಿ ಚಂದ್ರಶೇಖರ್ ವೈದ್ಯಾಧಿಕಾರಿ, ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರ, ತೂಬಿನಕೆರೆ ,ಮಂಡ್ಯ. 9880618133	ಸದಸ್ಯರು

ಸದರಿ ವಿಷನ್ ಗ್ರೂಪ್ ನ ತಂಡವು ಅವಶ್ಯಕತೆಗನುಗುಣವಾಗಿ ಸಭೆ ಸೇರಿ ಆರೋಗ್ಯ & ಕುಟುಂಬ ಕಲ್ಯಾಣ ಇಲಾಖೆಯ ಕಾರ್ಯವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಕಾರ್ಯನಿರ್ವಹಿಸುತ್ತಿರುವ ಎನ್.ಹೆಚ್.ಎಂ ಹಾಗೂ ರಾಜ್ಯವಲಯದ ಎಲ್ಲಾ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಅಧ್ಯಯನ ಮಾಡಿ ಅವುಗಳಲ್ಲಿ ಅವಶ್ಯಕ ಗುಣಾತ್ಮಕ ಬದಲಾವಣೆಗಳನ್ನು ತರುವುದು, ಆರೋಗ್ಯ & ಕುಟುಂಬ ಕಲ್ಯಾಣ ಇಲಾಖೆ ಹಾಗೂ ವೈದ್ಯಕೀಯ ಶಿಕ್ಷಣ ಇಲಾಖೆಗಳ ಮಧ್ಯೆ ಉತ್ತಮ ಸಂಯೋಜನೆ ರಚಿಸುವುದು ಹಾಗೂ ಚಿಕಿತ್ಸಾತ್ಮಕ ಮತ್ತು ಸಮುದಾಯ ಆರೋಗ್ಯ ವಿಷಯಗಳಲ್ಲಿ ಪ್ರಾಶಸ್ತ್ಯ ನೀಡುವುಡದು, ಇತ್ಯಾದಿ ವಿಷಯಗಳ ಕುರಿತು ಅಧ್ಯಯನ ನಡೆಸಿ ಕಾಲಕಾಲಕ್ಕೆ ಸರ್ಕಾರಕ್ಕೆ ಸಲಹೆ ನೀಡುವುದು.

ಈ ಆದೇಶವನ್ನು ಆರ್ಥಿಕ ಇಲಾಖೆಯ ಆದೇಶ ಸಂಖ್ಯೆ: ಎಫ್ 01 ಟಿಎಫ್‌ಪಿ 96, ದಿನಾಂಕ:10-07-1996ರಂತೆ ಇಲಾಖಾ ಕಾರ್ಯದರ್ಶಿಯವರಿಗೆ ಪ್ರತ್ಯಾಯೋಜಿಸಿರುವ ಅಧಿಕಾರದನ್ವಯ ಹೊರಡಿಸಲಾಗಿದೆ.

ಕರ್ನಾಟಕ ರಾಜ್ಯಪಾಲರ ಆಜ್ಞಾನುಸಾರ
ಮತ್ತು ಅವರ ಹೆಸರಿನಲ್ಲಿ

(ಯ.ಶಿವಶಂಕರ್) 31/12/2020
ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿ
ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಕಲ್ಯಾಣ ಇಲಾಖೆ (ಸೇವೆಗಳು)
31/12/2020

ಪ್ರತಿ:

1. ಮಹಾಲೇಖಪಾಲಕರು(ಎ ಮತ್ತು ಇ), ಕರ್ನಾಟಕ, ಬೆಂಗಳೂರು.

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Annexure 2: Karnataka at a Glance, 2020

Variable	Year 2020
Geographical area (in sq km)	191,791
Districts	31
Talukas	227
Towns	347
Hobli	776
Villages	29340
Socio-Demographic	
Population (Female) (Census 2011)	61095297 (30128640)
Estimated population (M: F) 2021	71957278 (35458389)
Child population (%) (0-6 years)	11.7
Senior citizens (60+ years) %	9.4
Literacy (%) (Total; Female)	75.6; 68.1
Sex ratio (females per 1000 males)	973
Economic	
Per capita income in rupees (At constant Prices (2017-18)	143827
Below Poverty Line (%)	21
Urbanization, industrialization, and motorization	
Urban population (%) (Census 2011)	38.7
Workers (% of population)	45.6
Number of factories	21162
Number of registered motor vehicles	22139958
Highways (National +State) in kms	86052
Education	
School drop out ratio (6-14 years) %	0.07
Pre-university Colleges	5004
Degree colleges	1058

Household information	
Households	15538187
Households with electricity (%)	88.75
Household with tap water source(%)	62.5
Household using LPG/PNG	27.4
Key facilities	
Police stations	1150
Fire Brigade Stations	213
Post offices	9618
Ration shops	19870
Health related	
Life expectancy at birth	65.15
IMR per 1000 live births	38
MMR per lakh live births	178
Medical colleges	60
Total Govt hospitals (Allopathy; AYUSH hospitals 2844;624	
Private hospitals (registered)	16993
Doctors: Hospital Beds	37419; 192508
Pharmacies; Blood banks	39521;261
108 Ambulances	743
Anganwadi Centres	66015
Other information	
Mobile phones in use	56,626,957
Internet connections	249071
Number of excise shops	11228
Income from excise in crores (2019-20)	22618.55

Source: Department of Economics and Statistics. Karnataka at a glance. 2021. Government of Karnataka

Annexure 3: Health Programmes in Karnataka
Supported by Ministry of Health and Family Welfare

S.N	Health Programme	Target Groups
	Central Government Initiatives	
1	Reproductive, Maternal, National and Child Health Plus Adolescent Programme https://nhm.gov.in/index1.php?lang=1&level=1&sublinkid=805&lid=557	Pre-pregnant, pregnant and lactating women, neonates, infants, children and adolescents
2	Revised National Tuberculosis Control Programme https://www.nhp.gov.in/revised-national-tuberculosis-control-programme_pg	All tuberculosis patients, HIV-Coinfected patients, population at risk etc.
3	National AIDS Control Programme https://www.nhp.gov.in/national-aids-control-programme_pg	Most at-risk population like female Sex workers, Men having sex with men, transgenders; bridging population like migrants, truck drivers, and general population at risk along with those affected with HIV and AIDS Patients including orphaned and vulnerable children etc.
4	National Vector Borne Disease Control Programme https://www.nhp.gov.in/national-vector-borne-disease-control-programme_pg	Population at risk, patients with the conditions etc. An umbrella program to control, prevent and efficiently manage Malaria, filaria, Kala-Azar, Japanese Encephalitis, and Dengue
5	National Programme for Control of Blindness https://www.nhp.gov.in/national-programme-for-control-of-blindness_pg	Population at risk, patients with the conditions etc.
6	National Iodine Deficiency Disorders Control Programme https://www.nhp.gov.in/national-iodine-deficiency-disorders-control-progr_pg	General population
7	National Mental Health Programme https://www.nhm.gov.in/index1.php?lang=1&level=3&sublinkid=1117&lid=353	Most vulnerable, at risk and underprivileged section of population
8	National Programme for Prevention and control of Cancer, Diabetes, CVD and Stroke https://www.nhp.gov.in/national-programme-for-prevention-and-control-of-c_pg	Population at risk, patients with the conditions
9	National Tobacco control Programme https://www.nhp.gov.in/national-tobacco-control-programme1_pg	Adolescents and general population
10	National Oral Health Programme https://www.nhp.gov.in/national-oral-health-programme_pg	Apparently healthy individuals, Patients with dental ailments
11	National Organ Transplant Programme https://notto.gov.in/	Patients or individuals who are in need of organ transplantation.
12	National Programme for Health Care of Elderly https://www.nhp.gov.in/national-program-of-health-care-for-the-elderly-n_pg	Elderly individuals (60+ years)
13	National Programme for Prevention and control of Deafness https://dghs.gov.in/content/1362_3_NationalProgrammePreventionControl.aspx	Patients with conditions

14	Pharmacovigilance Programme of India https://cdsco.gov.in/opencms/opencms/en/PvPI/	Patients and healthcare professionals
16	Yaws Eradication programme https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=148&lid=76	Population at risk and patients
17	National Leprosy Eradication Programme https://nhm.gov.in/index4.php?lang=1&level=0&linkid=281&lid=348	Population at risk and leprosy patients
18	Guinea Worm Eradication Programme https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=142&lid=73	Population at risk and patients
19	Rabies Control Programme https://www.nhp.gov.in/national-rabies-control-programme_pg	Population and animal bite victims
20	Integrated Disease Surveillance Programme https://idsp.nic.in/	All patients affected by the listed conditions.
21	National Programme for control & Treatment of Occupational Diseases https://www.nhp.gov.in/national-programme-for-control-and-treatment-of-oc_pg	All workers.
22	National Nutritional Programme	Children, adults, pregnant women, economically backward sections of the population, etc
23	National Nutritional Anemia Prophylaxis Programme https://www.nhp.gov.in/national-iron-plus-initiative-for-anemia-control_pg	Population at risk and anaemia patients.
24	National Programme for prophylaxis against Blindness in children https://www.nhp.gov.in/national-vitamin-a-prophylaxis-program_pg	Children at risk and blind children
25	National Adolescent Health Programme https://nhm.gov.in/index1.php?lang=1&level=1&sublinkid=805&lid=557	Adolescent population
26	Universal Immunization Programme https://www.nhp.gov.in/universal-immunisation-programme_pg	New born, children, adolescents and pregnant women
27	National Filaria Control Programme https://nvbdcp.gov.in/index4.php?lang=1&level=0&linkid=450&lid=3727	Population at risk, filarial patients.
28	National Cancer Control Programme https://main.mohfw.gov.in/Organisation/Departments-of-Health-and-Family-Welfare/national-cancer-control-programme	Population at risk and patients affected by Cancer
29	National Iodine Deficiency Disorder Control Programme https://www.nhp.gov.in/national-iodine-deficiency-disorders-control-progr_pg	General Population/ Population with Iodine Deficiency Disorders like mental and physical retardation, deaf mutism, cretinism, still births, abortions etc.
30	National Programme for Prevention and Control of Fluorosis (NPPCF) https://nhm.gov.in/index1.php?lang=1&level=3&sublinkid=1055&lid=611	▪ Population at risk and population/patients affected by Flurosis ▪ Fluorosis endemic regions/populations
31	Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) http://pmssy-mohfw.nic.in/	General population with more focus on under-served areas
32	National programme for Palliative care https://nhm.gov.in/index1.php?lang=1&level=2&sublinkid=1047&lid=609	Patients suffering from terminal illness like Cancer, AIDS etc
33	National AYUSH Mission https://namayush.gov.in/	General population
34	National Programme for Prevention & Management of Trauma and Burn Injuries https://main.mohfw.gov.in/basicpage-6	Population at risk and patients with trauma and/or burn injuries.

State Government Initiatives		
1	Vajpayee Arogyashree https://elibrary.worldbank.org/doi/10.1596/9780821396186_App-G	BPL families
2	Rajiv Arogya Bhagya http://arogya.karnataka.gov.in/sast/English/index.php/using-joomla/extensions/components/content-component/article-category-list/35-rajiv-arogya-bhagya-scheme	APL families
3	Jyothi Sanjeevini Scheme http://arogya.karnataka.gov.in/sast/English/index.php/site-map/2017-12-20-22-15-29/jss/50-jyothi-sanjeevini-scheme	Government employees
4	Janani Suraksha Yojana https://www.nhp.gov.in/janani-suraksha-yojana-jsy-_pg	BPL pregnant women
5	Madilu https://karunadu.karnataka.gov.in/hfw/nhm/pages/mh_schemes_madilu.aspx	Newly delivered poor mothers and infants
6	Prasuti Araike https://karunadu.karnataka.gov.in/hfw/nhm/pages/mh_schemes_paraike.aspx	BPL, SC and ST women
7	Shuchi https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	Adolescent girls
8	Rashtriya Bala Swasthya Karyakrama (RBSK) https://karunadu.karnataka.gov.in/hfw/nhm/pages/nbch_nbs_rbsk.aspx	Children- 0-18 years
9	Indradhanush https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	Children
10	Nutritional Services https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	Children and women
11	Mobile Health Units https://nhm.gov.in/index1.php?lang=1&level=2&sublinkid=1221&lid=188	Pregnant women
12	Arogya Sahayavani-104 https://nhm.karnataka.gov.in/page/NHM+COMPONENTS/Health%20System%20Strengthening/Arogya+Sahayavani+(104)/en	Pregnant women
13	EMRI (Arogya Kavacha-108) https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	Pregnant women and general public
14	Nagu-Magu https://karunadu.karnataka.gov.in/hfw/nhm/pages/refserv_nagumagu.aspx	Postnatal mothers and new born
15	Bike Ambulances (First Response Unit) https://karunadu.karnataka.gov.in/hfw/nhm/pages/refserv_bikeamb.aspx	Population at risk
16	SwachhSwasthSarvatra (SSS) https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	General public

17	Swachhata Pakshika https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	General public
18	Vatsalyavani https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	General public and pregnant woman
19	Pre-Conception and Pre-natal Diagnostic Techniques Programmes (PC. & PNDT) https://karunadu.karnataka.gov.in/hfw/nhm/pages/rh_pcpndt.aspx#	Pregnant women & New born
20	Janani Suraksha Vahini https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	Pregnant women and female children
21	Arogya Kavacha (108) https://karunadu.karnataka.gov.in/hfw/kannada/Documents/HFWS%20Annual%20Eng%202018-19.pdf	Pregnant women and sick neonates/ infants
Initiatives by other ministries and departments relevant to health		
1	Road Safety program/ initiative by Ministry of Road Transport and Highways National Highway Accident Relief Service Scheme (http://morth-roadsafety.nic.in//WriteReadData/links/File387ec1d6c23-d6ac-4d5f-84a8-41d6b5345a66.pdf)	General Population
2	National Sub-Mission to provide safe drinking water https://www.mdws.gov.in/national-sub-mission-guidelines-provide-safe-drinking-water-remaining-arsenic-and-fluoride-affected	All the arsenic & fluoride affected habitations.
3	National Emergency for Preparedness Plan: Disaster Management https://nidm.gov.in/pdf/guidelines/new/sdmp.pdf	People affected by disasters
4	Programmes for Water and Sanitation https://www.unicef.org/wash	Rural India, small and medium towns, NGO, Private sector and community
5	National Biomass Cook stoves Programme http://164.100.94.214/national-biomass-cookstoves-programme	General population
6	Rajiv Gandhi National Drinking Water Mission (RGNDWM) https://www.indiawaterportal.org/sites/default/files/iwp2/RGNDWM_Evaluation_Study_Planning_Commission_2010.pdf	General population
7	National Program for rehabilitation of persons with disability	Persons with disability
8	Mid-day meal program http://mdm.nic.in/mdm_website/	Children in government and government-aided schools
9	ICDS scheme http://icds-wcd.nic.in/	Children in the age-group 0-6 years and pregnant and lactating mothers

Annexure 4: Infrastructure and range of services at different levels of health care as per IPHS guidelines

	Population: Centre norm	Location	Type of health worker	Delivery strategies	Range of services offered
Health and wellness centres	-	Primary level (Sub enters and primary health centres) -Villages	Two Medical Officers, Staff nurses, lab technician, Pharmacist, LHV, Mid-Level Health provider, MPW (F/M), (SHC- 2 MPW (F) and 1 MPW (M), UPHC- one MPW (F) per 10000Population), ASHA (1/1000 or 1 / 500 for tribal and hilly areas/ 1 / 2500 in urban areas), Village Health Sanitation and Nutrition Committees, Mahila Arogya Samitis, Self-Help Groups, Women Collectives, Patient Support Groups, AYUSHMAN Ambassadors (One male and One female School Teacher for School health Promotion)	Seamless continuum of care: Outreach services, Mobile Medical Units, Camps, Home and community-based care	RCH Services: Care in pregnancy and childbirth, Neonatal and infant health, Child and adolescent health care services including immunization, family planning, contraceptive services, and Reproductive care services Management of communicable diseases: General Outpatient Care for simple acute illness and minor ailments National Health Programmes: Prevention, screening, and management of non-communicable diseases, screening and essential management of mental health ailments, care for common ophthalmic and ENT problems, primary oral health care, elderly and palliative health care services, Emergency medical services: Including for Trauma and Burns
Sub centre	1: 5000 in plain areas and 1: 3000 in challenging to reach areas	Village	Health worker – male/female 1 / 5000	Outreach services, and a minimum of six hours of routine OPD services in a day for six days a week	RCH Care: Antenatal care, intranatal care, postnatal care, essential newborn care, family planning services, safe abortion services, adolescent health care services, school health services General health services: Curative services for minor ailments, first aid for animal bite National Health Programmes: control of locally endemic diseases, disease surveillance under IDSP, promoting safe water and sanitation, field services such as village health and nutrition day, community interactions, etc. Recording and reporting of vital events Monitoring vital events and their reporting

Primary Health Centre	1: 30000 in plain areas and 1: 20000 in difficult to reach areas	Village	1 Medical Officer / 30000 1 Pharmacist / 30000 3 Nurses (Type A PHC) / 30000 4 Nurses (Type B PHC) / 30000 1 Health Worker Female 1 Health Assistant Male / 30000 1 Health Assistant Female / 30000 1 Laboratory Technician / 30000 2 Group D workers and 1 Sanitary worker cum watchman / 30000 1 Accountant cum Data Entry Operator per PHC	24-hour facility with nursing facilities for emergency hospital care, for curative, preventive and promotive health care	Medical care: OPD services, 24 hours emergency services, referral services, in-patient services(6 beds) RCH services: Antenatal care, intranatal care, postnatal care, proficient in identification and essential first aid treatment for complications and referral, newborn care, care of child, family planning services, medical termination of pregnancies, management of reproductive tract infections Nutrition services: Coordinated with ICDS, school health including school visit, screening, treatment, and referral as well as immunization, adolescent health care National health programmes: Promotion of safe drinking water and basic sanitation, Prevention, and control of locally endemic diseases. collection and reporting of vital events, IEC / BCC activities, training of medical and paramedical staffs, Referral services, basic laboratory and diagnostic services, selected surgical procedures, monitoring, and supervision, functional linkages with sub-centers, Mainstreaming of AYUSH Essential AYUSH services for ailments Record of vital events and reporting
Community Health Centre	1: 120000 in plain areas and 1: 80000 in challenging to reach areas	Block	Specialists from Surgery, Medicine, Obstetrics and Gynaecology and Paediatrics; 1 Block Medical Officer/Medical superintendent; 1Public Health specialist, Anesthetist, and at least 1 Public Health Nurse and Support Staffs	Block-level health administrative unit and gatekeeper for referrals to a higher level of facilities	OPD & IPD services of General Medicine, Surgery, OB&G, Paediatrics, Dental and AYUSH services; Care of routine and emergency cases in Medicine and Surgery, RCH services; National health programmes Blood storage facility; Diagnostic services Referral/ Transport services
Subdivisional or Taluka hospital	1 per 5-6 lakhs population	Tehsil/Taluk	20 doctors and 45 paramedical staffs in 31-50 bedded hospitals;24 doctors and 73 paramedical staffs in 51-100 bedded hospitals	Link between SC, PHC, and CHC on one end and District Hospitals on the other end	Essential specialty services, RCH services, Psychiatric services, Rehabilitation services. Geriatric services, Accident and trauma services, counseling and testing centre

District hospital	1 per District	District	Two doctors each of Medicine, Surgery, Obstetrics and Gynaecology, Paediatrics and Anaesthesia; One doctor each for Ophthalmology, Orthopaedics, Radiology, Pathology, ENT, Dental, Psychiatry, and AYUSH Doctors; 76 paramedical staffs, including Nurses, Lab Technicians, Pharmacists, Social Workers, Dietician, Technicians, etc.	A secondary level referral centre for the public health institutions; Curative including specialist services, preventive and promotive services covering an urban and rural population of the District	Basic specialty services specialty services, Epidemic and disaster management, Special Newborn Care Units (SNCU), Mental health services, rehabilitation services, Accident and trauma services, Dialysis services, Anti-retroviral therapy, Related diagnostic facilities, Patient safety, infection control and Health care workers safety services

Annexure 5: Health care facilities across districts in Karnataka, 2021

Sl.No	Districts	No. of Talukas	Population in 2021	Health & wellness centres	Sub-centres n (%)	PHCs n (%)	CHCs n (%)	Taluka hospital n (%)	District hospital n (%)	Medical college hospital n	Laboratory facilities n	X-ray^ centres n	CT Scan^ facilities n	MRI^ Centres n	Dialysis^ Facilities n
1	Bagalkot	7	2169452	155	234(-46)	49(-32)	8(-56)	5(+15)	P*	1	7	13	2	-	7
2	Ballari	5	3380240	248	272(-60)	73(-35)	11(-61)	6(-11)	P*	2	5	18	-	-	8
3	Belagavi	15	5426096	476	549(-49)	148(-18)	16(-65)	9(-17)	P*	1	15	24	2	1	7
4	Bengaluru Urban	4	6472160	81	195(-85)	36(-83)	5(-91)	3(-77)	P*	14	4	16	1	-	8
5	Bengaluru Rural	4	1167401	142	167(-28)	48(+23)	2(-79)	4(+71)	P*	2	4	6	-	-	4
6	Bidar	8	1935760	215	280(-28)	58(-10)	8(-50)	4(+3)	P*	1	8	13	2	-	4
7	Chamarajanagara	5	1082139	221	245(+13)	64(+77)	3(-67)	3(+39)	P*	1	5	7	1	1	3
8	Chikkaballapura	7	1379908	161	199(-28)	60(+30)	2(-83)	5(+81)	P*	0	7	8	2	1	6
9	Chikkamagaluru	8	1136942	228	375(+65)	90(+137)	5(-47)	6(+164)	P*	0	8	14	-	-	6
10	Chitradurga	6	1818420	249	283(-22)	82(+35)	11(-27)	5(+37)	P*	1	6	16	1	1	7
11	Dakshina Kannada	7	2310853	323	440(-5)	72(-7)	8(-58)	4(-13)	P*	8	7	11	1	1	5
12	Davanagere	6	1794310	147	301(-16)	101(+69)	6(-60)	5(+39)	P*	2	6	13	2	-	3
13	Dharwad	9	2129928	122	194(-54)	45(-37)	0(-100)	3(-30)	P*	2	9	4	1	-	4
14	Gadag	7	1167084	122	168(-28)	39(0)	2(-79)	4(+71)	P*	1	7	7	1	2	5
15	Hassan	8	1848630	-	456(+23)	136(+121)	15(-3)	7(+89)	P*	1	8	21	2	1	6
16	Haveri	8	1776077	212	303(-15)	69(+17)	5(-66)	6(+69)	P*	0	8	12	1	-	7
17	Kalaburagi	11	3029841	246	347(-43)	94(-7)	16(-37)	6(-1)	P*	4	11	23	2	-	7
18	Kodagu	6	560990	160	206(+84)	29(+55)	7(+50)	2(+78)	P*	1	6	10	1	-	3
19	Kolar	5	1705436	190	230(-33)	69(+21)	2(-86)	4(+17)	P*	2	5	9	1	2	5
20	Koppal	6	1615277	145	185(-43)	49(-9)	9(-33)	3(-7)	P*	1	6	13	2	-	4
21	Mandya	7	1850467	267	385(+4)	115(+86)	10(-35)	6(+62)	P*	2	7	15	-	2	6
22	Mysuru	8	3437914	327	438(-36)	147(+28)	10(-65)	6(-13)	P*	2	8	19	1	-	6
23	Raichur	7	2225308	175	223(-50)	52(-30)	6(-68)	4(-10)	P*	2	7	11	1	2	4
24	Ramanagara	5	1147733	-	275(+20)	63(+65)	5(-48)	3(+31)	P*	1	5	8	1	1	4
25	Shivamogga	7	1875987	211	305(-19)	110(+76)	7(-55)	6(+60)	P*	2	7	15	2	1	6
26	Tumakur	10	2790349	404	487(-13)	147(+58)	4(-83)	9(+61)	P*	2	10	15	2	1	10
27	Udupi	6	1326053	249	301(+13)	62(+40)	6(-46)	2(-25)	P*	1	6	9	2	-	3
28	Uttara Kannada	11	1526064	292	343(+12)	83(+63)	3(-76)	10(+228)	P*	1	11	14	2	-	11
29	Vijayapura	12	2625816	-	309(-41)	67(-23)	9(-59)	4(-24)	P*	2	12	5	2	-	5
30	Vijayanagara	-	-	-	-	-	-	-		-	-	-	-	-	-
31	Yadgiri	6	1445226	149	176(-39)	42 (-13)	6(-50)	2(-31)	P*	0	6	9	2	-	3
	Total	221	64157861	5917	8871	2299	207	146	31	60	221	378	40	17	167

Note: There are 66015 Anganwadi centers are present in the state and district wise information is maintained by Child and Family Welfare Department.
No prescribed population norms exist for District Hospitals and Medical Colleges follow NMC norms. Vijayanagara District is recently formed and therefore data is unavailable; Data on Urban facilities may vary.
A District hospital is present in all districts under the control of Health or Medical Education department. *P refers to Present; ^Includes both public and private facilities

Annexure 5.1: Health care facilities across cities in Karnataka (as per latest available data as on 2021)

Sl.No	Cities	No. of Talukas	Population in 2021	Health & wellness centres	Sub-centres n (%)	Anganwadis	PHCs	CHCs	Taluka hospital	District hospital	Medical college hospitals
1	Belagavi City	-	5426096	476	549	12	148	16	9	0	1
2	Bengaluru City	-	6472160	81	195	160	36	36	3	0	14
3	Hubli Dharwad City	-	2129928	122	194	19	45	101	3	1	2
4	Kalaburagi City	-	3089841	246	347	15	94	5	6	1	4
5	Mangaluru City	-	1526064	323	440	12	72	8	4	1	6
6	Mysuru City	-	3437914	237	438	23	115	10	6	0	2

Sl.No	Cities	Laboratory facility in		Blood banks		X ray centres		CT scan facilities		MRI centres		Dialysis facility	
		Public	Private	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
1	Belagavi City					24		1	1				
2	Bengaluru City					14		1	1	1			
3	Hubli Dharwad City					4		1	1	1			
4	Kalaburagi City					23		1	1				
5	Mangaluru City					11		1	1	1			
6	Mysuru City					19		1					

Annexure 6: Health manpower across districts in Karnataka (June 2021)

Sl.	Districts	No. of Talukas	ASHAs				Health worker Male	Health worker Female	Nurses	Pharmacist	Lab Technician	Radiologists	Programme Officers	OBG	Paediatrician	Physician	Surgeon	Dentists	Other Specialists
			S	F	V	V%	V%	V%	V%	V%	V%	V%	V%	V%	V%	V%	V%	V%	V%
1	Bagalkot	7	1447	1430	17	1	36	19	7	7	1	0	0	5	41	0	0	33	28
2	Ballari	5	2088	2076	12	1	15	13	35	14	24	3	14	4	22	0	0	44	16
3	Belagavi	15	3862	3855	7	0	67	30	16	11	11	6	0	3	33	0	0	42	19
4	Bengaluru Urban	4	873	848	25	3	65	11	23	0	3	6	0	0	0	0	0	0	0
5	Bengaluru Rural	4	834	828	6	1	69	25	33	0	8	0	20	0	0	0	0	0	0
6	Bidar	8	1362	1355	7	1	2	7	42	15	0	0	0	33	20	0	0	44	19
7	Chamarajanagara	5	800	785	15	2	90	65	40	74	63	15	0	0	0	0	0	25	13
8	Chikkaballapura	7	1064	1054	10	1	80	52	27	21	4	31	0	0	0	0	0	10	8
9	Chikkamagaluru	8	959	943	16	2	46	48	6	62	30	18	0	7	0	0	0	15	17
10	Chitradurga	6	1481	1476	5	0	13	15	7	48	0	13	0	10	0	0	0	33	2
11	Dakshinakannada	7	1381	1372	9	1	85	32	1	-	34	27	17	0	0	0	0	18	17
12	Davanagere	6	1228	1215	13	1	16	20	7	31	0	0	0	0	0	0	0	10	0
13	Dharwad	9	1033	1010	23	2	49	17	17	0	0	0	0	0	0	0	0	0	8
14	Gadag	7	767	754	13	2	19	17	35	8	13	0	33	0	13	0	0	25	33
15	Hassan	8	1498	1497	1	0	54	36	23	66	21	4	33	0	6	0	0	14	27
16	Haveri	8	1501	1469	32	2	41	30	36	32	30	0	33	0	6	0	0	14	27
17	Kalaburagi	11	1899	1855	44	2	5	9	32	43	4	48	0	25	4	0	0	19	40
18	Kodagu	6	502	472	30	6	72	39	10	-	71	33	50	0	8	0	0	45	20
19	Kolar	5	974	962	12	1	57	57	36	21	26	6	0	0	10	14	0	0	11
20	Koppal	6	1343	1311	32	2	35	4	29	13	27	13	33	7	64	0	0	64	28
21	Mandya	7	1343	1387	10	1	43	43	41	40	31	0	0	0	0	0	0	64	28
22	Mysuru	8	1839	1810	29	2	68	44	17	45	27	0	0	0	0	0	0	6	2
23	Raichur	7	1508	1497	11	1	25	6	48	20	38	0	0	0	0	25	0	55	100
24	Ramanagara	5	879	857	22	3	57	27	17	0	14	0	0	0	0	0	0	0	4
25	Shivamogga	7	1362	1331	31	2	48	31	13	43	30	10	0	6	0	0	0	29	4
26	Tumakur	10	2154	2136	18	1	52	33	13	26	24	9	0	4	0	0	0	12	3
27	Udupi	6	1028	1010	18	2	82	43	2	47	12	0	0	0	40	33	0	0	4
28	Uttara Kannada	11	1400	1388	12	1	80	39	25	60	-	-	17	6	43	0	0	44	18
29	Vijayapura	12	1808	1784	24	1	18	28	18	7	8	0	0	53	38	0	0	63	23
30	Vijayanagara	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	Yadgiri	6	1024	1007	17	2	11	14	37	34	33	45	33	40	22	0	0	80	40
	Total	221	41241	40774	521	1	43	30	23	31	19	10	9	7	13	2	0	30	16

S – sanctioned ; F – filled ; V-vacant.: Data as on June 2021 | Numbers shown in all categories from health workers male onwards correspond to % of vacancies

Among the 41,241 sanctioned positions of ASHA workers, the proportion of vacant positions was only 1.26%. Almost all the districts met the requirement of appointment of the sanctioned number of ASHA workers, except Kodagu district, where the proportion of vacant positions of ASHA workers was 5.98%.

The total number of sanctioned positions of health worker male was 5686 in the state of which the proportion of vacant positions was substantially higher (43.38%). Interestingly, male health workers are not being appointed in recent times and hence, vacant positions. The districts with highest vacancies were Chamarajanagara (90.29%), Dakshina Kannada (85.12%), Udupi (82.35%), Chikkaballapura (80.41%) and Uttara Kannada (80%).

Significantly, the proportion of vacant positions of health workers female across the state was 29 %. Chamarajanagara (64.5%) had highest vacancies, followed by Kolar (57.09%) and Chikkaballapura (51.92%).

In the total of 8887 sanctioned posts of nurses, only 6838 positions are filled, indicating a vacancy of 23.05%. Dakshina Kannada and Udupi Districts had met the requirement of filling nearly all the sanctioned positions, but in the District of Raichur, almost half of the sanctioned positions (47.8%) remained vacant. Also, the District of Bidar had a vacancy of 41.5%, followed by Mandya (40.67%) and Chamarajanagara (40.32%).

With regard to pharmacists in the state, there was a vacancy of 31.36% of the total sanctioned 2748 posts. The districts with highest proportion of vacancies of pharmacists were Chamarajanagara (73.61%), Hassan (66.07%), Chikkamagaluru (62.26%) and Uttara Kannada (60.2%).

Laboratory technicians fell short by 18.94% in the state against the total of 2270 sanctioned posts. The districts of Bidar, Chitradurga, Davanagere and Dharwad had all the sanctioned posts of Lab technicians being filled. However, the districts of Kodagu had vacancy of 71.43% and Chamarajanagara had vacancy of 63.33%.

The state also has 172 sanctioned posts of programme officers of which 9.3% is vacant. Except the 10 Districts (Bellary, Bengaluru Rural, Dakshina Kannada, Gadag, Hassan, Haveri, Kodagu, Koppal, Uttara Kannada, and Yadgiri), all the other districts have all the sanctioned posts of programme managers being filled.

The total number of sanctioned positions of physicians is 232, of which 1.72% is vacant. The districts with highest proportion of vacancies of physicians were Udupi (33.33%), Raichur (25%) and Kolar (14.29%) and almost all the sanctioned positions of physicians in the other districts were being filled.

Significantly, all the 237 sanctioned positions of surgeons are completely filled. There are also 514 sanctioned positions of OBG specialists , of which 7.19% is vacant, with highest proportion of vacancies in Vijayapura (52.94%), Yadgiri (40%) and Bidar (33.3%) districts.

Similarly, out of 435 sanctioned positions of paediatricians in the state, 13.1% is vacant and the districts with highest proportion of vacancies were Koppal (64.29%), Uttara Kannada (42.86%), Bagalkot (41.18%) and Udupi (40%).

The positions of dentists and other specialists were also significantly vacant across the districts with vacancy of 29.68% and 16.19%, respectively. Yadgiri District had highest proportion of vacant positions of 80%, followed by Koppal and Mandya with vacant positions of 64.29%, followed by Vijayapura(62.5%) and Raichur (54.55%).

The state also has total of 74 sanctioned posts of radiologists of which 22.97% is vacant. Uttara Kannada and Chikkamagaluru Districts had all the sanctioned seats being vacant. Chitradurga and Kodagu districts also had a higher proportion of vacant positions of radiologists with a vacancy of 66.6% and Shivamogga district had a vacancy of 50% of sanctioned positions.

In terms of the number of radiologists, 13 districts of the state have all the sanctioned posts being filled. On the contrary, Kalaburugi and Yadagiri districts had lesser number of radiologists positions being filled, with a vacancy of 48.28% and 45.45%, respectively.

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