



ICMR STRATEGIC PLAN & AGENDA 2030

*Transforming Health of Indian People
through Responsive Research*



**Indian Council of Medical Research
New Delhi**





ICMR STRATEGIC PLAN & AGENDA 2030

RESEARCH

INNOVATE

IMPLEMENT

**Transforming Health of Indian People
through Responsive Research**

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Foreword



The world is changing at a faster pace than ever before. Large scale development, rapid urbanization, increased travel, changing climatic conditions, inequities in access to health care etc. have seriously impacted various disease conditions. The re-appearance of diseases which were considered to be controlled and emergence of new infections like H1N1, Ebola and Zika virus in addition to the increasing burden of non-communicable diseases is a cause for concern.

The Indian Council of Medical Research (ICMR) has been on the forefront of medical research in the country and has supported national health programmes. We are at a crucial juncture when the world has moved from Millennium Development Goals (MDGs) to Sustainable Development Goals (SDGs). The Government of India has recently released a new National Health Policy 2017 aiming for universal health coverage. 'Vision for a Healthy India', a document prepared by NITI Aayog provides guidance to health planners and implementers on future strategies and action plan to improve health indicators in the country. The Government of India has also strengthened efforts towards elimination of diseases like leprosy, filariasis, leishmaniasis, tuberculosis and malaria.

ICMR plans to re-align its research to become truly complementary to national policies. There will be a focus on translating the leads emerging from research to action for the benefit of society and introduction of affordable indigenously developed technologies for disease diagnosis, prevention, treatment and control. The ICMR Strategic Plan-2017 is based on 5 major pillars. ICMR will aim at overall strengthening of research capacity and infrastructure in the country with a special emphasis on creating platforms for data sharing and exploration for generation of new ideas. Through a network of centres, ICMR will develop research collaborations with AYUSH agencies with a focus on scientific validation of traditional remedies. In addition, ICMR will focus on Evidence to Policy translation and strengthening of ongoing national health programs. This document provides a roadmap in terms of strategies planned and timelines mentioning the short, medium and long-term goals to be achieved by 2030. I hope that in the years to come, India will emerge as a global leader in health research.

(Dr. Soumya Swaminathan)
Secretary DHR & DG, ICMR



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Executive Summary

Providing affordable healthcare for all in a populous country like India is a challenging task. Indian Council of Medical Research (ICMR) is one of the oldest medical research councils of the world, set up in 1911 as Indian Research Fund Association (IRFA) with a mandate of formulation, coordination and promotion of biomedical research in the country. After Independence, IRFA was renamed as ICMR and has contributed immensely in formulating policies and programmatic interventions for health problems of the country like tuberculosis, viral diseases, leprosy, malaria, cholera and nutritional disorders. The DOTS strategy for tuberculosis, research on multi-drug therapy for leprosy and eco-friendly community based approaches for malaria control are ICMR's landmark research contributions to the society. ICMR has had a major role in developing diagnostics, during epidemics of H1N1 influenza, dengue fever, chikungunya, Japanese encephalitis and Kyasanur forest disease (KFD). Recently ICMR has played a significant role in Polio elimination from India and has now focused efforts on elimination of leprosy, kala-azar, filariasis, malaria and tuberculosis.

India spends only about 1% of its gross domestic product on public health, compared with 5.55% in China and 17.14 % in the United States in 2014. India's per-capita expenditure on health research is less than \$1. A nation is prosperous when the health system of the country is strong which is backed up by significant and strong health research feeds. ICMR has drafted a new Strategic Research Plan for the next seven years to contribute towards improvement in health outcomes in India. The ICMR Strategic Plan-2017-24 is based on 5 major pillars of capacity building, data management, leveraging traditional medicine, evidence to policy and strengthening program implementation through research.

The ISP-2017-24 was supported by a comprehensive research performance evaluation by external agencies. Domestic and foreign external stakeholders have always appreciated ICMR's global recognition and brand value as well as its impactful contribution in outbreak investigation and timely intervention. However, the areas requiring improvement include focus on development of new technologies, new drugs and devices; more effective use of communication tools such as social media, mass media, public exhibitions, wide spread research dissemination initiatives and ICMR website; greater engagement with private sector, need to strengthen facilities and opportunities for medical research in the country and emphasis on operations research to strengthen health infrastructure.

The recommendations of various committees that have reviewed ICMR's work, recent WHO guidance on elimination of diseases and sustainable development goals and a plan to leverage the strength of ICMR institutional network in India form the foundation on which pillars of ISP-2017-24 have been built. Its core aim is to deal with health challenges faced by the country such as non-communicable diseases, anti-microbial resistance, emerging infections, maternal

and child health and issues related to health systems and health care delivery. ISP-2017-24 is based on 5 major pillars and 15 target oriented goals [Box-1]. The Strategic Plan will focus on capacity building, organizing data systems, leveraging traditional medicine, evidence to policy and strengthening program implementation through research.

With implementation of ISP 2017-24, ICMR intends to play a greater role in improving the health of the people of India. As a knowledge generating body, it will position itself to provide critical feeds for policy making and program strengthening and improvement. The renewed focus on innovation and translation of research into products and schemes of mass benefit is expected to touch the lives of the people of India.

Box 1: Strategic Framework: 5 Pillars with 15 Goals [ISP 2017-24]

Strengthen Health Research Capacity	Data systems and Research Platforms	Leveraging Traditional Medicine	Enable Evidence to Policy Translation	Strengthen Program implementation through Research
Develop Programs & customized courses for enhancing skills and introduce high end schemes with a focus on mentorship for established and new researchers to enable them to undertake basic, clinical, implementation and translational research	Develop and Implement ICMR Policy for sharing and access to health/ biomedical research data	Identify key researchable areas in traditional medicine and provide training for traditional medicine researchers in pre-clinical and clinical research and frame guidelines	Build capacity for evidence-based health policy development	Identify gaps in health programmes, at both national and state levels, and undertake research to address them to improve programme implementation in the country
Provide infrastructural and mentoring support to select institutions and medical colleges and individuals to undertake actionable research	Setup disease-specific/thematic repositories and warehouse of health/ biomedical research data	Establish national level inter-disciplinary research facility & a network for traditional medicine research	Establish national level health technology assessment mechanism for use in health policy	Promote innovations in health systems and health care delivery
Establish regional virtual as well as physical centres of excellence which will act as hubs of mentorship and capacity building	Promote ICMR research data warehouse by various stakeholders for improving research and public health	Conduct collaborative research on identified researchable areas in traditional medicine	Knowledge Translation (KT) by engaging with stakeholders to share relevant, reliable and timely research evidence and syntheses	Disseminate and advocate successful models/ pilot interventions for introduction in health programmes



ICMR VISION

Translating Research into Action for Improving the Health of the Population



ICMR MISSION

GENERATE, manage and disseminate new knowledge.

INCREASE focus on research on the health problems of the vulnerable, the disadvantaged and marginalized sections of the society.

HARNESS and encourage the use of modern biology tools in addressing health concerns of the country.

ENCOURAGE innovations and translation related to diagnostics, treatment, methods/ vaccines for prevention.

INCULCATE a culture of research in academia especially medical colleges and other health research institutions by strengthening infrastructure and human resource.



ICMR MANDATE

1

Formulate, spearhead and promote biomedical research in India as a National Apex Body

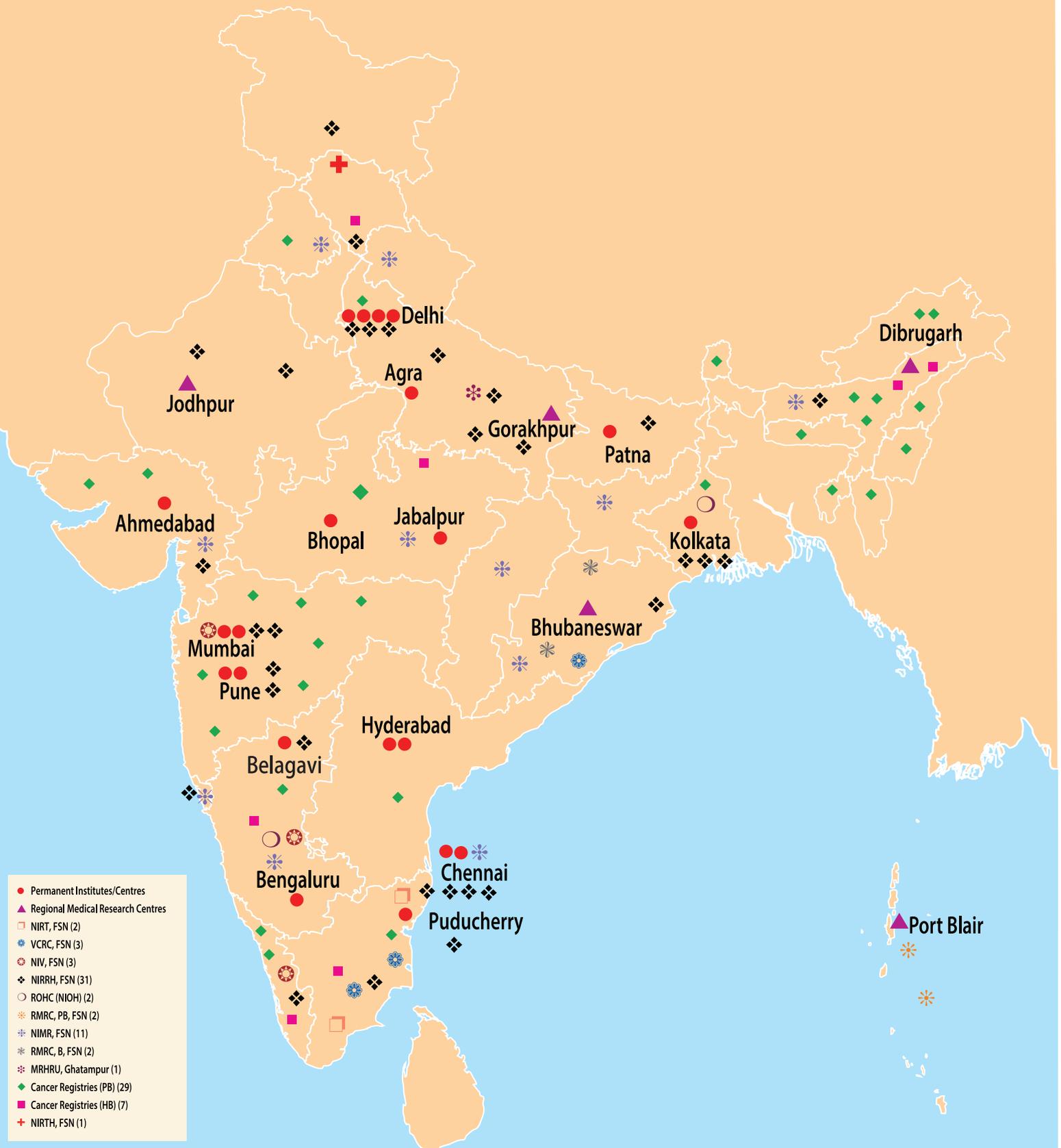
2

Conduct, coordinate and implement medical research for the benefit of the Society

3

Translate medical innovations to products/ processes and introducing them into the public health system

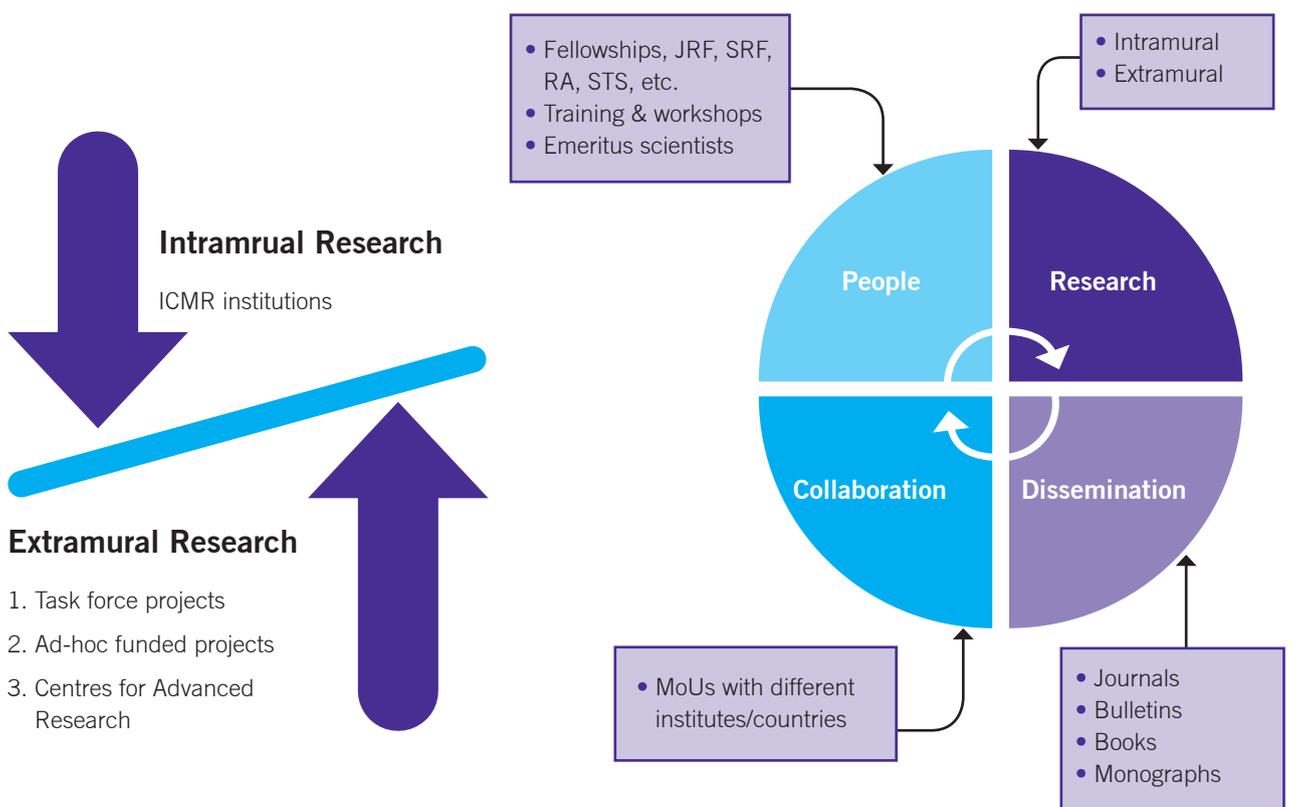
ICMR Institutional Network Across the Country



ICMR's Research Accomplishments and Vision for Future

Current Research Landscape of ICMR

Research conducted by ICMR's permanent institutes as well as other research institutes, medical colleges, and non-governmental organizations through ICMR's extramural funds has made significant scientific contributions in defining epidemiology, outbreak investigations and understanding aetio-pathogenesis of various diseases of public health importance such as malaria, Japanese encephalitis, tuberculosis, AIDS, kala-azar, filariasis, leprosy, cancers, diabetes and poliomyelitis. ICMR has also diligently addressed issues concerning nutrition, reproduction, maternal and child health, occupational and environmental health and health systems. ICMR has developed ethics guidelines for biomedical research and supporting ethical conduct of research. ICMR's research output and its impact on policies and programs has demonstrated considerable and constant growth.



ICMR has shown a strong commitment to encourage and strengthen professional development through its training and capacity building initiatives such as thematic training programs, workshops, and short-term research studentships for those preparing for a career in medicine and medical research. It also provides research fellowships and short-term visiting fellowships for upcoming researchers to expand their skills and knowledge base early in their career. ICMR also offers Emeritus Scientist positions to retired medical scientists and teachers to enable them to carry out research on specific topics. The international research collaborations of ICMR have spanned across all the continents with signed agreements with leading research agencies from the lead countries in contemporary areas such as cancer, diabetes, infectious diseases and vaccines.

ICMR's Major Achievements and Research Output

Strategic Objective	Achievements
Diagnostics	<ul style="list-style-type: none"> • Immuno-diagnostic tests (FLA-ABS, SACT-ELISA, PGL-ELISA, etc.) for multi bacillary leprosy • RLEP-PCR technology for early diagnosis of leprosy recently introduced under NLEP • Development of POC detection kit for <i>Plasmodium falciparum</i> • Development of commercial diagnostic kits against JE, West Nile (WN), Dengue (DEN) and Chikungunya (CHIK) • Development of indigenous ELISA kits for diagnosis of Hepatitis A&B • Developed a highly sensitive and specific diagnostic kit for detection of IgG antibodies against paragonimiasis (north-east India) • A new phage typing scheme for <i>V. cholerae</i> biotype El • Immune-chromatographic dipstick kit for the rapid diagnosis of cholera • Direct Agglutination Test (DAT) for early diagnosis of kala-azar • Test for molecular diagnosis of beta thalassemia • Test for detection of pathogenic bacteria in food • Non-invasive procedure for diagnosis of visceral leishmaniasis from urine or saliva
Vaccines Development/ Drug Efficacy Trials	<ul style="list-style-type: none"> • Development of indigenous vaccine (JENVAC) against Japanese encephalitis (JE) with support from Bharat Biotech • Partnered in the development of indigenous cholera vaccine • Immunotherapeutic and immunoprophylactic role of MIP vaccine studied. The MIP vaccine is taken up by NLEP under implementation research mode. • Conducted largest BCG clinical trial demonstrating the inefficacy of BCG to provide protection in adults • Development of vaccine against Kyasanur Forest Disease (KFD)
Contributions to National Programmes	<ul style="list-style-type: none"> • Concept of MDT was tested and evaluated for leprosy • UMDT (MDT + Minocycline + Ofloxacin, clofazimine) regimen development for leprosy • Demonstration of oral rehydration therapy to prevent mortality in diarrhoeal disease • Efficacy of HAF (Home available Fluids) in combating dehydration • Clinical Trials of new combination anti-malarial drugs • Efficacy of Short Course Chemotherapy (SCC) in pulmonary, extra-pulmonary and MDR-TB • Efficacy of DOTS was tested and evaluated • Domiciliary treatment of TB • Community based Drug studies demonstrating effectiveness of DEC and Ivermectin against Filariasis. • Validated Miltefosine treatment for Kala-azar
Devices Development	<ul style="list-style-type: none"> • Affordable glucometer and strips for diabetes • Magnifying device (Magnivisualizer) for cervical cancer screening • Engineering control device for silica flour milling units at Beawar • Nylon gloves for tobacco harvesters • Engineering control device for Agate units • Personal Protective Equipment for salt workers • Redesigned cycle rickshaw • Personal Cooling Garment for persons working in heat stress situations • Technologies for Vitamin A and Ferritin estimations

Strategic Objective	Achievements
Establishment of Innovative Intervention Models	<ul style="list-style-type: none"> • Bioenvironmental approaches for malaria control (eg. Larvivorous fishes, bio-larvicides, Health Impact Assessment of Developmental Projects, etc.) • Demonstration of a successful community based integrated vector management programme Cherthala, Kerala against filariasis
Nutrition	<ul style="list-style-type: none"> • Nutritive value of Indian Foods and Food Fortification are landmark achievements of ICMR • Double fortification of cooking salt with iron and iodine • RLEP-PCR technology for early diagnosis of leprosy recently introduced under NLEP • Micro-nutrient mix • Balamruthum – Fighting malnutrition in children
Environmental & Occupational Hazards	<ul style="list-style-type: none"> • ICMR studies led to shifting of all silver foundries from residential zone to forestall community exposure • Registration of Methomyl was cancelled by the Pesticide Registration Committee • Byssinosis like health conditions following jute dust exposure became compensable based on ICMR study results • Nickel controversy in chocolates/hydrogenated oil • Integrated Environment Programme on Heavy Metals Pollution (Phase-I & Phase-II) • Conducted integrated environmental epidemiology study in identified critically polluted areas of the country • Monitoring of pesticide residue in fruits and vegetables • Generated data base on pesticide residues in soft drink • Quantitative detection of heavy metals and phthalates in Toys • Landmark epidemiological, clinical and environmental research studies following Bhopal Gas Tragedy
National Registries/ Network Projects/ Monitoring	<ul style="list-style-type: none"> • Clinical Trial Registry – India (CTRI) • National Cancer Registry Programme • MACE Registry • National Nutritional Monitoring Bureau (NNMB)- now discontinued
Surveillance Networks	<ul style="list-style-type: none"> • National Rotavirus Surveillance Network (NRSN) • Bacterial Meningitis • Virus research and diagnostic laboratory network • Demonstration of HIV infection in India and initiated country wide sero-surveillance • Polio surveillance and research support for Polio elimination • Antimicrobial Resistance Surveillance Network (AMRSN) • Support NACO in diagnosis, monitoring, training of HIV/AIDS • Support IDSP by providing diagnosis for influenza, measles etc. • INDIAB study to monitor prevalence of diabetes in the country
Support in Outbreaks/ Epidemics/ Pandemics/ National Emergencies	<ul style="list-style-type: none"> • Assessing Health Impact due to Indian Ocean Tsunami in 2004 (NIE, NIRT, NICED, CRME, VCRC, RMRC-PB) • Environment and health impact assessment for Bhopal Gas Tragedy, 1984 (NIOH, NIMS, BMHRC, NIP, NICPR) • Health impact due to Earthquake in Gujarat, 2001 (NIMR, DMRC), • Super cyclone in Odisha, 1999 (NIMR) • Epidemic investigations during SARS/H1N1, and preparedness for ZIKA and Ebola viruses, etc.

Strategic Objective	Achievements
Inputs for Policy Implementation	<ul style="list-style-type: none"> • DOTS for tuberculosis • MDT for leprosy • Malaria drug policy in North-east • ORS implementation in diarrhoea
Guidelines/Regulations/Policy	<ul style="list-style-type: none"> • National Guidelines for Accreditation, Supervision and Regulation of ART Clinics in India • Ethical guidelines for Biomedical Research on human participants • Guidelines for Good Clinical Laboratory Practices • Guidelines for Safety Assessment of Foods Derived from Genetically Engineered Plants • Intellectual Property Rights Policy • Health Research Policy • Guidelines for Stem Cell Research • Dietary Guidelines for Indians
Isolation/Characterization of New Pathogens	<ul style="list-style-type: none"> • <i>V.cholerae</i> strain O139 • Entero-aggregative Escherichia coli (E AggEC) • Kyasanur forest disease (KFD) • Leptospirosis • Paragonimiasis
State of the Art Infrastructure Development/Flagship Initiatives	<ul style="list-style-type: none"> • Asia's first BSL-4 laboratory developed at NIV, Pune • Partnered in India's first scientifically established test tube baby in 1978 at IRR, Mumbai • India TB Research Consortium/Foundation • Tribal Health Research Forum • Vector Borne Disease Science Forum
Health System Strengthening	<ul style="list-style-type: none"> • The ICMR School of Public Health at NIE launched its first Massive Open Online Course (MOOC) Health Research Fundamentals - More than 6000 participants enrolled in first two courses. • Large-scale evaluation of national health programs <ul style="list-style-type: none"> • Integrated Management of Neonatal and Childhood Illnesses (IMNCI) (8 states) • Evaluation of NCD program under Tamil Nadu Health Systems Project (32 districts of Tamil Nadu) • Temperature monitoring of vaccine cold chain (10 states) • Programme implementation review following rotavirus vaccine introduction (4 states) • Health systems preparedness for NCD rollout in tribal areas (12 states) • Developed online tools for data management
Capacity Building	<ul style="list-style-type: none"> • Generate and nurture human resources for health research activities through various fellowships (JRF, SRF, RA, STS) and trainings/workshops • Research support to medical colleges all over country • Masters in Public Health, Medical Entomology and Food & Nutrition

Directions for Better Health Research Outcomes: Guidance and Recommendations of Various Advisory and Evaluation Committees of ICMR

A. Governance, Leadership and Infrastructural Improvements in Research Implementation

- Restructuring/consolidation of ICMR Institutes/better coordination with DHR
- Creation of state of art research centers in medical colleges
- Re-shaping and modernizing the extramural research program of ICMR
- Enhancing Information Communication Technology (ICT) in health research
- Several fold increase in need for more investment in research
- Academia industry partnership/interagency synergy
- Strengthening human resources and infrastructure: Creating a talent pipeline
- Reshaping training and mentorship initiatives
- Aligning research to impact on policy formulation
- Establishing a mechanism for monitoring and evaluation and measuring return on investment
- Establishing global partnerships and up-scaling international collaboration
- Science dissemination/advocacy for brand building and expanding outreach
- Periodic priority setting in health research
- Governance reform and developing research leaders

B. Cutting Edge Research in Emerging and Frontier Areas

- Drug development and clinical trials
- Big data analytics
- Life style diseases
- Pandemic and epidemic preparedness, investigations and control of outbreaks, cross border issues
- Impact of climate change on human health
- Surveillance platforms: Vaccine preventable diseases, AMR, diseases targeted for elimination
- Health hazards of Electro-magnetic radiation
- Assisted Reproductive Technologies and Surrogacy
- Indigenous and affordable health care (Technological Innovations)
- Health technology assessment
- Areas gaining significance: Stem cell research/Genomics/Bioinformatics/Telemedicine/Nanotechnology

C. Flagship Programmes to be Taken on Mission Mode

- Diseases identified for elimination such as kala-azar, filariasis, leprosy, malaria and tuberculosis
- Transforming current pre-pregnancy and pregnancy care
- To combat stunting, wasting and micronutrient deficiency
- Mission to establish surveillance mechanisms and tools for high priority vaccine preventable diseases
- Mission for combating antimicrobial resistance
- Mission for transforming measurement

- Combating mental ill health
- Long term cohorts
- Health systems Redesign
- Health problems of the elderly
- Transforming health policy research
- Health technology development and technology entrepreneurship

ICMR Strategic Plan and Core Areas



Pillar 1: Strengthen Health Research Capacity

Skill Development for Cutting Edge Health Research and Research Leadership

Success of any program depends on availability of adequate number of well-trained human resources. To be able to undertake cutting edge high quality bio-medical and health research, ICMR will initiate several courses on contemporary topics, expand its reach through online courses and regional hubs and introduce mentoring and supervision. The emphasis will be on strengthening the research capacity in medical colleges, universities, research institutes and young researchers.

Rationale

World Health Organization, the Council on Health Research for Development (COHRED), the Global Forum on Health Research and other agencies have consistently emphasized that a primary function of sustainable knowledge systems is to create and continuously improve the human and physical resources for health research. Many ICMR institutes are currently contributing to strengthening health research capacity in the country by offering short term programs as well as Masters or Doctoral level programs and fellowships.

ICMR plans to strengthen the national capacity to carry out multidisciplinary research by training and mentoring researchers in research institutions, universities and govt. medical colleges in the next seven years. In addition to strengthening the current capacity building initiatives at ICMR, it is aimed to build up the national capacity to carry out multidisciplinary, high end research focusing on skill building. ICMR would work not only on empowering the young and middle level faculty in medical colleges and other research institutions by engaging, mentoring and supporting research programs in nationally relevant areas, but also promote talented researchers working abroad to come back to India. The overall focus will be on developing capacity to undertake research which will result in either prevention and control of diseases or improvement of health of the people and health systems. For this, ICMR plans to adopt a three-pronged approach of customized courses for undertaking advanced high end and basic start-up health research; strengthening the available infrastructure in elite research institutions, medical colleges, research institutions; and establishment of centers of excellence and regional mentorship hubs.

Additionally, ICMR plans to acquire an independent university or equivalent status to strongly position itself as a teaching agency and provide an opportunity to students to obtain a postgraduate or doctoral degree under the ICMR Brand.

Strengths of ICMR

Infrastructure

- ICMR HQ. and ICMR institutes
- Multidisciplinary research units
- Model rural health research units

Capacity Building

- Masters and post-doctoral programs
- Fellowship programs
- Certificate courses
- Research methodology and scientific writing workshops
- Short-term Studentship program

Others

- MD Ph.D
- PDF
- RA
- International Fellowships

Various domain areas identified that require capacity building in India include research prioritization in case of communicable and non-communicable diseases, research methodology; basic and advanced biostatistics, data analytics, bioethics, health economics, health informatics, health technology assessment, traditional medicine, health promotion, basic bio-medical research, implementation research, clinical trials and cross-cutting areas like health systems strengthening, program evaluation, disease modeling, systematic reviews and Cochrane reviews. Research mentorship initiatives will be given special importance.

Salient Achievements of ICMR in this Area

- **Post-doctoral, DNB and Masters Programmes:** Various ICMR Institutes such as NICED, NICPR, NIP, NIE undertake Ph.D and Masters level specialized and multi-disciplinary training program/ courses for professionals in identified specific areas.
- **Fellowships (RA/SRF/JRF):** The Indian Council of Medical Research awards Research Associate Fellowships and Senior Research Fellowships to young scientists. ICMR also awards Postdoctoral Research Fellowships, Junior Research Fellowships, Short-term visiting fellowships.
- **Research Methodology Courses:** ICMR and its institutes carry out Research Methodology courses for the young and middle level faculty members. Most of these programs have a hands-on project development component.
- **Specific Thematic Courses:** ICMR institutes organize thematic and subject specific courses on environmental and occupational health, Cytopathology, Tribal health, Implementation research, epidemiology, biostatistics, statistical analysis, entomology and outbreak investigation.
- **Short-term Studentship Programme:** ICMR implements the Short Term Studentship Program to promote interest and aptitude for research among medical under graduate students to be done by the students with mentoring and supervision by the medical college faculty members. An additional incentive is that meritorious papers emerging from student's research are considered for publication in Indian Journal of Medical Research.
- **Certificate courses and WHO training course:** Some examples include Associate Fellow of Industrial Health by NIOH, WHO courses by NIP, Good Clinical Practices by NIRRH, Bio risk management by NIV, Bio-safety in Laboratory practices, and a course in Entomology by VCRC.
- **Training opportunities at various ICMR institutes:** Various institutes have the facilities and programs to train the professionals in specialized areas like genomics, Molecular Biology, cGMP, Genome Sequencing, Bioinformatics facilities, Preclinical Reproductive and Genetic Toxicology, Andrology Clinic, Animal House facilities etc.

Objectives of Pillar 1: Strengthen Health Research Capacity

1. To develop programme and customized courses for enhancing skills and introduce high end schemes with a focus on mentorship for established and new researchers to enable them to undertake basic, clinical, implementation and translational research.
2. To provide infrastructural and mentoring support to select institutions and medical colleges and individuals to undertake actionable research.
3. To establish regional virtual as well as physical centres of excellence which will act as hubs of mentorship and capacity building

Objective 1: To develop programs and customized courses for enhancing skills and introduce high end schemes with a focus on mentorship for established and new researchers to enable them to undertake basic, clinical, implementation and translational research

Stakeholders

- Junior and middle level scientists of ICMR and its institutes and other national research and academic institutions.
- Junior, middle, senior faculty and super specialists, medical students, post graduates of medical colleges and research/academic institutions, non-government organizations
- Programme managers of sub-district, district, state and national levels
- Community representatives and community gatekeepers
- Specialized skilled researchers
- Ethics committee members

Strategies

- Short and long term programs oriented to creating top class young scientists
- Prepare or modify existing customized courses focusing on training for skill-building
- Short-term customized 5-10 days general and thematic research methodology and scientific writing workshops at regular intervals in colleges and institutes
- Customized Masters/Doctorate level courses/Post-doctoral fellowship (PDF) on the ICMR institutional platform/at other academic or research organizations
- Program to attract young investigators from overseas
- Pursue creation of ICMR University
- Novel high end research schemes combining training in research and large scale funding opportunities
- Online courses like, induction training courses for young researchers, certificate courses and other specialized courses: try university affiliation
- Introduce rewards and incentives for outstanding research performance and output at institute as well as at individual level
- Inter-sectoral, national and international collaboration for training and capacity building initiatives in specific/ identified areas

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • Two yearly induction trainings for ICMR scientists, faculty, program managers, postgraduates • 50 ICMR scientists and 500 junior and middle level faculty from academic institutions trained for high end, skilled and basic research methods • Five online courses on basic and cross cutting areas prepared and launched 	<ul style="list-style-type: none"> • Continue two yearly induction training for ICMR scientists, faculty, program managers, postgraduates • Another 50 ICMR scientists and 500 junior and middle level faculty from academic institutions trained for high end, skilled and basic research methods • Another five online courses on basic and cross cutting areas prepared and launched 	<ul style="list-style-type: none"> • Continue two yearly induction training for ICMR scientists, faculty, program managers, postgraduates • Almost all ICMR scientists and most of junior and middle level faculty members are trained for high end, skilled and basic research methods • Another five online courses on basic and cross cutting areas prepared and launched and the process goes on

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • Two regional thematic workshops in medical colleges per year conducted • Young Faculty Research Promotion Program (YFRPP)- prepared and launched by ICMR • Application for ICMR University status submitted and bill for Cabinet Review drafted • Planning for high end research training program completed 	<ul style="list-style-type: none"> • Continue two regional thematic workshops in medical colleges per year • Young Faculty Research Promotion Program (YFRPP)- of ICMR is functional • Linkages with state and national level public and private institutions, MCI and HRD ministry established • High end research training program with research grant awarded to 10 researchers [5 per year] 	<ul style="list-style-type: none"> • Institutionalizing a system for rewarding young researchers in India and granting twenty five rewards • Continue three regional thematic workshops in medical colleges and process goes on every year • Most of the young faculty is registered with YFRPP • Continue activity with state and national level public and private institutions and with the HRD ministry • University or equivalent status for ICMR attained • High end research training program with research grant awarded to 20 researchers [5 per year]

Objective 2: To provide infrastructural and mentoring support to select institutions/medical colleges and individuals to undertake actionable research

Stakeholders

- Govt. medical, dental, pharmacy, nursing and AYUSH colleges
- Academic organizations and research institutions
- State level organizations engaged in knowledge generation
- Private institutions, non-governmental organizations, community based organizations

Strategies

- Needs assessment, identification and selection of appropriate institutions, organizations for undertaking theme-based action oriented research.
- Identification and providing necessary logistics infrastructure support to select institutions for providing mentoring support
- Provide infrastructure (logistics and equipment) support to the identified elite institutions acting as regional hubs to initiate capacity building in identified areas
- Engage junior and middle level faculty by undertaking actionable research in medical colleges
- Infrastructure strengthening at partner institutes including elite institutions

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • Algorithms for providing the infrastructure support and mechanisms for support prepared 	<ul style="list-style-type: none"> • Ten more centres of excellence for mentoring skilled high end research and 3 more regional centres to mentor basic research methods identified 	<ul style="list-style-type: none"> • Identify need based more centers of excellence for mentoring skilled high end research and more regional centres to mentor basic research methods

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> Completed assessment of academic/ research institutions to provide support Ten centres of excellence for training and mentoring for high end research and 5 regional centres to mentor basic research methods identified 50 actionable research program with team of investigators started 	<ul style="list-style-type: none"> Identification of 50 academic/research institutions) identified for granting the support to undertake action oriented research [1-2 assigned to each ICMR institution] 100 more actionable research program with team of investigators started 	<ul style="list-style-type: none"> Almost every medical college/ research institution has actionable research proposals initiated across the country

Objective 3: To establish regional virtual as well as physical centres of excellence which will act as hubs of mentorship and capacity building

Stakeholders

- Govt. medical, dental, pharmacy, nursing and AYUSH colleges
- Academic organizations and research institutions
- State level organizations engaged in knowledge generation
- Private institutions, non-governmental organizations, community based organizations

Strategies

- Finalize objective criteria for selecting institutions or organizations as regional hubs for mentorships
- Creating centres of excellence and mentorships for capacity building at state, regional, national levels
- Prepare guidelines to provide infrastructure support to select institutions or organizations for imparting capacity building
- Orient and re-orient the faculty/resource persons for providing courses/training

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> Guidelines for identifying the regional hubs are in place Identification of 5 regional academic/ research institutions to act as regional hubs completed Training of Trainers at the 5 identified regional hubs -academic/research institutions) identified 	<ul style="list-style-type: none"> Identification of 5 additional regional academic/ research institutions to act as regional hubs in years 4/5 Training of Trainers at the 5 identified regional hubs - academic/research institutions) in years 4/5 	<ul style="list-style-type: none"> Identification of 5 additional regional academic/ research institutions to act as regional hubs in years 6/7 Training of Trainers at the 5 additional identified regional hubs - academic/research institutions) in years 6/7

Expected Outcomes

- Committed well-trained human resources and centers will be developed to carry out the need based action oriented research in the public and private sector
- Researchers and officials from ICMR and non-ICMR research/ academic institutions will be trained both in public and private sectors in various research domains mentioned earlier
- The environment to carry out locally and nationally relevant research and infrastructure and manpower to carry out need based action oriented research will be created
- High end research projects on mission mode will be initiated
- Research collaborations and networks will be developed. Sustainable capacity building platforms will be built and potential funding mechanisms will be established

Pillar 2: Rationalizing Data Systems and Providing Easy Access Research Platforms

Platforms for Next Generation Medical Research: The Fourth Paradigm

ICMR generates huge volumes of data through intramural and extramural research programs. Making these datasets as well as the data generated through publicly funded research available to different stakeholders through efficient data systems to create a research platform would help in accelerating research and improving public health. It will open avenues for estimating/ comparing disease burden, hypothesis generation, evidence for policy formulation and evaluation of interventions. In order to enhance wider utilization of ICMR research data by stakeholders, ICMR will develop and implement ICMR's policy on data sharing and access. Further, ICMR will transform individual data sources into thematic data repositories and assimilate the repositories to a comprehensive data warehouse. The data warehouse will be made available to stakeholders for use through advance data analytics platform. Focus will be given on wider utilization of ICMR research and enhancement of national and international collaborations.

Rationale

Publicly funded research data is a public property and should be made available for public consumption. ICMR as a public funded premier national medical research agency, generates huge amount of data through its intramural and extramural research programs. The data ranges from simple text based patient profiles, to complex molecular structures and images. Availability of research data generated by ICMR in a timely and responsible manner to different stakeholders will be extremely useful in accelerating research and improving public health. It will contribute to estimating and comparing disease burden, hypothesis generation, evidence for policy formulation and evaluation of interventions.

ICMR has developed data management portals for several of its research programs and provides access to the data in the form of documents and reports which have been used by different stakeholders for research. However, exponentially increasing requirement of quality data and developments in informatics and data analytics have necessitated need for improvements in current data management practices at ICMR. Few areas that need improvement include development and implementation of ICMR policy on data sharing and access which will streamline the procedural bottlenecks in data sharing by researchers, reducing diversity in data formats and platforms through development of guidelines and SOPs which will bring uniform standards in data collection and improvement in quality of data, improving access to

Strengths of ICMR

- Extensive expertise in epidemiology
- Large scale data sources of population based National registries, surveys
- Surveillance systems on diseases of national and international priorities
- Structured disease specific/ thematic digital databases available
- Examples of collaborative data access and sharing initiatives with national and international agencies exist
- Infrastructure and expertise in data analytics available
- Work on big data analytics has been initiated

data generated by ICMR programs/ projects particularly medium and small programs/ projects, organizing data sources under thematic repositories and comprehensive warehouse and finally enabling intelligent data analytics on a robust research data platform. Activities of ICMR in this area will not only improve utilization, outreach and public health impact of research data produced by ICMR but also by other national agencies. This will facilitate national and international collaborations and position ICMR into the next generation medical research- the fourth paradigm.

Important ICMR Data Sources which Impacted Public Health

- **National Nutrition Monitoring Bureau (NNMB):** Initiated in 1972, contains population based data on dietary intake, demographic, socioeconomic and anthropometry. The data has been compiled from 10 states of India. The data is being used extensively in assessing nature, magnitude and distribution of nutritional problems and dietary patterns in the country.
- **National Cancer Registry Program (NCRP):** Initiated in 1982, the registry contains data from 31 population-based cancer registries on the incidence, morbidity and mortality. There are 29 hospital based cancer registries collecting data on management and patterns of care. The data is being used extensively for correlating environmental and other factors with changes in cancer prevalence patterns.
- **Antimicrobial Resistance Network:** Initiated in 2013 contains hospital based data on antimicrobial resistance among six groups of pathogens. The data is being compiled from 10 tertiary care hospitals. The data has been used to devise evidence based treatment guidelines which will guide treatment.
- **Hospital-based Surveillance of Rotavirus:** Initiated in 2005, contains clinical, epidemiological and virological features of severe rotavirus disease. The data is being collected from 32 sentinel hospitals across the Country. The data was useful to estimate the rotavirus disease burden in the country and understand molecular epidemiology of the virus. The surveillance network will also be useful to document the impact of rotavirus vaccination.
- **ICMR Influenza Network:** Initiated in 2003, the influenza network collects clinical, epidemiological data from patients with influenza-like illness (ILI) and severe acute respiratory infections (SARI) from several clinical virology laboratories geographically distributed in Northern, Western, Eastern, Southern, and Central India, to date over 100,000 clinical samples have been assayed and archived. The surveillance database also contains data on genetic characterization of the influenza viruses isolated. The network provides useful data for monitoring circulating influenza strains, detection of emerging/re-emerging viruses, and define seasonality in different geographical areas.
- Data from many ongoing object-oriented communicable and non-communicable disease surveillance programs such as bacterial meningitis, influenza, anti-malarial drug resistance, sickle cell anaemia, XDR tuberculosis, leprosy etc. are available.

Objectives of Pillar 2: Rationalizing Data Systems and Providing Easy Access Research Platforms

1. To develop and implement ICMR Policy for sharing and access to health/biomedical research data
2. To setup disease-specific/thematic repositories and warehouse of health/biomedical research data
3. To promote ICMR research data warehouse by various stakeholders for improving research and public health

Objective 1: Develop and implement ICMR policy for sharing and access to health/biomedical research data

Stakeholders

- Academicians
- Industry
- Researchers
- Policy makers
- Department of Electronics and Information Technology (DeiTY)
- National Informatics Centre

Strategies

- Review national and international policies on data access and sharing with reference to health/biomedical research data
- Establish a multidisciplinary/multi-stakeholder committee for developing, guiding and monitoring implementation of ICMR policy on sharing and access of health/biomedical research data
- Operationalize the ICMR policy on data sharing and access across ICMR institutes and ICMR funded research

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • ICMR policy on sharing and access of health/ biomedical research data developed • Operational guidelines for policy implementation developed • ICMR policy on sharing and access of health /biomedical data implemented for intramural programs of ICMR through ICMR institutes • Implementation of policy for extramural programs of ICMR initiated 	<ul style="list-style-type: none"> • ICMR policy on sharing and access of health/biomedical research data reviewed • Policy implemented for extramural projects 	<ul style="list-style-type: none"> • Updating ICMR policy based on the experience, review and then national and international needs • Dissemination of the policy and key findings to relevant stakeholders

Objective 2: To setup disease-specific/thematic repositories and warehouse of health/biomedical research data

Stakeholders

- Data generators (researchers, medical professionals)
- Data users (public, researchers, policy makers, industry)

Strategies

- Develop infrastructure for data digitization and electronic data capture through establishing data management cells in ICMR institutes
- Establish local data-repositories at ICMR institutes and centralized data repository at ICMR HQ, by incremental mirroring of data from local data repositories
- Develop comprehensive data warehouse at ICMR and establish research platform for mining of data from multiple sources

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> Data repositories in five thematic areas established SOPs for uniform data sharing and management for institutional repositories developed Data management cells at ICMR institutes for digitization of local data sources developed 	<ul style="list-style-type: none"> ICMR health/ biomedical research data warehouse operationalized Mining tools and algorithms for mining data from heterogeneous sources developed and implemented 	<ul style="list-style-type: none"> Bi-directional links of the data sources in ICMR data warehouses with other types of Government data sources made operational

Objective 3: To promote and use ICMR research data warehouse by various stakeholders for improving research and public health

Stakeholders

- ICMR institutes working in thematic areas
- National experts
- Statisticians
- Program managers
- Researchers
- Medical professionals
- Industry

Strategies

- Encourage use of ICMR research data platform for estimating disease burden, research prioritization and fund allocation
- Brainstorming among the stakeholders to identify research questions to be answered based on additional data analysis
- Generate evidence based on secondary data analysis for program evaluation and policy formulation

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> Modules and SOPs for data integration, data warehouse finalized Research platform developed 2-3 big data analytics research projects planned 	<ul style="list-style-type: none"> ICMR health/ biomedical research data warehouse operationalized 2-3 big data analytics research projects using ICMR research platform completed 	<ul style="list-style-type: none"> Review the ICMR health/ biomedical research platform for identification of gaps and improvements Generate evidence for relevant stakeholders for formulation of policies on thematic areas 7-10 big data analytics research projects using ICMR research platform completed

Expected Outcomes

- ICMR Policy for sharing and access of biomedical research data will be developed
- ICMR Research Data Repository and Warehouse providing access to global researchers will be established
- Data generated by ICMR funded projects, ICMR Institutes and other important national health databases will be rationalized by themes and diseases areas
- Capacity for big data analytics will be developed in the country
- Research platform providing access to ICMR research data for interested researchers and other stakeholders will be created which will help to identify and bridge gap as well as generate evidence for policy formulation

Pillar 3: Leveraging Traditional Medicine

Translational Research in Traditional Medicine for Trans-national Use

India's policies and programmes support research related to traditional medicines and emphasize on maximizing benefits of this important resource of the country. Building on the strengths of the infrastructure, experience and expertise in traditional medicine, ICMR plans to extend its research support to traditional medicine researchers and academicians to take the benefits of Indian traditional medicines to the national and global level. Realizing that conducting traditional medicine research on modern platforms has formidable challenges, ICMR proposes to build capacity among AYUSH researchers, develop clinical research guidelines, establish inter-disciplinary network and conduct collaborative research with AYUSH partners.

Rationale

Based on a recommendation from ICMR's Scientific Advisory Board to focus on time-honoured traditional therapies as valuable additions to the existing therapeutic options of modern medicine for selected conditions; ICMR, over the subsequent years, developed procedures, protocols and systems to support traditional medicine research. In the recent times, several reforms concerning ethical and regulatory reviews have taken place in the country as applicable to clinical trials. Further, the Govt. of India's current programs and policies are supportive of research on traditional medicines in India. Recently, Parliamentary Standing Committee recommended ICMR to develop a framework for validation of classical and high priority AYUSH formulations and facilitate inter-disciplinary AYUSH research. In this context, ICMR acknowledges the existence of formidable challenges in bringing traditional medicine research on the modern medicine platforms and considers that ICMR institutions have necessary skills and competencies to overcome these challenges to make the collaborative research with traditional medicine more meaningful. ICMR believes that with proper strategic backing traditional medicine can be positioned to contribute in improving the health of Indian people. ICMR proposes partnership development involving the Ministries of Health and Family Welfare and AYUSH, Department of Science and Technology, ICMR institutions, AYUSH research councils and institutions and health researchers from all sectors. In view of the above, the revised ICMR strategy wishes to pursue the key objectives of identifying key researchable areas in traditional medicine, providing training for traditional medicine researchers in pharmacological and clinical research and frame guidelines; establishing national level inter-disciplinary research facility and a network for traditional medicine research and conducting collaborative research on identified researchable areas in traditional medicine.

Strengths of ICMR

Infrastructure

- National Institute of Traditional Medicine has been established in Belagavi.
- Medicinal plants division is functional at ICMR.
- There is ongoing collaboration with AYUSH research Councils.
- Division of basic medical science is supporting extramural research in traditional medicine area.

Expertise

- Inter-disciplinary research network exists.

Experience

- Multi-centric trials of AYUSH products have been done.
- Compendium of pharmacopeia standards and monographs on Indian medicinal plants have been published.

Salient Achievements of ICMR in this Area

- Centre for advanced research have been set up by ICMR.
- Programs of traditional medicine in the areas of clinical and pharmacological research have been supported.
- ICMR has funded extramural research projects on traditional medicines.
- ICMR has supported centre for basic, pharmacological and toxicological research for traditional medicines.
- A compendium of traditional remedies & techniques has been prepared.
- Monographs on medicinal plants of India have been published.
- Through Central Biostatistical Monitoring Unit (CBMU), ICMR conducted multi-centric trials of traditional medicine related procedures and products.
- ICMR institutes have made contributions in specific domains or areas related to specific diseases or drugs.
- ICMR has established a specialized institute for traditional medicine research at Belagavi, Karnataka.
- ICMR-AYUSH Mission has been established for drug development from AYUSH leads.

Objectives of Pillar 3: Leveraging Traditional Medicine

1. Identify key researchable areas in traditional medicine and provide training for traditional medicine researchers in pre-clinical and clinical research and frame guidelines
2. Establish national level inter-disciplinary research facility and a network for traditional medicine research
3. Conduct collaborative research on identified researchable areas in traditional medicine

Objective 1: Identify key researchable areas in traditional medicine and provide training for traditional medicine researchers in pre-clinical and clinical research and frame guidelines

Stakeholders

- Ministry of Health and Family Welfare
- Ministry of AYUSH
- ICMR institutions and centres, AYUSH councils
- Department of Bio-technology
- Department of Science and Technology
- State councils and agencies dealing with codified and non-codified knowledge holders
- Health researchers from all sectors

Strategies

- Brainstorming within ICMR
- Meetings and discussions with stakeholders
- Development of modules in collaboration with stakeholders including industry

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • A policy document that integrates traditional medicine with modern medicine developed • Guidelines for clinical research in traditional medicine framed • ‘Good laboratory practices document’ developed for dispensing traditional preparations • Training modules for codified and non-codified traditional knowledge holders & traditional practitioners developed • At least three training programmes on ‘Clinical research methods’ for AYUSH researchers/ practitioners (30-50 per programme) for creating research workforce in AYUSH (NITM-Belagavi) planned and conducted • Online programmes for clinical research involving AYUSH / traditional formulations introduced • New researchable leads from traditional medicine identified through consultations 	<ul style="list-style-type: none"> • ICMR-NITM-Belagavi -AYUSH industry partnership formalized • Trained inter-disciplinary teams with skills and expertise needed for traditional medicine research established • A compendium on traditional healers’ knowledge developed to preserve the ancient knowledge and practices 	<ul style="list-style-type: none"> • Model for collaboration / partnerships between AYUSH and research institutes replicated at multiple sites in the country • Additional levels of training of AYUSH researchers and trainers initiated

Objective 2: Establish national level inter-disciplinary research facility and a network for traditional medicine research

Stakeholders

- Ministry of Health and Family Welfare
- Ministry of AYUSH
- Department of Science and Technology
- ICMR institutions and centres, AYUSH councils
- State councils and agencies dealing with codified and non-codified knowledge holders
- Health researchers from all sectors
- Allied health agencies
- Pharmaceutical industries and laboratories

Strategies

- Strengthen and position NITM-Belagavi as National facility for traditional medicine research
- Brain-storming with stakeholders to develop framework for research and practice of traditional medicine including application of technologies

- Create and use network and infrastructure for multi-disciplinary collaborative research on traditional medicine
- Develop strategic partnerships between stakeholder organizations
- Develop strategic partnership with leading institutions from outside ICMR
- Network with ICMR institutions with core strength and experience to contribute in this area
- Generate joint strategies with AYUSH counterparts for working opportunities, co-ordination, monitoring and regular reviews

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • Mechanism for functional research based infrastructure appropriate for undertaking basic, applied and clinical research in traditional medicine established • ‘Centre of excellence in ethno-medicine / non-codified traditional medicine’ established with the support of AYUSH at NITM-Belagavi • Development of monographs, quality standards, Phyto-chemical Reference standards and safety review monographs continued 	<ul style="list-style-type: none"> • National network with core strengths and experience established by ICMR • Development work on monographs, quality standards, phytochemical reference standards and safety review monographs continued 	<ul style="list-style-type: none"> • Unified, compressive digital resource on scientifically validated Indian traditional medicinal plants developed • Development work on monographs, quality standards, phytochemical reference standards and safety review monographs continued

Objective 3: Conduct collaborative research on identified researchable areas in traditional medicine

Stakeholders

- Ministry of AYUSH
- Ministry of Health and Family Welfare
- National and State health systems
- Department of Science and Technology
- Regulatory and approval authorities
- ICMR institutions and centres
- Allied health agencies
- AYUSH councils and institutions, state councils
- Health researchers from all sectors including health and bio-medical researchers
- Pharmaceutical industries and laboratories

Strategies

- Brain-storming within ICMR and with stakeholders
- Involve ICMR institutions/centers to undertake basic, clinical and applied research on traditional knowledge based products including proven products of AYUSH systems
- Identify, develop and promote core strengths of ICMR institutions to contribute to research in traditional medicine

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> At least three priorities with solutions in traditional medicine for collaborative clinical research by an ICMR institute finalized Documentation of the traditional knowledge to identify potential leads completed Research protocols on the identified products finalized 	<ul style="list-style-type: none"> Pre-clinical evaluations completed and mechanism for undertaking clinical studies in collaboration with AYUSH for selected practices/ preparations finalized Established infrastructure used to carry out discovery research to understand mechanism of action of at least two therapeutic interventions from traditional medicines Inter-disciplinary research in pharmaco-epidemiology & pharmaco-vigilance on traditional medicine formulations initiated 	<ul style="list-style-type: none"> At least one new drug lead from traditional medicine successfully evaluated through phases of trials Evidence base for non-codified traditional medicinal practices developed through robust observational studies

Expected Outcomes

- Establishment of research collaboration with key AYUSH stakeholders
- Skills developed for research in AYUSH/ Traditional medicine
- Generate mechanism for establishment of clinical trials unit for traditional medicine research to meet the demands of specific clinical trial needs of multi-centric studies
- Guidelines for clinical research in traditional medicine framed
- AYUSH/ traditional medicine researchers trained in skills related to research

Pillar 4: Enable Evidence to Policy Translation

Closing the Knowledge to Policy Gap

Many ICMR research outcomes have benefitted the national disease control programs and helped in reducing the disease burden in the past. ICMR aims to strengthen evidence based approach for policy making in the country. Major plans include establishment of a Evidence to Policy (E2P) Unit as well as Medical Technology Assessment Board (MTAB) in the next 7 years to facilitate introduction of indigenously developed affordable technologies, devices and products for the use of a common man. It is important to maximize knowledge translation activities and create enabling environment for bridging the research and policy gap.

Rationale

ICMR has been working on generation of evidence or knowledge related to diseases of public health importance in India since its inception. Translational component of the research output of ICMR institutions has helped policy development on several occasions, however, much more can be done. Very often, a gap between research, decision making and clinical practice remains. The shared conceptual clarity among researchers and policy makers about the scope and nature of health research to be conducted that could have policy implications is insufficient. In past, in absence of evidence from systematic reviews, the national health programs have benefited by the operational research carried out in the country. The scope for knowledge brokering, a strategy to close the 'know-do gap' is expanding. Thoughtfully conducted systematic reviews can fill this gap efficiently. The science of evidence-based medicine (EBM) is still in its infancy in the country. ICMR has supported the EBM initiative in India by funding an Advanced Center for EBM (2007-2011) that hosted the South Asian Cochrane Network & Centre (SACNC) at the Christian Medical College, Vellore. In 2007, ICMR procured a national subscription to The Cochrane Library making it accessible to all Indian scientists. This was a major achievement that opened the doors of EBM in India. It is experienced that there is lag between the knowledge becoming available and that being actually used by policy makers. ICMR is proposing to address the issue of gap described above. The overarching aim is to strengthen evidence for policy making in the country. ICMR institutes across the country work very closely with the State health governments. Civil servants, politicians and academicians continue to express concerns about the way policy is made, and whether it is ready to meet future challenges. The costs of policy failures can be significantly high. Therefore, ICMR intends to re-strategize how it can make research more credible and accountable to people's needs through appropriate policy making.

Strengths of ICMR

Expertise

- 8 Technologies already developed & many are in pipeline

Experience

- Network of institutes & centres have lot of capability and trained manpower
- National subscription of the Cochrane library
- Experience of hosting SACNC

Infrastructure

- Division of ITR has been established and expertise in IPR available
- Established CAR on EBCH

Examples of Evidence to Policy Translation by ICMR

- Introduction of DOTS strategy for tuberculosis.
- Introducing Multi-drug therapy for leprosy irrespective of type of leprosy is likely to find a place in the policy to treat leprosy patients.
- Novel vector control tools for Malaria have been evaluated and introduced in the national vector borne disease control program.
- ICMR's landmark work on surveillance on polio viruses led to introduction of the oral polio vaccine [OPV] in the national program and subsequent initiatives that led to Polio eradication in the country.
- National Policy for Cervical, Oral & Breast Cancer Screening was introduced based on the evidence generated by ICMR.
- Development of hand held Magnivisualizer for Cervical cancer screening has been one of the recent ICMR achievements. This field friendly instrument provides an opportunity for less skilled peripheral health staff to diagnose cervical cancer in women.
- A 6 primer LAMP test for faster & reliable diagnosis of Leishmania infection in the field has been developed.
- An indigenous Sandwich ELISA test based kit for early diagnosis of *Chlamydia trachomatis* infection has been developed.
- JE, Hepatitis A&E and Kyasanur Forest Disease Vaccine technology has been transferred to the industry for vaccine development.
- Fifteen Systematic Reviews on priority topics have been completed by Center for Advanced Research on EBCH and Div. of Child Health; AMR, Cancer Diabetes, INOSA guideline.

Objectives of Pillar 4: Enable Evidence to Policy Translation

1. Build capacity for evidence-based health policy development
2. Establish national level health technology assessment mechanism for use in health policy
3. Knowledge Translation (KT) by engaging with stakeholders to share relevant, reliable and timely research evidence and syntheses

Objective 1: Build capacity for evidence-based health policy development

Stakeholders

- Researchers
- Policy makers
- Health administrators
- Regulatory bodies
- National and State Health Systems Resource Centers
- National Knowledge Network (NKN) partners

Strategies

- Capacity building for conducting systematic reviews and policy briefs
- Creation of "Evidence to Policy Training Centre" for skill building of health professionals, scientists and policy makers
- Evidence-to-policy capacity enhancement workshop, to improve policy-makers' capacity for evidence-informed policy-making (EIP)

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> At least 2 workshop/ focused trainings on systematic reviews, economic analyses conducted per year at ICMR institutes or regional centres Training of 2 scientists in economic analysis 15 systematic reviews on nationally relevant Research questions completed Framework for evidence to policy centre finalized 15 policy briefs prepared 	<ul style="list-style-type: none"> At least 2 workshops on systematic reviews conducted per year at ICMR institutes or regional centres Evidence to Policy Training Centre created in ICMR Evidence to policy centre linked with Medical Technology Assessment Board [MTAB] Discussions initiated with SHSRC regarding use of policy briefs in decision making 	<ul style="list-style-type: none"> All ICMR Institutes and approximately 500 professionals trained in conduct of systematic reviews and economic analyses At least 25 systematic reviews and 50 policy briefs completed by ICMR Examples of at least one policy brief used for decision making per state per year every year from 6th year onward

Objective 2: Establish national level health technology assessment mechanism to guide health policy

Stakeholders

- Researchers
- Policy makers
- Health administrators
- Regulatory bodies
- Health economists
- Bioethicists
- Social scientists
- Communities

Strategies

- Create a Health Technology Assessment framework to evaluate technologies (drugs, devices, procedures other clinical, public health and organizational interventions and organizational systems used in health care) for assessing their safety, effectiveness, cost effectiveness, social, ethical and legal aspects
- Evaluate identified priority technologies/ processes, through HTA
- Recommend cost effective technologies for the policy uptake/ programmatic introduction

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> Priority setting/topic selection for HTA using India state-level disease burden estimates for prioritization and planning completed HTA framework for technology/process assessment established Training of core group of ICMR scientists in HTA completed 	<ul style="list-style-type: none"> 3-5 technologies/processes evaluated through the proposed HTA framework A special purpose agency (section 25 company)/ PPP model to handle entrepreneurial competitive awards for medical technology development established 	<ul style="list-style-type: none"> Up to 10 innovations from ICMR and 5 indigenously developed diagnostic products processed through HTA Impact evaluation of at least 10 indigenously developed products (diagnostics, vaccines), processes and Guidelines intended for basic, clinical and public health use initiated/completed

Objective 3: Knowledge Translation (KT) by engaging with stakeholders to share relevant, reliable and timely research evidence and syntheses

Stakeholders

- Policymakers
- Researchers
- Communities/consumers
- Media
- Health administrators
- Regulators
- Health insurers
- Industry

Strategies

- Produce evidence syntheses mechanisms and platforms: rapid reviews/policy briefs
- Disseminate evidence through media briefings/national consultation etc.
- Establish e-portals for evidence generated to influence policies, sensitize affected and vulnerable communities
- Develop a formal mechanism for linking research findings with local health policies and treatment practices by engaging with key NGOs and journalists

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • Guidance documents for synthesis and analysis created • 5 Fact sheets for dissemination of evidence created 	<ul style="list-style-type: none"> • Yearly 2 Media briefings/ 2 National consultation/2 Dissemination meetings of research findings for policy makers and media conducted • At least 5 e-portals for dissemination to community developed 	<ul style="list-style-type: none"> • An online database of policy briefs for uptake by the policy makers created • Uptake of evidence-based knowledge products into state health care system established

Expected Outcomes

- Mechanisms established to enable knowledge translation for health policy. Health policy decision-making may become more cohesive, evidence based and rational
- Use of evidence in decision-making for health policies will help to bridge the 'Evidence to Policy Gap'
- Medical Technology Assessment Board will perform cost-effectiveness evaluations for interventions such as new drugs, diagnostics, vaccines and programs. This might help in cost savings
- The decision-making landscape in the country will be much improved

Pillar 5: Strengthen Program Implementation through Research

Meeting the Unmet, Filling the Gaps, Sharpening Effective Delivery

ICMR supports the Ministry of Health and Family welfare, Govt. of India and State Govts. in tackling public health problems by providing key inputs, evidence and guidance in the areas of epidemiology, monitoring and evaluation, introduction of newer tools like – diagnostics, drugs, devices and vaccines.

ICMR also develops and assists National programmes in developing guidelines for various health conditions; advices regarding scale up of programme and undertakes capacity building of the programme staff for surveillance and outbreak investigations etc. It is planned to significantly improve the existing programmatic engagement at the national and state levels to improve benefits to the community by providing critical research inputs.

Rationale

Government sponsored health programmes are designed to comprehensively and equitably provide preventive, curative and rehabilitative health care services for priority public health concerns. Since health is a State subject, States adopt the national programmes in addition to their own initiatives. ICMR institutions spread out across the country and mandated with specific focused areas of research have traditionally provided several useful inputs by working closely with State health systems and National programmes. ICMR has worked extensively in the areas of Tuberculosis, HIV/AIDS, vector borne diseases, polio, rotavirus, nutrition, maternal and child health, immunization, bacterial meningitis surveillance, cancer, non-communicable diseases and health system research. ICMR will strongly focus on supporting and strengthening health programmes through relevant and focused research. In addition, new models, tools and techniques shall be researched for policy and programme purposes. There is a felt need to further strengthen bilateral linkages between programme and researchers and improve timely uptake of research results. ICMR will work with programme implementers to align research more meaningfully to health systems with a view to understand barriers and improve health care delivery, access and identify timely solutions.

Strengths of ICMR

Expertise

- Outbreaks/epidemic investigation
- Disease burden studies
- Epidemiological surveys
- Clinical Trials

Experience

- Drug trials, vaccine trials, community based intervention trials, insecticide trials
- Validating intervention tools

Infrastructure

- Institutional network
- Collaboration with states & other national and international agencies
- Trained/skilled human resources

Salient Achievements of ICMR in this Area

- Active participation and substantial contribution in polio eradication programme in India, including developing post polio eradication vaccination policies.
- Development of model projects to control vector borne diseases like malaria, dengue, kala-azar, filariasis and their field evaluations.
- Development of National guidelines for management of health conditions like infertility, RTIs/STIs; newer drugs like bedaquiline for TB, misoprestol, type 2 diabetes mellitus, various sites of cancers etc.
- Building laboratory network for quick detection of emerging infections like virology diagnostic research laboratory network, respiratory illness network, viral hemorrhagic fever virus network, congenital rubella syndrome network, national rotavirus surveillance network etc.
- Publication of National Guidelines on recommended dietary allowances for indians and dietary value of indian foods.
- Introduction of successfully fortified food supplements like DEC fortified salt - a potential supplementary strategy for Mass Drug Administration (MDA) to eliminate Lymphatic filariasis (LF).
- Large scale epidemiological and clinical research on nutritional deficiency disorders.
- Operationalization of National Cancer Registry Program since 1982 in providing strategic data for prevention and control of cancer.
- National NCD risk factor surveys generating valuable risk factor data.

Objectives of Pillar 5: Strengthen Program Implementation through Research

1. To identify gaps in health programmes, at both national and state levels, and undertake research to address them to improve programme implementation in the country
2. Promote innovations in health system and health care delivery
3. Disseminate and advocate successful model/pilot interventions for introduction in health programmes

Objective 1: To identify gaps in health programs, at both national and state levels, and undertake research to address them to improve program implementation in the country

Stakeholders

- Policy makers
- Programme managers
- Sponsors and funders
- Academic and research organization
- Regulatory bodies

Strategies

- Set up and strengthen existing monitoring, evaluation and surveillance systems to identify gaps for equitable health care delivery through appropriate research
- Proactive participation in State and National level programme planning, monitoring and review missions and meetings/HSRC Committees in drafting/ revising health polices/ programmes
- Engage with health and non-health sectors for addressing the research needs of the health programmes
- Develop guidelines for management of diseases and improving quality of care

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • Mechanisms to engage with State and National programme managers formalized • Gap analysis and research priority setting for all existing national health programs completed • Research studies initiated on at least 3 identified priorities • Initiate "I-SUPPORT" mechanism "I-SUPPORT" = ICMR Support Programme Relevant to Research & Translation 	<ul style="list-style-type: none"> • Research studies on identified priorities completed • Chart out recommendations for the programmes • Results and recommendable actions of research studies communicated to the programme within 6 months of completion of the study • Additional 3 multi-centric research studies planned and initiated 	<ul style="list-style-type: none"> • Evaluation of the impact of recommendations from the study on the national programme • Continue "I-SUPPORT" • Develop relevant policy recommendation for both regional and national partners

Objective 2: Promote innovations in health system and health care delivery

Stakeholders

- Health professionals and health care workers
- Private sector
- Policy makers
- Programme managers
- Public – general community
- Industry (R & D)
- Research organizations
- Centre for Public Innovation System

Strategies

- Cataloguing innovations
- Creating network for development and evaluation of innovation for programme strengthening
- Conducting economic evaluation of existing programmes

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • Networks established • Mapping innovations through stakeholder meetings and conferences to identify promising leads completed • At least 10 protocols for implementation of identified innovations as collaborative research developed • Operating Procedures/ manuals developed for implementing the innovations 	<ul style="list-style-type: none"> • At least 5 innovative research leads for undertaking implementation research made available • At least 10 best practice models for participation of private sector in mainstream public health developed 	<ul style="list-style-type: none"> • Yearly at least 2 newer interventions suggested • Innovations in at least 2 national and 5 State level programme implemented and evaluated

Objective 3: Disseminate and advocate successful model/pilot interventions for introduction in health programs

Stakeholders

- Policy makers
- Programme managers
- Community
- Private sector health care workers
- Peer reviewed journals
- Press and media

Strategies

- Organize regular interactive policy briefings between research teams and programme implementers
- Organize platforms for stakeholder convergence
- Communicate information on research results through electronic, print technology, Information, Education and Communication (IEC) to all stakeholders of research: more effective means of dissemination of research results

Deliverables

At end of 3 years	At end of 5 years	At end of 7 years
<ul style="list-style-type: none"> • Plan for dissemination and advocacy of at least 5 model projects developed • Relevant research questions to address barriers/ challenges in scaling up at least 5 successful models in health programmes through analyses identified periodically • IEC/advocacy material for use by the state/programme for at least 5 national and 5 state level programmes developed 	<ul style="list-style-type: none"> • SOP for training and updating the implementers of the newer innovations and strategies developed • Platforms for stakeholder engagement for at least 5 programmes created 	<ul style="list-style-type: none"> • Impact of research in strengthening national and State level programmes demonstrated through well-defined objectives • At least five successful intervention models disseminated to other parts of the country • 3-5 model interventions in the country developed

Expected Outcome

- Enhanced and timely uptake of research findings in programme planning, implementation, monitoring and evaluation
- Allocation of adequate funds for research in every programme at national and state levels
- More reliable information obtained on health systems research and outcomes in terms of new cases, morbidity patterns, mortality, complications, recurrences, disease endemicity, clinical management and preventive measures

Monitoring and Evaluation

Relevant methods from those listed below will be selected to carry out monitoring and evaluation at the end of 3, 5 and 7 years respectively:

- Ongoing monitoring for training programs
- Pre and post surveys
- External audit
- Process evaluation or impact evaluation at the end of 7 years
- Joint review mechanisms
- Evaluation by an external experts committee
- Joint review mechanisms

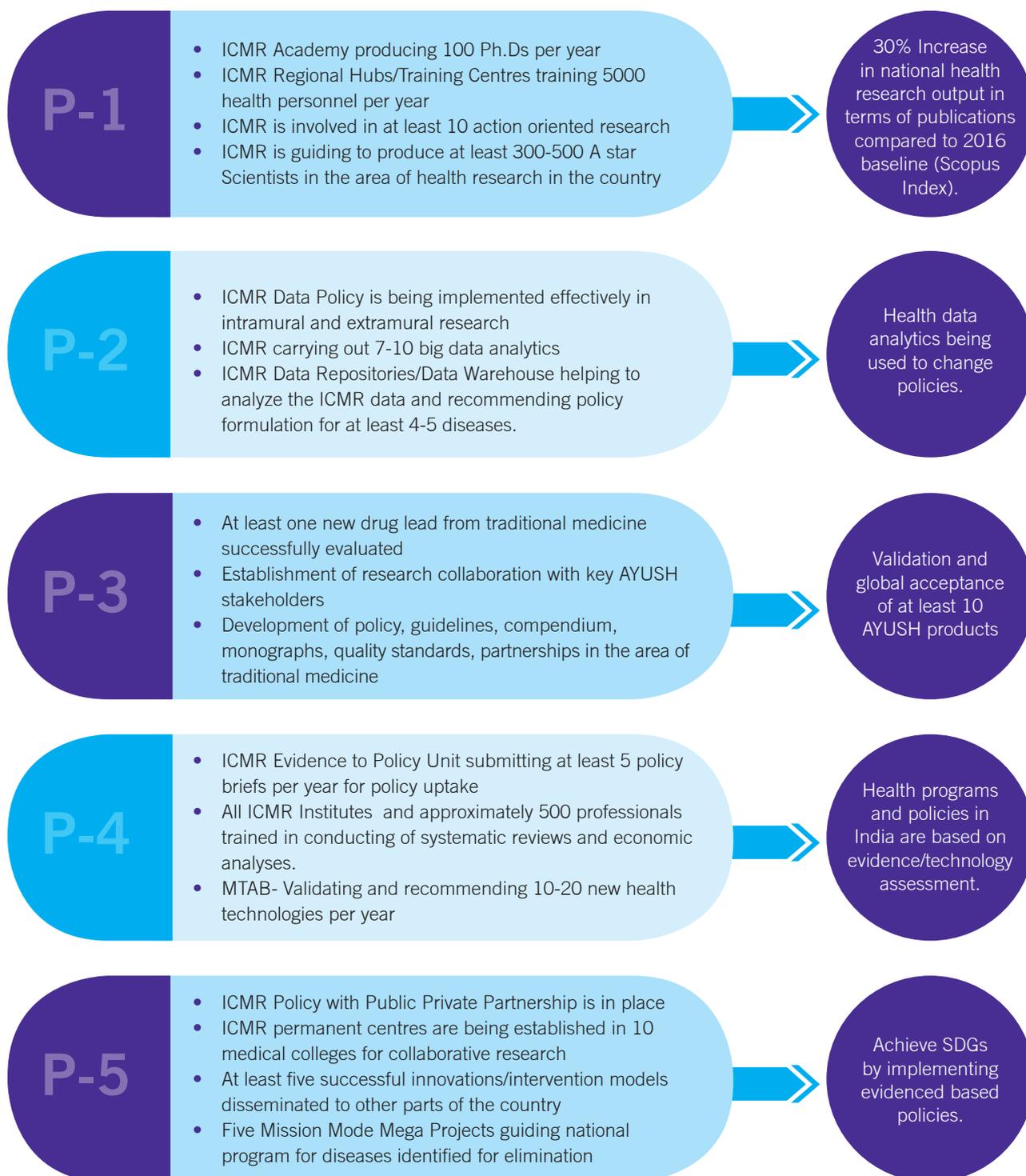
There will be ongoing internal evaluation and mid-term as well as end-line evaluation by an external agency. For each of the 5 pillars, measurable indicators will be identified and used to evaluate the output, outcome and impact.

Aligning ICMR's Vision with National Health Policy and India's Commitment to SDG 2030

India has witnessed tremendous improvements in various health indicators over the past few decades, but there is a long way to go. Department of Health Research (DHR) and ICMR have made substantial contributions in policy making and program implementation space in the health sector. Several innovations of ICMR are at the door step of commercialization and emphasis will be continued to be given in this area. There is a growing realization that national, regional and global partnerships might expedite the whole process of finding comprehensive solutions for better health. There are several examples of success following an approach based on partnerships, collaboration and integration and ICMR would use those as cardinal principles. ICMR has identified the need to establish mission-mode projects in key areas of communicable and non-communicable diseases, maternal and child health and nutrition. ICMR's research focus will be in the direction of attainment of Sustainable Development Goals, pursuance of National Health Policy 2017 and alignment with the national flagship programs like Swachh Bharat, Skill India, Digital India and Make in India with an ultimate goal of making our citizens healthy and the Indian Society strong.

Since inception, ICMR's goal has been to promote health research for betterment of health of Indians. The approach has been to keep pace with emerging challenges, leverage on technological advances and be responsive to changing health needs of the society. By initiating specific enquiries, conducting surveys and surveillance platforms and setting up domain specific institutes; ICMR has generated crucial evidence in biomedical and health areas and provided sustained support to national health programs in the years that followed. The ICMR strategic plan (2017-24) is meant to steer forward this mandate and fulfill the vision of ICMR which is aligned with the National Health Policy-2017 that is committed to providing universal health coverage. The Sustainable Development Goals (SDG) of UN for health are meant to ensure healthy lives and promote wellbeing for people at all ages and also to end hunger and achieve food security. Emphasis will be given on providing improved user-friendly platforms for mining, exploration, generating hypotheses and solutions as well. While keeping a focus on these areas, ICMR also plans to leverage the unexplored dimensions of Indian nutrition. Accordingly, the areas of emphasis described under the five pillars of the strategic plan are clearly aligned with them. Understanding the critical importance of capacity building in health research in the whole country; providing appropriate platforms for evidence to policy translation and strengthening program implementation for overall improvement of health and prevention and control of diseases; the strategic plan describes key objectives, strategies, deliverables and outcomes in these areas in the next 5-7 years. Additionally, ICMR's strategic plan also focuses on rationalizing and creating ICMR repositories that will be linked to various national health related databases and making them available traditional medicine. Although traditional medicine has very rich legacy and experience in India, taking the leads from Indian traditional medicine to the global market would require evaluation of the products using modern methods. ICMR will establish strategic partnerships with traditional medicine research councils and researchers in the coming years.

ICMR Strategic Vision 2030: Expected Outcomes and Impact



Abbreviations

AMR	Anti- Microbial Resistance
ART	Assisted Reproductive Technology
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy
BCG	Bacille Calmette-Guerin
BMHRC	Bhopal Memorial Hospital & Research Centre
CAR	Centres for Advanced Research
cGMP	Current Good Manufacturing Practices
CRME	Centre for Research in Medical Entomology
DEC	Diethylcarbamazine
DHR	Department of Health Research
DMRC	Desert Medicine Research Centre
DOTS	Directly Observed Treatment, Short Course
EBCH	Evidenced based child health
EBM	Evidence-Based Medicine
EIP	Evidence-Informed Policy-making
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immuno Deficiency Syndrome
HRD	Human Resource Development
HSRC	Health Systems Resource Centers
HTA	Health Technology Assessment
ICMR	Indian Council of Medical Research
IDSP	Integrated Disease Surveillance Programme
IEC	Information, Education and Communication
INDIAB	India Diabetes Study
INOSA	INdian initiative on Obstructive Sleep Apnea
IPR	Intellectual Property Rights
IRR	Institute for Research in Reproduction (Now NIRRH)
IRFA	Indian Research Fund Association
ISP	ICMR Strategic Plan
ITR	Innovation & Translational Research
JRF	Junior Research Fellowship
KFD	Kyasanur Forest disease

KT	Knowledge Translation
LF	Lymphatic Filariasis
MACE	Management of Acute Coronary Events
MCI	Medical Council of India
MDA	Mass Drug Administration
MDR	Multiple Drug Resistance
MDT	Multi Drug Therapy
MDG	Millennium Development Goals
MIP	Mycobacterium Indicus Pranii
MoU	Memorandum of Understanding
MTAB	Medical Technology Assessment Board
NCD	Non-communicable Diseases
NICED	National Institute of Cholera and Enteric Diseases
NICPR	National Institute of Cancer Prevention and Research
NIE	National Institute of Epidemiology
NIMR	National Institute of Malaria Research
NIMS	National Institute of Medical Statistics
NIOH	National Institute of Occupational Health
NIP	National Institute of Pathology
NIRT	National Institute for Research in Tuberculosis
NIRRH	National Institute for Research in Reproductive Health
NITM	National Institute of Traditional Medicine
NIV	National Institute of Virology
NKN	National Knowledge Network
NLEP	National Leprosy Eradication Programme
OPV	Oral Poliovirus Vaccine
ORS	Oral Rehydration Solution
POC	Point of Care
RA	Research Associate
RMRC-PB	Regional Medical Regional Centre, Port Blair
SACNC	South Asian Cochrane Network & Centre
SDG	Sustainable Development Goals
SHSRC	State Health Systems Resource Centers
SOP	Standard Operating Procedure
SRF	Senior Research Fellowship
STS	Short Term Studentship
VCRC	Vector Control Research Center
WHO	World Health Organization



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