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Ministry of Science and Higher Education - Ethiopia

National Health Research Thematic Areas

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Contents

Contributors of the document	1
Introduction.....	4
1. Nutrition, Food Safety and Policy.....	5
1.1 Identified Researchable Issues/Areas.....	5
1.1.1 Nutrition.....	5
1.1.2 Food Safety	6
1.1.3 Nutrition Policy and Program	7
2. Environmental and Occupational Health	7
2.1 Identified Researchable Issues/Areas.....	7
2.1.1 Water, Sanitation, and Hygiene (WASH).....	7
2.1.2 Occupational Health and Safety (OHS).....	8
2.1.3 Food Hygiene.....	8
2.1.4 Infection Prevention and Control (IPC).....	8
2.1.5 Climate Change, Pollution and Health.....	8
2.1.6 Housing and Institutional Health	9
2.1.7 Ecosystem and Health.....	9
3. Infectious Diseases, Drug Resistance and Global Health	9
3.1 Identified Researchable Issues/Areas.....	9
3.1.1 Infectious disease	9
3.1.2 Antimicrobial Drug Resistance (AMR).....	10
3.1.3 Global Health	10
4. Non-Communicable Disease, Mental Health and Rehabilitative Health Services	10
4.1 Identified Researchable Issues/Areas.....	11
4.1.1 Non-Communicable Diseases	11
4.1.2 Psychological, Mental Health and Rehabilitative Services.....	11
4.1.3 Sport, Health and Exercise.....	11
5. Reproductive, Sexual, Maternal, Newborn and Child Health.....	12
5.1 Identified Researchable Issues/Areas.....	12
5.1.1 Reproductive and Sexual Health.....	12
5.1.2 Maternal, New-born and Child Health.....	12
5.1.3 Young People’s Reproductive Health and Substance Use/Abuse	13

6.	Pharmaceutical Sciences	14
6.1	Identified Researchable Issues/Areas.....	14
6.1.1	Drug Discovery and Development.....	14
6.1.2	Biodiversity and Traditional Medicine Practice	14
6.1.3	Manufacturing and unit process	14
6.1.4	Pharmaceutical Regulation and global health	14
6.1.5	Pharmaceutical Quality	14
6.1.6	Clinical Trials.....	14
7.	Molecular Biology, Diagnostic, Genomics and Vaccine Development.....	15
7.1	Identified Researchable Issues/Areas.....	15
7.1.1	Molecular Biology, diagnostics and Genomics	15
7.1.2	Vaccine Development	15
8.	Health System Delivery quality and Financing	16
8.1	Identified Researchable Issues/Areas.....	16
8.1.1	Health Care Delivery System.....	16
8.1.2	Health Policy.....	17
9.	Emerging and re-emerging diseases, health system resilience and preparedness	17
9.1	Identified Researchable Issues/Areas	17
9.1.1	Emerging and re-emerging diseases:.....	17
9.1.2	Disaster risk reduction and health emergencies	18
9.1.3	Collaboration, Coordination, and Partnerships	18
9.1.4	Communication mechanisms.....	18
9.1.5	Post-Event Recovery	18
10.	Bibliography	19

Introduction

Attaining full health and high living standards are central aspects of all development efforts. According to the sustainable development goals, health has a central place in SDG 3 “Ensure healthy lives and promote well-being for all at all ages”, underpinned by 13 targets. Almost all of the other 16 goals are also related to health or their achievement will contribute to health indirectly.

To achieve this, several policies and strategies have been set although there are a lot of multidimensional complexities towards meeting these high living standards. Therefore, it is necessary to identify these hurdles in achieving human aspirations. The government of Ethiopia has put health at the forefront of its goals and devised a four-tier health delivery system connecting the health extension and promotion services to highly specialized disease management. Researching on major health issues is also given due emphasis in the country.

This theme focuses on priority areas of nutrition, health promotion, disease prevention, treatment of diseases, and rehabilitative efforts to human health problems and major reproductive, maternal, and child health concerns. Host, pathogen, and environment interactions concerning the occurrence of health and wellness in one aspect and disease and disability in the other are also dealt with under this theme.

The theme includes the following major sub-themes and research areas:

1. Nutrition, Food Safety and Policy

This theme focuses on nutritional problems including malnutrition (undernutrition, obesity, overweight), micronutrient deficiencies, and prevention and treatment of malnutrition at all levels are studied under this theme. The sub-theme gives particular attention to developing effective strategies for nutrition interventions during pregnancy, lactation, early infancy, childhood, and adolescence in both rural and urban areas, and focuses on how best to tackle micronutrient deficiencies including clinical trials. It also deals with food security, dietary practices, quality assurance and sanitary measures of the community, and genetic modification of foods for an equitable supply considering the high impact of population growth, migration, emergencies, war and natural disaster on food security. Besides, the research area focuses on food safety and quality, together with monitoring toxic chemicals such as pesticide residues, polyaromatic hydrocarbons, and heavy metals. Furthermore, the theme focuses on nutritional policy issues that hinder the effective implementation of nutrition programs.

1.1 Identified Researchable Issues/Areas

1.1.1 Nutrition

- Chronic malnutrition (stunting, underweight, overweight especially in children, adolescents and mothers)
- Nutritional deficiency (especially micronutrient deficiencies like iodine, iron and zinc deficiency)
- Nutritional assessment and Growth monitoring
- The double burden of malnutrition: prevalence, contributing factors and intervention
- The interconnection of soil composition, crop/vegetable production and micronutrient deficiencies
- Nutrition-related problems and interventions (especially children 0-59 months and mothers 15-49 years)
- Nutrition and WASH
- Nutrition, infectious diseases and chronic diseases interaction
- Triple burden of malnutrition: prevalence, contributing factors and intervention

- Interconnection of Obesity, Overweight, Stress, DM, Hypertension and Cardiac Problems
- Dietetics research on Nutrition during pregnancy, Child malnutrition, chronic illnesses, and geriatrics
- Access to food consumption and food security problems
- Nutrition-Sensitive and nutrition-specific intervention
- Nutritional anthropology for behavioural change in societal feeding culture
- Child feeding practice, breastfeeding and weaning
- Feeding practice of the community (balanced diet...), Food taboos and Nutrition Education
- Food fortification and micronutrients supply
- Home Gardening and nutrition
- Community Nutrition and Societal Cognition (with a special focus on children cognition)
- Nutrition in Emergencies
- Brain development problems related to nutrition
- Others (Emerging and re-emerging diseases)

1.1.2 Food Safety

- Ethiopian Food and Drug Administration (EFDA) standardization and applications for healthy foods and beverage supply and distribution
- Research on locally available complementary foods analysis, clinical trial, production and supply for children, pregnant mothers, and chronic patients.
- Genetically Modified Foods (Plant and animal foods)
- Quality of food
- Food and beverage composition and analysis
- Food and beverage adulteration detection
- Detection of toxic substances and pesticide residues in food and beverage
- Food and beverage authentication of origin

- Genesis and sources of toxic trace elements (Geochemical analysis of trace elements, Assessment of toxic elements)
- Food microbiology
- Food Chemistry and Nutritional analysis
- Food safety management and risk assessment Epidemiology of foodborne disease
- Others

1.1.3 Nutrition Policy and Program

- Implementation Research for Nutrition Programs, Policy, and Intervention
- Nutrition Policy

2. Environmental and Occupational Health

This theme deals with Environmental and Occupational Health and safety research areas which concerned with the health effects of individuals and populations when exposed to air and water pollution, pesticides, organic solvents, dust, and physical hazards, which occur in the environment, home, or the workplace. The theme consists of the provision of safe water supply, management of wastes, prevention and control of communicable diseases, vector control, housing, and occupational health and hygienic practices as well as safe working conditions. The theme also deals with finding ways of protecting workers from potentially hazardous poisonous chemicals and toxic substances including preventive trials. The area also focuses on environmental health, occupational health and safety standards, policies and regulations.

2.1 Identified Researchable Issues/Areas

2.1.1 Water, Sanitation, and Hygiene (WASH)

- Waterborne disease and intoxications
- Waste management (Solid, liquid, and hazardous waste)
- WASH and climate change
- Microplastics contaminants
- Electronic waste recycling
- Environmental laws and policy
- Personal and Environmental Hygiene

- Sanitation technologies and innovations

2.1.2 Occupational Health and Safety (OHS)

- Industrial hygiene and workplace hazards
- Risk exposure and vulnerability
- Occupational health and injuries
- Radiation and Toxicity (Environmental and Occupational toxicities)
- Occupation Safety standards and regulations

2.1.3 Food Hygiene

- Food and beverage composition, analysis, and detection of adulteration
- Detection of toxic substances, microbes, and pesticide residues in food and beverage
- Genesis and sources of toxic trace elements (Geochemical analysis of trace elements, assessments of toxic elements)
- Food processing and technologies
- Food microbiology
- Epidemiology of foodborne disease
- Food toxicology

2.1.4 Infection Prevention and Control (IPC)

- IPC programs
- IPC education and training
- Healthcare-associated infection surveillance
- IPC standards and regulations
- Environmental Cleaning
- Utilization of standard operating procedures (SOPs) Awareness and practices of IPC in Health Care facilities

2.1.5 Climate Change, Pollution and Health

- Air pollution (indoor, outdoor, and vehicle sources)
- Global warming

- Environmental contaminations
- Pollution (Air, Water, soil, Sound, and Electromagnetic pollution) management
- Impacts of climate change
- Climate-related emerging and re-emerging infectious disease
- Waste management
- AMR and contaminants

2.1.6 Housing and Institutional Health

- Standard housing
- Institutional health (Prison health, school health, etc.)
- Housing and health

2.1.7 Ecosystem and Health

- Ecotoxicology and risk assessment
- Biodiversity loss and health
- Ecosystem health

3. Infectious Diseases, Drug Resistance and Global Health

This theme focuses on research questions related to epidemiology, pathogenesis and immunity, molecular mechanisms, diagnostics, prevention and control of infectious diseases. It also deals with the molecular nature and molecular marker for disease diagnostics.

3.1 Identified Researchable Issues/Areas

3.1.1 Infectious disease

- Common infectious disease (Tuberculosis, HIV, Malaria ...)
- Sexually transmitted infections
- Neglected tropical disease (Leishmaniasis, Schistosomiasis, Soil Transmitted Helminths, Leprosy, Trachoma)
- Lower and upper respiratory illnesses
- UTI
- Water-, and Food-borne diseases (cholera, giardiasis...)
- Intestinal parasites
- Zoonotic disease (rabies, anthrax, etc.)
- Emerging and re-emerging infectious disease (COVID-19.....)

- Healthcare associated infections
- Meningococcal meningitis
- Tetanus
- Measles
- Viral diseases (HPV, Hepatitis)

3.1.2 Antimicrobial Drug Resistance (AMR)

- Magnitude and distribution of drug-resistant pathogens
- Transmission and sources of AMR genes
- Drug-resistant microbes in health centers and hospital settings
- Abundance and diversity of AMR genes in domestic waste
- Mechanisms of antimicrobial drugs resistance
- Developing local minimum inhibitory concentration (MIC) breakpoints, and a comparison with Clinical and Laboratory Standards Institute (CLSI) and European Committee on Antimicrobial Susceptibility Testing (EUCAST)
- Antimicrobial consumption and appropriateness of antibiotic treatment

3.1.3 Global Health

- Zoonotic diseases
- Vector-borne diseases and vector management
- Trans-boundary infectious diseases
- Emerging and re-emerging infectious diseases
- One health

4. Non-Communicable Disease, Mental Health and Rehabilitative Health Services

This research area focuses on studies related to epidemiological patterns, diagnostic, preventive, follow-up, quality of life, curative and control strategies for common emerging non-communicable human health problems. This theme also emphasizes mental health problems in which the epidemiology, management, follow-up, and prevention of mental health problems as well as, the extent of substance use and its impact will be addressed. Besides rehabilitative

services as a result of accidents, diseases and mental and psychological problems (related to conflicts, displacement, and others) will be addressed.

4.1 Identified Researchable Issues/Areas

4.1.1 Non-Communicable Diseases

- Cardiovascular diseases
- Diabetes mellitus
- Cancer (breast, cervical (pelvic), lung, colonic, prostatic, leukemias ...)
- Renal and hepatic diseases
- Chronic respiratory disease (Asthma, COPD, etc.)
- Eye diseases (Cataract and Glaucoma)
- Palliative care, Geriatric care, and rehabilitation
- Injury-related problems (Burn, accidents, etc.)
- Road traffic accident (Driving license issuing and vehicle control, Pedestrian knowledge of road use, Economic impact of accident and injuries, and Assessment basic interventions to reduce road traffic accidents)

4.1.2 Psychological, Mental Health and Rehabilitative Services

- Substance use disorders (alcohol, smoking, khat, and illicit drug)
- Lack of collaborative work on leaders of institutions of religion, Youth Substance abuse such as chat and marijuana prevention and protection
- Street people and rehabilitation center issues
- Common mental illnesses
- Mental health consequences of chronic diseases
- Integrated mental health services

4.1.3 Sport, Health and Exercise

- Health and fitness
- Life style and chronic disease
- Sport and nutrition
- Sport, culture and society
- Sport and disability

- Sport education and management
- Sport talent identification and development
- Sport tournament and recreation
- Exercise and Sport physiology
- Sport psychology
- Sport and Doping
- Exercise and Sport medicine
- Others (emerging and re-emerging issues)

5. Reproductive, Sexual, Maternal, Newborn and Child Health

This research area focuses on Reproductive and sexual health issues with a particular focus on women, children, and adolescents, traditional practice on young people, women, and children. Maternal health problems associated with pregnancy and childbirth, nutrition and hygienic practices during pregnancy and lactation. The theme also gives due emphasis to contemporary child health-related and new-born care.

5.1 Identified Researchable Issues/Areas

5.1.1 Reproductive and Sexual Health

- Reproductive health problems across the human life span,
- Traditional practices,
- Early marriage and adverse pregnancy outcomes,
- Family planning and population pressure,
- Risky sexual behaviors and use/abuse of substances,
- Sexual orientations, and sexually transmitted illnesses,
- Male reproductive health concerns,
- Infertility, fertility management and reproductive dysfunction,
- Sexual and reproductive health among special needs and vulnerable communities,
- Sexual and reproductive health issues during conflicts, cancer of reproductive system, and reproductive and sexual health with population growth and development.

5.1.2 Maternal, New-born and Child Health

- Maternal health issues such as skilled delivery attendance,
- Pregnancy-related issues including exposure to teratogenic agents

- Congenital abnormalities,
- Cancer of the cervix, uterus and breast,
- Breastfeeding, nutrition, and immunization
- Maternal mortality, determinants and causes,
- Neonatal and childhood morbidity and mortality,
- Child growth, and development and
- Schooling and socialization of the child
- Maternal health (Pre-conception, antenatal, intrapartum and postpartum cares
- Neonatal and child care (new bore care, asphyxia, perinatal infection, vaccination, Child caring, protection, breastfeeding problems, etc)
- Reproductive organ problems like prolapse, etc
- Family planning and STI relation (awareness)
- Institutional and home delivery problems
- Family health packages problems
- Family health data problems
- Family health development problems

5.1.3 Young People's Reproductive Health and Substance Use/Abuse

- Reproductive health, abortion and related concerns of adolescents and the youth,
- Schooling, employment, and engagement in paid labor activities,
- Substance use/abuse and the role of peer pressure
- Reproductive health and youth/adolescent-centered activities such as clubs,
- Adolescent friendly health/reproductive health services,
- Sporting activities and their role in shaping reproductive health behaviors, and
- Physical, psychological, and mental and cognitive development and consequences related to ill-reproductive health
- Adolescent and youth reproductive health problem and services
- Harmful traditional practice (traditional healing practices...)
- Sexual and reproductive rights, and others

6. Pharmaceutical Sciences

This theme focuses on identifying a compound from various sources such as from laboratory synthesis and /or medicinal plants that are therapeutically useful in curing and treating diseases. Besides, the theme includes drug development which is finding a suitable molecular target and investigating the clinical trials on approved drugs and/or new drugs to support the commercial launch of the drug. The research areas focus and promote public health by ensuring the safety, efficacy and quality of locally produced traditional medicines and evaluate the standard and regulations of traditional healer practices. In addition to the aforementioned thematic areas, this section also includes the development of diagnostics, diagnostic technologies, vaccines and biological.

6.1 Identified Researchable Issues/Areas

6.1.1 Drug Discovery and Development

- New drug synthesis and lead molecule discovery
- Drug design and development
- Drug delivery and formulation
- Drug toxicity assessment

6.1.2 Biodiversity and Traditional Medicine Practice

- Drug or lead molecule discovery from organisms used for various ailments has public health importance both in communicable and non-communicable diseases.
- Traditional medicine practice
- The integration between modern health care system and traditional medicine practice
- Enriching the medicinal plant database through compilation and documentation of standardized information on traditional medicine
- Conservation of threatened and endangered medicinal plants to safeguard indigenous plant biodiversity.

6.1.3 Manufacturing and unit process

6.1.4 Pharmaceutical Regulation and global health

6.1.5 Pharmaceutical Quality

6.1.6 Clinical Trials

- Studies on newly investigated or existing drugs, medical devices, biologicals, and vaccines to evaluate their effects on health outcomes in human subjects.

7. Molecular Biology, Diagnostic, Genomics and Vaccine Development

This thematic area is about the characterization of molecular biology tools, development diagnostics, diagnostic technologies, vaccines and biologicals

7.1 Identified Researchable Issues/Areas

7.1.1 Molecular Biology, diagnostics and Genomics

- Molecular characterization, determination and mechanism of diseases (Malaria, TB, HIV, etc)
- Stem cell isolation and evaluating its therapeutic power
- Chronic diseases and aging research
- Developing vaccination for challenging and new emerging diseases,
- Forensic DNA:
 - ✓ Forensic kit development of a commercial prototype
 - ✓ Genotyping of a certain population
 - ✓ Maternal and paternal ancestry study of a mixed community
 - ✓ DNA profiling from historical crime scenes
 - ✓ Nanotechnology techniques for DNA genotyping
- Molecular mechanism of heritable disease and Cancer onset
 - ✓ Polymorphism screening and cancer susceptibility
 - ✓ Polymorphism screening and hereditary disease
 - ✓ Cancer molecular cytogenetic/genetics;
 - ✓ Protein function, structure, activity and their implication in cancer onset
 - ✓ Epigenetic, Methylation and alkylation of DNA and its association with genetic diseases,

7.1.2 Vaccine Development

- Development of diagnostics and diagnostic technologies,
- Vaccines and biologicals
- Molecular and structural immunology

- Production and commercialization of diagnostic kits for different infectious diseases
- Preclinical and translational immunology
- Cellular immune responses and immune regulation
- Production of Monoclonal Antibody (mAb)
- Transplantation and Autoimmune disease
- Stem cells and Regenerative therapy
- Therapeutic cloning and insulin production
- Immune dysfunction
- Lymphocytes in health and disease
- Epigenetic fixation of immune cell fates
- Intestinal immune responses

8. Health System Delivery quality and Financing

This research priority will focus on problems related to a service organization, and leadership and use of ICT technology in the health care system. It also examines ways to enhance the quality and efficiency of human health care service and policy. Besides, it assesses health care service qualities to attain a standard of health care delivery. Furthermore, the theme is supposed to address program monitoring and evaluation, and performance assessment.

8.1 Identified Researchable Issues/Areas

8.1.1 Health Care Delivery System

- Improving the quality of care (surgical, medical, pediatric, etc.),
- Pain management,
- quality public health laboratory diagnostic system,
- Control or prevention of infectious or non-infectious diseases,
- Care for the elderly/health need/long term care,
- Cancer care, dental health, treatment compliance, comfort measure, palliative care, geriatric care, end of life care, and care for chronic illnesses,
- Method evaluation (diagnostic kits, procedures),
- Monitoring and Evaluation of efficiency and effectiveness of health care delivery systems

- Health information systems and digitization
- Productivity, work and professional performance, saving and investment,
- Debt and expenditure, equity, health-care financing, economic return, and social and political justice
- Efficient (timely) healthcare (diagnostic, treatment) essentials procurement system
- Pharmaceutical, Nursing, Laboratory, and Medical/Surgical care services.

8.1.2 Health Policy

- Health care evidences/ practice change implementation
- Health care insurance
- Health extension package status (implementation, monitoring and follow up), impact on hospitals like UoG.
- Health system and Leadership policy adoption and implementation problems, standardization, coverage, management and governance of health services (efficient and effective care delivery problems).

9. Emerging and re-emerging diseases, health system resilience and preparedness

This thematic area deals with researches on how to improve the ability of the country's health system to be resilient with respect to emerging global and domestic threats. The thematic area also focuses on researches on assessment, management and evaluation of emergency health interventions across the disaster cycle (preparedness, response, recovery, mitigation) with emphasis on risk communications, infrastructure and capacity.

9.1 Identified Researchable Issues/Areas

9.1.1 Emerging and re-emerging diseases:

Research on diseases which have the capacity to spread through outbreaks and pandemics, including but not limited to COVID-19, Zika, SARS, Malaria, MERSCoV, etc.

9.1.2 Disaster risk reduction and health emergencies

9.1.3 Collaboration, Coordination, and Partnerships

9.1.4 Communication mechanisms

9.1.5 Post-Event Recovery

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