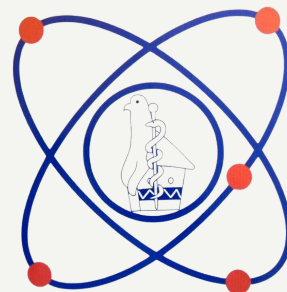


ANNUAL NEWSLETTER

UPDATE OF RESEARCH ACTIVITIES 2023



2023

Medical Research Council of Zimbabwe



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Chairman's Address



Figure 1: Professor Charles FB Nhachi – Chairman of Council

I welcome you to read this Newsletter, which is shared at the MRCZ Forum and afterwards. The FORUM is our trade name for the MRCZ's "Annual Health Research Ethics Day." It is the day that we set aside, once a year to have an opportunity to share and discuss various issues relating to ethical conduct of research in Zimbabwe. An opportunity to share progress in research and identify priorities for future focus. It is also an opportunity to hear from the various stakeholders about their concerns and challenges that they encounter as researchers. All the information is collated and published through our mouthpiece, the **NEWSLETTER!**

As is well known, the Medical Research Council of Zimbabwe, (MRCZ), is a semi-autonomous council operating under Ministry of Health and Child Care. The council was established through the Research Act of

1959 and Medical Research Government Notice 225 of 1974. Among other duties, the mandate of the council includes,

- To keep under review, medical research in Zimbabwe, with particular attention to adequacy of such research for the needs of the country.
- To promote all aspects of medical research, and to ensure maximum coordination between the persons or authorities undertaking or about to undertake any form of medical research.
- collect funds whether by public subscription or otherwise for the promotion of medical research in the country.
- To, with the approval of the Minister of Health and Child Welfare carry out research in various medical fields.

The year 2023 has been a busy one, interesting and fruitful. The council has been involved in a number of activities all under the auspices of its mandate. The establishment, training, and formalization of Institutional Review Boards (IRBs) is one key activity that the MRCZ is continuously engaged with. IRBs are in essence "tentacles" of the National Research Ethics Committee. Trained IRBs enhance optimal conduct and harmonization of health research ethics. This activity is ongoing and bearing desirable results.

The National Health Research and Development committee, (NHRDC), has been the flagship of the technical subcommittees of the council all along. Of late Council has established an Ethics Committee on Traditional, Complementary and Alternative Medicine, (TCAM), which is one of our pride and joy of the year's achievements. This broadens and deepens the oversight status of Council regarding ethical health research conduct.

The successful application and acceptance into the EDCTP international families of eligible research funding recipients puts Zimbabwe health research activities and

efforts on the world map. Between 2019 and 2022, EDCTP funded MRCZ's "Zimbabwe Ethics and Regulatory Capacity Project-ZERCAP". Through this project our mandate around capacity development of ethics committees and research regulation was greatly enhanced. This newsletter is printed with partial support from ZERCAP.

The Medical Research Council of Zimbabwe, with mandate from Ministry of Health and Child Care (MoHCC), proposed amendments to the outdated gazette notice number 225 of 1974, ACT 4/19o 59. Accordingly, and as per requirements of the constitution of Zimbabwe, council embarked on a national consultative process. Consultative meetings were organized for the month of October 2023, and the consultations were targeted at stakeholders who included, health researchers, research institutions, policy makers, health institutions, universities and the community at large among others. The consultations were referred to as "Stakeholder Assessments for a Zimbabwe Medical Research Bill". The initial consultations have been completed and a draft document is in the making. Stakeholders are encouraged to provide any last-minute additions to the discussion.

Currently, provisions for health research are outlined in the Research Act {Chapter 10:22}1984 and also in the Medical Research Council of Rhodesia Government Notice No. 225 of 1974. The proposed amendments include the reviewing and updating of the 1974 government notice. The proposed Medical Research Bill is to establish the, inter alia, Medical Research Council, National Medical Ethics Committees, National Clinical Trials Center and a National Health Research Fund.

The MRCZ was among the government parastatals which were appraised by the president at state house. All endeavors are in line with the ultimate goals of achieving the National Development Strategies.

Yes indeed, as in all ambitious goals, there were challenges along the way. Lack of

adequate funding is a perennial problem, and this has curtailed the range of activities that Council would like to embark on. MRCZ would like to support research or fund some selected strategic research activities. In tandem with shortage of resources is the inability to expand our staffing compliment thereof.

Look to the future though, it's not all doom and gloom. In fact, the future is beckoning with exciting innovations. Council has a list of initiatives lined up, one of which is the establishment of a centre of excellence in traditional medicine research. Partnerships with interested universities will see this happen soon.

Council could not have achieved some of these milestones without the tireless dedication of the rest of the team. With that in mind I would like to extend profound gratitude to Sr. Ruzario, Vimbai, Natasha, Mildred and the guys...Tendayi, Anesu, Tinashe, Lowance and Patrick.

May FORUM 2024 be grander!

Professor Charles FB Nhachi,

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The Importance of Informed Consent in Health Research



Figure 2: Dr. E Shana NHRDC Chairperson

Informed consent is one of the most salient features of a health research protocol

¹The Nuremberg trials were a series of 13 trials carried out in Nuremberg, Germany, between 1945 and 1949. The defendants, who included Nazi Party officials and high-ranking military officers along with German industrialists, lawyers and doctors, were

involving human participants. Unless otherwise granted a waiver by an Ethics Committee, all studies involving human participants, their specimens, or data must obtain informed consent from the participants involved.

This article discusses Informed Consent Forms (ICFs) of study protocols submitted for review to MRCZ. We highlight areas where researchers should focus to ensure informed and voluntary participation of research participants, and their subsequent disclosure of critical information related to the study.

Historical perspective

Historically, not much is found in literature about informed consent in ancient medical practices that date back to the days of Hippocrates. Most of what we now know regarding informed consent today is from relatively recent developments, especially from world views which emerged after the second world war. There were horrors of unethical conduct by some physicians during World War II, and the Nuremberg trials¹ exposed many atrocities. This prompted the scientific research community to develop codes of conduct in health research involving human participants. The aim was to avoid a repeat of similar abuse.

Informed consent as we know it today began to take shape with the adoption of the Universal Declaration of Human Rights (UDHR) on 10 December 1948 which laid the foundation for one of the four principles of health research ethics in humans: **the respect for persons (autonomy)**. Article 1 of the UDHR declares “all human beings are born free and equal in dignity and rights...” and Article 5 states that “No one shall be subjected to

indicted on such charges as crimes against peace and crimes against humanity. For additional information, See <https://www.history.com/topics/world-war-ii/nuremberg-trials>

torture or to cruel, inhuman or degrading treatment or punishment.”²

Subsequent declarations and guidelines include the Helsinki Declaration³ of 1964 and its revisions in 1983 and 1989. This World Medical Association (WMA) Declaration was a statement of ethical principles for medical research involving human subjects, including research on identifiable human material and data. Another important initiative was by The Council for International Organizations of Medical Sciences (CIOMS), an international nongovernmental organization in official relationship with World Health Organization (WHO) to, among other things, advance ethics in health research. The latest version of CIOMS guidelines are from 2016⁴, and emphasize the need to protect the dignity, rights, welfare and safety of participants in health research involving human subjects. MRCZ is guided by these international guidelines, and by the Constitution of the Republic of Zimbabwe.

Why Informed Consent is necessary

Informed Consent is derived from the principle of Respect for Persons (Autonomy), which together with Justice (treat others equitably or fairly), Beneficence (distribute benefits and risks fairly) and non-maleficence (do no harm) constitute the four principles guiding health research ethics involving human participants. Informed consent, when properly implemented, provides a ‘standard’ by which users of the research can be assured of the quality of the results, and that participants willingly enrolled in the research.

In low resource settings such as Zimbabwe, care must be taken to get more robust and

detailed processes in obtaining informed consent, just as is done in more developed countries! In our case, additionally, our various cultures, beliefs, educational backgrounds and understanding of scientific concepts must be factored in. This is an area on much debate. Notwithstanding, we should ask ourselves if we are doing enough to adequately address the issues of ‘informed’ and ‘voluntary’ consent; two of the most critical components in the consenting process.

Our experience at MRCZ is that several researchers continue to approach the consenting process as a footnote to their study activities, as an activity that must be done before actual research work begins. Researchers sometimes copy and paste old forms without much thought and recklessly ask potential participants to ‘sign’ them as part of routine activities. ICFs are thus sometimes held out as “proof” that consent has been obtained from participants and that the investigators can safely go on and carry out activities without further reference to participants’ consent. That is not correct. Informed consent is a process of engagement between the researcher and research participants (of which signature of the IFC is part). **Informed consent should remain alive and active throughout the duration of the research activity.**

Who should give informed consent?

Informed Consent Forms (ICFs) are signed documents between the research team (represented by the principal investigator) and the research participant (represented by themselves or their legal guardians if they are not able to provide legal consent).

² 3rd Session of the United Nations General Assembly, Paris, 10 December, 1948).

³ See <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>

⁴ See https://cioms.ch/working_groups/bioethics/

Informed consent should be given by, or on behalf of a research participant or their legal guardian, and for the protection of the research participants in the research. An investigator or their representative should obtain the legally effective informed consent of the subject or the subject's legally authorized representative. Researchers are encouraged to discuss with MRCZ if they are not sure about who should give consent in their research, or in cases where it is not to the benefit of the participant to get informed consent from a legal guardian (such as, for example from a parent in a teenager sexuality study).

MRCZ's Informed Consent Form Template

MRCZ takes informed consent very seriously. It is a founding principle of research ethics, and a well-developed ICF is a prerequisite for protocol approval. ICFs should demonstrate that human participants can enter research voluntarily and with full information about what it means for them to take part. Their giving consent through the ICF is a requirement in all research involving human participants, their specimens, or data. MRCZ has developed a template Informed Consent Form which is available on the MRCZ website⁵. It is a starting point for addressing informed consent in your research, and each section should be treated with care. Researchers are encouraged to address all the sections in the form, and provide relevant details about informed consent in their research.

Structure of your study Informed Consent Form

Researchers are encouraged to use the MRCZ ICF template to develop their own. ICFs must have identifying information on the first page. This includes the study title as it appears on the submitted application to MRCZ. The project title should appear on the first page and on the signature page. The Principal Investigator and their contact details should be included. This ensures that each form has a responsible authority behind it- it is an agreement between the research participant and the research study as represented by the principal investigator. Other information includes research sites, research study number (MRCZ assigned), and when approved, MRCZ stamp on every page. Version numbers are also necessary where revisions are continually made. Pagination information should reflect the total number of pages on the header or footer (eg .page 3 of 20, 7 of 20 etc).

Purpose of the study

Your ICF should clearly outline what, why, when, where, by whom and all other important details related to the study. It should consider the level of education, culture or beliefs, age and circumstances of study participants. The ICF should detail reasons why the selected individual is being asked to enrol into the study. Researchers should try to explain and answer this question on the ICF, and in person during participant recruitment. ICFs should be developed in the language most understood by participants. Therefore, translations should be available where English is not a main language for the participant, or where participants use a different language to that used in the research.

⁵ <http://www.mrcz.org.zw/forms/>

Risks and discomforts

Every research carries with it some level of risk. Investigators often think that their research is harmless and tend to inform participants that there are no risks involved or anticipated during the study. This is almost always not true to majority of studies. A harm could be psychological, social, financial or, as usually thought, physical. There are inherent potential risks in all studies and the investigator needs to lay out how any potential risks and discomforts will be minimised or mitigated during the research study. A risk is a possibility of harm. Risk has a magnitude (degree of severity) and probability (likelihood) which together gives their degree (of risk). An acceptable ICF should adequately pay attention to all perceived risks, and how to mitigate them.

Benefits and compensation

Benefits to the participant or to the community from which they come, should be clearly described in the ICF. Benefits could be in the form of free diagnostic procedures, access to free study treatments, or community health services. Researchers should not use benefits such as monetary payments to persuade participants to take disproportional risks. Additionally, researchers are encouraged to describe how they will compensate participants for their time and reimburse them for any costs they meet to participate in the study. Compensation for time spent in the study and reimbursements for transport and other study-related expenses could include money. Amounts should be approved by MRCZ to protect participants from undue inducements.

Researchers must clearly state level of compensation and extent of treatments in all research-related injuries. They should indicate who will be responsible. MRCZ may not limit injuries to physical but may include social, financial or psychological harm

depending on the type of study involved. High risk studies such as early phase clinical trials may need to have study insurance in place to cater for compensation.

Alternative procedures or treatments

Participants need to be informed that this is research, an experiment with an unknown outcome in the condition under study. If the research involves a trial medicine or procedure, the researcher must give a list of other available treatments for the same condition (whether proven or in other investigational settings) outside of the study in question. The participant should be informed so that they can decide whether to enrol in the research or access other existing treatments. Participants should also be informed that they are free to change their mind anytime. They can leave the study and get other available treatments later. They also need to know of any consequences of voluntarily leaving the study, if any. And conditions under which they may be removed from the study. This is to guarantee the clear nature of voluntariness as a condition for an ethically appropriate informed consent process.

Conclusion

We have outlined only a few of the important areas researchers need to pay attention to in obtaining informed consent from potential study participants. Informed consent demonstrates that the participant is fully aware at their level or capacity and that they participate voluntarily but with full information. The process used by MRCZ continues to be reviewed as more social, legal and other views are incorporated in order to protect the rights, safety, welfare, and dignity of study participants.

Dr E Shana is the chairperson of the National Health Research and Development Committee at the MRCZ.

New Medical Research Bill on the cards



Figure 3: GZU Stakeholders Assessment Meeting for the Medical Research Bill

The Medical Research Council of Zimbabwe is undertaking stakeholder engagements to update the laws governing medical research in Zimbabwe. The proposed legislation is the Medical Research Bill which should establish, among others, the Medical Research Council, National Medical Research Ethics Committee, National Clinical Trials Centre and a National Health Research Fund. After stakeholder consultations, the Bill will be developed and presented to Parliament for consideration.

Provisions for health research are outlined in the Research Act [Chapter 10:22], and an older Medical Research Council of Rhodesia Government Notice No. 225 of 1974. These pieces of legislation are outdated, and a decision has been reached by the Minister to review and update them. MRCZ is a parastatal of the Ministry of Health and Child Care and is mandated to regulate all operational and clinical research which directly or indirectly involves human subjects in Zimbabwe. MRCZ is a specialised Council

of the Research Council of Zimbabwe (RCZ) and reports to Parliament through the Minister of Health and Child Care.

Consultation with stakeholders covers medical research topics which should be considered for the new Bill. These include efforts to:

- a. Update the mandate of MRCZ to better regulate and coordinate health research in Zimbabwe and facilitate registration of institutional ethics committees.
- b. Establish a National Clinical Trials Centre to design, conduct, analyze and publish clinical trials and other well-designed studies. (goals, staffing, cost efficiency, coaching and mentorship, commercialization).
- c. Set up a National Health Research Ethics Committee which will be responsible for, among other functions, reviewing study protocols and making decisions thereon; including power to determine adequacy of health research in responding to Zimbabwe's needs.
- d. Promote original Zimbabwean research and determine adequacy of health research including in times of emergencies and epidemics.
- e. Mobilize and disburse funds for health research and collaborate with health researchers and research institutions inside and outside of Zimbabwe.
- f. Legislate measures to address misconduct and infractions by researchers conducting health research.
- g. Promote advanced genetic research in Zimbabwe, including genomics, gene editing, telemedicine, personalized medicine, and prohibition of unethical research such as human cloning.

- h. Promote ethical health research in traditional, complementary, and alternative medicine in Zimbabwe; and
- i. Safeguard intellectual property rights in health research and use of such rights in the commercialization of health research.

Stakeholder consultation meetings commenced in October 2023, and will finish before the end of the year. If you have not yet made your contributions, please do so! There is a limited period for receiving your feedback on these consultations. You are encouraged to reach out to MRCZ directly. Should you require assistance or need other support to adequately make your contribution to this important national exercise, please contact the MRCZ secretariate.



Figure 4: Stakeholder's at the Medical Research Bill Meeting

Public Health Research in support of Zimbabwe's National Development Strategy 1 (NDS1) and Vision 2030



Figure 5: Professor Tendayi Kureya - National Executive Secretary

Background and Purpose

Zimbabwe is taking deliberate steps to set a public health research agenda to support the National Health Strategy (2020-225), the National Development Plan 1 (NDS 1) and fundamentally, Vision 2030. Our shared Vision 2030 seeks to transform the country to an upper middle-income economy, with a healthy nation that reaps the benefits of her success. Our journey

① *"Towards a Prosperous and Empowered Upper Middle-Income Society by 2030, with Job Opportunities and a High Quality of Life for its Citizens."*

will create an enviable society where our people thrive, live healthy lives and contribute meaningfully to development of the country. Economically, per capita Gross National Income will increase to over US\$5000 in real terms by 2030, with less income disparities, and underpinned by the development of a middle class⁶. Research in public health should enable help us to close the existing gap in a sustainable and equitable manner.

A public health research agenda is required to guide research which in turn should provide evidence for our public health interventions. There are positive developments in Zimbabwe's health sector, but huge challenges still exist. On the positive, the country is recording declines in maternal, neonatal and child mortality rates. Age specific fertility rates and unmet need for family planning contraceptive prevalence rates are also on the decline. However, disparities by urban-rural,

⁶ Government of Zimbabwe, 2018, Vision 2030.

demographic, age, educational and socioeconomics continue to exist and hamper efforts to achieve Vision 2030. Factors such as health financing, quality of care in health service delivery, skilled human resource availability, essential medicines and commodity availability, religious objectors and rapid rural to urban migration remain significant factors contributing negatively and retarding the trajectory for the achievement of Vision 2030.

There is political will to address the challenges facing public health delivery. In line with Vision 2030, Government is committed to invest in diagnostic facilities and equipment, including oncology and dialysis centres closer to the people. This entails establishing specialised, well equipped health care facilities that draw both from internal and external expertise, while taking advantage of developments in technology. There is an effort to craft a clear agenda on training of specialised medical personnel across various disciplines, and now, a research and development **agenda** that is driven by a local effort, and to serve local needs. The envisaged public health research agenda will be driven by the need to redirect local research to provide solutions to our priority public health issues.

The Vision for Public Health

The vision for public health is outlined within the Social Development pillar⁷ of Vision 2030. Zimbabwe's public health system should be efficient, integrated and of unbeatable quality. Priority should be given to preventive care at community and household levels, and the key challenges posed by HIV, malaria and non-communicable diseases

should be overcome using homegrown and cutting-edge solutions. The public health system should be strengthened to prevail and provide specialist health services at district levels (currently obtainable only at Provincial level)⁶.

Zimbabwe's constitution (2013) outlines health as a fundamental human right. Through Vision 2030, Government has committed to ensuring healthy lives and promoting well-being for all at all ages. The National Development Strategy 1 (NDS1: 2021-2025) provides the national perspective on health and wellness in Zimbabwe. Guided by NDS1, the Ministry of Health and Child Care formulated the current National Health Strategy 2021-2025 which has identified 10 critical health outcomes to be achieved:

1. improved access to essential medicines and commodities.
2. increased access to water, sanitation, and healthy environment.
3. improved health infrastructure and medical equipment for Health Service Delivery.
4. improved governance of the Health Service.
5. improved health sector human resources performance.
6. increased domestic funding for health.
7. reduced morbidity and mortality due to communicable and non-communicable diseases.
8. improved reproductive, maternal, new-born child and adolescent health and nutrition.
9. improved public health surveillance and disaster preparedness and response; and

⁷ Vision 2030, page 39

10. improved primary, secondary, tertiary, quaternary, and quinary care.

Public health research is required in all these outcome areas and should be prioritised for improved efficiency and effectiveness.

Public health research focus

The agenda for public health research should be set following the desired vision as outlined in Vision 2030, NDS1 and the national Health Strategy (2021-2025). Pillars for this research should respond directly and indirectly to the desired health outcomes. Following this reasoning, and utilising best practice elsewhere, public health research should cover topics that include:

- Pharmaceuticals (drug development through clinical trials, traditional, complementary, and alternative medicines etc)
- Public health implementation or operational (equipment, medicines/commodities; infrastructure, referral, effectiveness of strategies, M&E)
- Technology applications for health (AI, biotechnology, genetic medicines, solar power, ICTs, social media eg)
- Environment and health (WASH, Climate change, disaster preparedness)
- Health Governance (policies, strategies, regulations, laws, penalties etc, skills gaps analysis, efficiency, social accountability)
- Priority Diseases (NCDs, HIV, Malaria, epidemics and pandemics eg COVID, shift of focus from treatment to prevention)
- Maternal and Child Health (family planning, still-birth prevention, child diseases,)
- Information and evidence (modelling, demography, forecasting, analysis of M&E data)
- Funding (funding for health, research, linkages,)
- Mental health and lifestyle (drug abuse, mental health, nutrition, etc)
- Cross cutting issues (gender, climate change, global issues, and world economics)

The exact categorisation of research pillars will be further informed by a stakeholder engagement exercise.

Stakeholders' role

Setting an agenda for public health research is the first step towards ensuring that public health is driven by evidence. Such evidence should be appropriate (eg local solutions to local problems) and provided in a timely and cost-effective manner. The agenda is a shared reference for researchers and stakeholders who are involved directly and indirectly in health-related research. The key partners in guiding Zimbabweans towards a shared public health research agenda include the **Ministry of Health and Child Care** as the custodian of health programmes. The Ministry of Health and Child Care, through its relevant departments (and notably, the National Institute of Health Research), should support the country in the identification of research priorities and product gaps that will guide new areas of investigation and innovation. The Minister of Health and Child Care is the responsible authority for the national public health research agenda.

The Medical Research Council of Zimbabwe is a parastatal of the Ministry of Health and Child Care and is mandated to regulate all operational and clinical research which directly or indirectly involves human subjects

in Zimbabwe. MRCZ is a specialised Council of the Research Council of Zimbabwe (RCZ) and reports to Parliament through the Minister of Health and Child Care. MRCZ has a mandate that includes setting and promoting a Zimbabwean research focus and determining adequacy of health research. MRCZ regulates and coordinates health research in Zimbabwe and facilitates registration of institutional ethics committees. MRCZ should also mobilise and disburse funds for health research and collaborate with health researchers and research institutions inside and outside of Zimbabwe. Future functions include safeguarding intellectual property rights in health research and use of such rights in the commercialization of health research.

Ministry of Higher and Tertiary Education and its colleges and universities is responsible for the formulation and implementation of policies related to skills training and development and the promotion of Science, Technology and Innovation. The Ministry comprises six (6) technical departments namely, Tertiary Education Programmes; Higher Education Programmes; Quality Assurance and Standards; Research, Development and Innovation; Projects and Technology Transfer; and the Zimbabwe National Commission for UNESCO. To implement its responsibilities, the Ministry oversees the promotion of science and technology, research and development, innovations; supervises and accredits teacher education, technical and vocational education and training (TVET) and university education. It also facilitates cooperation in research and development, higher and tertiary education as well as in science and technology at local, regional and international levels.

Research Council of Zimbabwe. The Research Council of Zimbabwe (RCZ) was established in 1986 to promote, direct, supervise and coordinate research. One of the major functions of RCZ is advising Government on issues of research for sustainable development.

Medicines Control Authority of Zimbabwe - regulator for medical products in the country. MCAZ is responsible for protecting public and animal health by ensuring that accessible medicines and allied substances and medical devices are safe, effective and of good quality through enforcement of adherence to standards by manufacturers and distributors. The mandate of MCAZ is to protect public health ensuring that medicines and medical devices on the market are safe, effective and of good quality.

National Biotechnology Authority - The National Biotechnology Authority (NBA) is an autonomous research and development institution with a mandate to develop Zimbabwe through the application of both conventional and cutting-edge biotechnologies. Established through The National Biotechnology Authority of Zimbabwe (NBA) Act of 2006 [Chap. 14: 31]; its role is to transform the country from a raw material-based into a knowledge-based economy through the judicious application of biotechnology in agriculture, medicine, energy and the environment.

Parliament - Elected leaders are pivotal policy makers for linking research with the communities that should benefit from that research. Parliamentarians have a tacit role to channel issues that are identified at community level to researchers and

implementers, and to take the results from research back to the communities.

Funding partners - UN, donors and private sector partners are required to fund a coordinated research agenda for health.

Research organisations - NGOs, private entities and other stakeholders conducting public health research in Zimbabwe.

Envisaged process

The process for setting the public health research agenda for Zimbabwe is driven by a conscious realisation of the importance of research to our desired public health outcomes. The objective is to develop a nationally agreed public health research agenda in support of Vision 2030. Research that is not important for this agenda will not be prioritised. Priority setting will be done through an exercise which uses good practice examples and methodologies drawn from experience and more widely. The process provides a systematic guide to assist planning and implementing a quality research priority-setting exercise that matches our context. Important in this is legitimacy, leadership at the highest level, and credible priorities that have been developed in an ethical and equitable manner.

The main result for this process is public health research priorities that clearly describe how and why the priorities were identified and who has responsibility for implementing them. The key stakeholders should regularly convene to discuss any changes that are required. The following steps could lead to a nationally agreed public health research agenda.

- National public health research agenda setting meeting to kick-start process.
- Consultations by lead agencies that include NIHR, MRCZ, NBA, RCZ.
- Draft of National Public Health Research Agenda Document
- Implementation of research guided by national agenda.

Financing the public health research agenda

Health financing, including financing for public health research, is required, and should be guided by evidence from research. Creativity in funding for public health should be a major topic for the public health research, as this will ensure that perennial problems in the sector are addressed in a sustainable manner. Research could also look at optimal use of additional sources of funding such as the Health Levy Fund (5 cents per dollar of airtime and mobile data which goes to health services for medicines and equipment for the public sector), AIDS Levy (3% of income tax), Health services fund (generated through user fees in the public sector) and Private medical scheme (whose expenditure was USD\$353mil in 2018). Such research could also consider creative use of sources at sub-national government (local authorities) and households. The assisted medical treatment order which is administered by the Department of Social Welfare and pays bills for those designated as poor is no longer operational but should be revised creatively. Funding for emergencies such as COVID should also be researched.

In the 2023 Budget, \$473.8 billion budget allocation is put towards the provision of health care services and may not be

adequate to fund the sector's critical needs. At the time of announcement, it was 11% \$4,5 trillion budget, falling short of the Abuja commitment⁸ of 15%. Historically health was financed through a mixture of domestic and external funding sources. Total expenditure on health as a percentage of GDP was 7.1% in 2018 (USD 1.7 billion). This level of health financing improved in 2020-21 to 22 % but predominantly in response to the COVID 19 pandemic. Health financing falls short of the WHO recommended USD 85 per capita.

The current policy on financing for public health is the “Zimbabwe National Health Financing Policy “Resourcing Pathway to Universal Health Coverage” 2016-2026. It is outdated and does not adequately address the need for systematic and predictable financing for research. The paradigm needs to shift from the current situation where Government funding for health is mostly allocated towards salaries, and donor partners funding medicines, supplies, and commodities. There is need to keep to commitments made, including Abuja, and setting targets for allocations for research.

Professor Tendayi Kureya (Professor- Sustainable Infrastructure, Royal Institute of Technology, Sweden) is the Executive Secretary of MRCZ.



Figure 6: MRCZ Secretariat in Kariba

⁸ In April 2001, African Union countries met in Abuja and pledged to allocate at least 15% of their annual

budgets to improve the health sector and urged donor countries to scale up support.

Capacitating Traditional Medicine Research in Zimbabwe

Professor Charles FB Nhachi,

There is great and urgent need for building capacity in Traditional Medicine research in our research institutions in Zimbabwe. By institutions we mean all stakeholders in the realm of Traditional medicine. This includes but is not limited to researchers, policy makers, the legal fraternity and health research funders in all our research institutions, universities, and other centers of higher education. The communities and traditional medicine practitioners are an integral part.

Research is the best and optimal systematic undertaking to authenticate, increase and demystify knowledge and understanding of traditional health practices. In this sense **capacitating traditional health practices research is not only necessary and fundamental but mandatory and imperative.** As the famous scientist Neil deGrasse Tyson notes, *"The good thing about Science is that it is true, whether one believes in it or not."*

The Medical Research Council of Zimbabwe is capacitating traditional medicine research and has established a technical sub-committee on Traditional, Complementary and Alternative Medicine (TCAM). The committee is accountable to Council and has a main mandate to ensure that all research involving traditional, complementary, and alternative medicine is

conducted using high scientific, safety and ethical standards. This ensures integrity of data as well as safety of participants, research staff, the public and the environment. TCAM will normally consider research proposal submissions but may also consider any matters referred to it by Council, Ministry of Health and Child Care, Professional Associations for traditional, complementary and alternative medicine practitioners and any other interested parties. Members of TCAM are expected to have interest, knowledge and experience related to traditional medicine research.

Yet another way of capacitating traditional medicine research is documentation. Oral history and narration of events, incidents, and methodologies of traditional medicine practice has mostly relied on folklore and sometimes even narration of dreams. Traditional medicine practitioners should be capacitated to document the methods of undertaking their practices. In a digitalized world it is no longer enough and nor justifiable just to tell tales. Documentation enhances memory, it enhances reproducibility of results and outcomes, it enhances accuracy of monotonous repetitive chores, and it establishes permanent evidence. Above all, it is a simple task to accomplish. Accompanying documentation of evidence should be Intellectual Property protection. Adequate measures should be employed to achieve this.

Simple but elegant research studies can be done at our institutes of higher education to carry out justification studies of the efficacy, safety, and commercial viability of our traditional medicaments. Some of this kind of research is not resource demanding and

does not require sophisticated or up market technologies. It is definitely doable!

MRCZ encourages simple examples of how we can facilitate the integration of traditional medicine practice into the mainstream of national health enhancement.

The bottom line to all this is, LETS ALL CAPACITATE TRADITIONAL HEALTH PRACTICE RESEARCH.

Professor Charles FB Nhachi,

B.Sc. (Hons) Pharmacology; M.Sc. Medicinal Chemistry; M.Sc. Advanced Applied Toxicology; PhD, Clinical Pharmacology and Toxicology; Post Grad certificate in Toxicopathology, Chairman, Medical Research Council of Zimbabwe (MRCZ); President, Zimbabwe Academy of Science; (ZAS), Editor – In – Chief, Journal of Applied Sciences in Southern Africa (JASSA); Patron, Zimbabwe Medical student Association, (ZIMSA); Professorial Chair, Clinical Pharmacology and Toxicology, University of Zimbabwe.

The year 2023 in retrospect



Figure 7: Mr. Anesu Gumbo - Compliance Officer

The year 2023 has seen the inflow of research dossiers and protocols retain its momentum from 2022. The MRCZ Secretariat has seen a marginal increase in research activity in current year and a gradual buildup from the first quarter through to the last. Traffic is already higher at this stage of the year relative to last year, and we have already surpassed the volume of submission received in the entirety of 2022. By 15th November, 137 new submissions have been received, compared to 133 for the whole of 2022,

representing a 3% increase in applications over last year. This represents a monthly average of about 12 new research protocols, and this has kept our ethics committee particularly busy throughout the year. Over half (70) of the total applications considered were in partial fulfilment of PhD requirements. The same trend can be seen for master's and undergraduate student applications, with the current figure of 170 looking likely to surpass last year's 182 studies received. Clinical research is generally on the up but still occupies bottom spot in research conducted. Only 5% of total applications received for review were clinical trials each in 2022 (7) and 2023 (8).

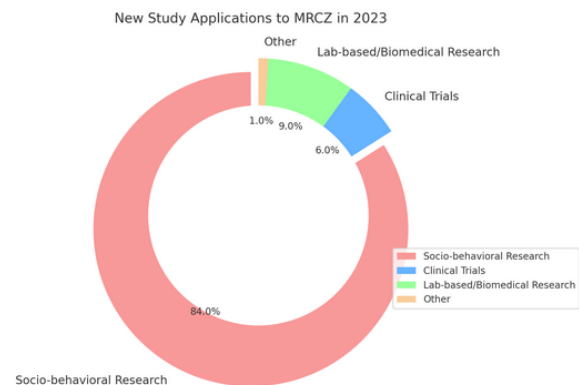


Figure 8: New study application to MRCZ

Despite the uptick in submissions, MRCZ has fared well in its delivery of timely review and feedback. Turnaround times have remained fairly constant, with average approximations of 30 days and 60 days for normal and expedited reviews respectively. We strive to do better. Management of turnaround-times has also been helped by the almost complete transition from hard to electronic copy reviews, with hard copy files being a requirement at the tail end of the review process. MRCZ draws closer to

launching its fully automated research review management system, and things look bright. We are also considering use of electronic stamps which could see the MRCZ further enhancing efficiency and convenience for researchers by reducing the need for in-person visits to the office (though important in some contexts). This will also reduce our overall carbon footprint. On the downside, meanwhile, hard copy submissions remain in use for our Masters and Undergraduate contingent until the review management system is up and running.

Anesu Gumbo is a Compliance Officer and MRCZ. You can reach him on agumbo@mrcz.org.zw

Introducing Zimbabwe Infectious Disease Modelling Consortium (ZIDMC): Promoting Local Modelling



Figure 9: Dr Tonderai Mapako (PhD), Principal Investigator - ZIDMC on behalf of the ZIDMC

Introduction

We are pleased to share the exciting development that has seen the birth of the first ever Zimbabwe Infectious Disease Modelling Consortium (ZIDMC). ZIDMC is a multi-institutional consortium dedicated to promoting data driven insights on disease

and health in Zimbabwe. It draws expertise from local, regional and global partner institutions. From humble beginnings, many individuals have selflessly contributed to coordinate, implement key activities, collaborate, and participate in current ZIDMC activities and the future prospects.

ZIDMC evolution

The journey by ZIDMC to date started with the advent of COVID-19 which heightened the need for intensified infectious disease modelling in Zimbabwe and globally. This saw the establishment of country-level and global modelling consortia such as The South African COVID-19 Modelling Consortium (SACMC) ^{9,10,11}, The COVID-19 International Modelling Consortium (CoMo Consortium) ¹² and the Vaccine Impact Modelling Consortium (VIMC) ¹³. In Zimbabwe, the Zimbabwe COVID-19 Research Group was established through the Ministry of Health and Child Care (MoHCC) structures of co-chairs of Epidemiology and Disease Control (EDC), National Institute of Health Research (NIHR) and Medical Research Council of Zimbabwe (MRCZ). Through multi-institutional participation, eight (8) Sub-Working Groups were established, and Modelling and Spatial Analysis was one such. The Modelling and Spatial Analysis Sub-Group then lead the efforts to establish the Zimbabwe Infectious Disease Modelling Consortium (ZIDMC). It worked closely with the National Coordinator for COVID-19 in the Office of the President and Cabinet, and routinely provided COVID-19 data analysis and interpretation.

⁹ <https://www.nicd.ac.za/diseases-a-z-index/covid-19/surveillance-reports/modelling-consortium-projections/>

¹⁰ http://www.sacema.org/node/National_COVID-19_Modelling_Consortium

¹¹ <https://sacovid19mc.github.io/>

¹² <https://como.bmj.com/>

¹³ <https://www.vaccineimpact.org/>

Why ZIDMC?

The COVID-19 experience showed that Zimbabwe needs a nationally coordinated overarching infectious disease modelling platform or consortium. The ZIDMC strategic philosophy to be an umbrella consortium available to the modelling ecosystem in Zimbabwe can strive to strengthen health and disease modelling for public health decision making in Zimbabwe and globally. It is evolving into an open platform available to modellers and other existing data analysis groups. It brings together modellers, policy makers, funders, partners, and collaborators on the national response to infectious diseases. The aim is to ensure that the national response to infectious diseases is “data driven”.

ZIDMC contributions and ongoing engagements

The ZIDMC managed to contribute to modelling insights during the COVID-19 national response. Locally, it drew experts from Zimbabwean Universities, UN agencies, NGOs and other partners interested in a data driven COVID-19 response. It also facilitated a local virtual workshop on COVASIM model application.

“My office will be very pleased to play an active part in the ZIDMC initiatives and also, in facilitating the necessary data access and linkages between the modelling team and the various government Ministries, Departments and Agencies (MDAs), and in advising on and contributing to the development of the long-term sustainability modelling plan.” Dr Agnes Mahomva, Health Advisor to the President and Cabinet.

ZIDMC has established links with South African Centre for Epidemiological Modelling and Analysis (SACEMA); Stellenbosch University, South Africa; Modelling and Simulation Hub, Africa (MASHA); University of Cape Town (UCT), South Africa); The Center for Epidemiological Modelling and Analysis (CEMA); University of Nairobi, Kenya), and VIMC (Imperial College London; United Kingdom) among other modelling hubs in the region and globally. There are ongoing funding engagements locally and through competitive grant applications.

ZIDMC brand

In order to facilitate dissemination, a consortium brand has been developed as shown in **Figure below**.



Figure 10: Brand identity for the Zimbabwe Infectious Disease Modelling Consortium (ZIDMC)

Our key activities

Our key activities include providing health and disease modelling capacity building for modellers, policy makers and users. We also aim to enhance institutional modelling collaborations and foster global modelling networking.

Conclusion

The ZIDMC is open to all the modelling pipeline ecosystem in Zimbabwe. Let us all contribute to its sustainability through various support.

ZIDMC Coordinating Team

The Principal Investigator (PI) of the ZIDMC is Dr Tonderai Mapako (tmapako@nbsz.co.zw | mapakot2008@gmail.com) from National Blood Service Zimbabwe. The Co-PIs are Prof. Tendayi Kureya (tkureya@mrcz.org.zw), Medical Research Council of Zimbabwe; Prof Simon Gregson (sajgregson@aol.com) and Dr Shungu Munyati (smunyati@brti.co.zw) from Biomedical Research and Training Institute. The Core Technical Support Team includes Mr Chenjerai Sisimayi (csisimayi@worldbank.org), Dr Rutendo Birri Makota (rutendobirri@gmail.com) from University of Zimbabwe and Mr David Zezai (dzezai@gmail.com) currently a PhD student in South Africa. The Medical Research Council of Zimbabwe Secretariat is providing the secretariat function for the Consortium. Kindly engage them on mrcz@mrcz.org.zw

Medical Research Council of Zimbabwe Online Submission System: A Glimpse into the Future



Figure 11: Vimbai Mukwekweze - Research Information and Compliance Officer

The Medical Research Council of Zimbabwe (MRCZ) is committed to promoting and facilitating high-quality medical research in Zimbabwe. Ethical clearance is an important step that required due diligence, timeliness, and protection of research materials. To streamline the submission process for research proposals, the MRCZ is implementing an online submission system. This article aims to guide researchers in accessing the system. I provide an overview of the requirements for making a submission.

Accessing the MRCZ Online Submission System:

To access the MRCZ Online Submission System, follow the steps outlined below:

1. Visit the official website of the Medical Research Council of Zimbabwe. The website URL is <http://www.mrcz.org.zw>.
2. Navigate to the "Online Submissions" section of the website. This section is in the main menu.
3. Click on the link or button provided to access the online submission system. This will redirect you to the login page or registration page, depending on whether you have an existing account.

Registration and Account Creation:

If you are a new user, you will need to create an account by following the registration process. This usually involves providing your name, contact information, and institutional affiliation. You may also be required to agree to the terms and conditions of using the system.

For existing users, log in using your username and password. If you have forgotten your login details, there is an option to recover or reset your password.

Submission Requirements:

Before making a submission through the MRCZ Online Submission System, ensure that you have the following information and documents ready:

- i. Research Proposal Summary – maximum of 4 pages
- ii. Research Proposal: Prepare a detailed research proposal according to the guidelines provided by the MRCZ. This should include the background, objectives, methodology, ethical considerations, and expected outcomes of your research.
- iii. Supporting Documents: Depending on the nature of your research, you will be required to attach additional documents such as informed consent forms, questionnaires, data collection tools, or letters of collaboration.
- iv. Ethics Review: Obtain ethical clearance for your research from relevant institutional review boards or ethics committees. You will need to provide the necessary documentation to demonstrate that your study has undergone ethical review from your institution.
- v. Budget: Prepare a detailed budget for your research project, outlining the anticipated expenses for personnel, equipment, supplies, and other relevant costs.
- vi. Curriculum Vitae (CVs): Submit up-to-date CVs or resumes that highlight qualifications, research experience, and any publications or presentations relevant to your

proposed research. **This is for the PI and Co-PIs**

- vii. Institutional Support: Obtain a letter of support or endorsement from your affiliated institution, confirming their commitment to facilitating your research and providing necessary resources.
- viii. Good Clinical Practices Certificates

The MRCZ Online Submission System offers a convenient and efficient way for researchers to submit their proposals for research projects. By accessing the system through the official MRCZ website and ensuring that you have all the required documents and information, you can navigate the submission process smoothly. Remember to carefully review the guidelines provided by the MRCZ to ensure compliance with the requirements.

FINANCE AND ADMINISTRATION



Figure 12: Mr. T Dube - Finance Officer

Our dear current and perspective researchers, welcome. Let me begin by thanking you all for making the requisite payments for your research. Without your support, we would be greatly incapacitated. Let me also share some information that will make future payments easier.

Payment process

The MRCZ Finance Office caters for all administrative payments for active or planned research. MRCZ has shifted from receiving cash payments at the office to solely accepting payment through transfers

or direct cash deposits to our bank accounts. Banking details are readily available from our Finance Office. The new payment methods minimise risk. You are also assured that there is paper trail with each payment that you make.

MRCZ requires that for all payments made, a copy of the proof of payment be sent accompanying the study application package via email to mrcz@mrcz.org.zw. For issuance of a receipt, the proof of payment should be sent directly to the finance office tdube@mrcz.org.zw. We strongly encourage all researchers who have made their payments to follow up with the MRCZ accountant's office for the issuance of their receipts.

Study Approval fees

Our current fee structure in USD or equivalent is as follows:

Service	Normal	Expedited
Research Application Fees	500	1000
Study Re-Opening	400	400
Study Amendment	100	200
Annual Renewal	100	200
Study Extension	100	200
PHD Study	200	n.a
PHD Flat fee 1% Admin Levy	100	n.a
MSC Study	50	n.a
BSc Study	10	n.a
Search Fees	10	n.a
Administration levy	1% of study budget	

Figure 13: Fee Structure

Administration levy

Administration levies are payable for all approved studies. The purpose of this levy is

to enable administration tasks such as study reviews inspections and other monitoring activities. This is calculated based on the submitted budget. A research budget which exceeds USD10,000.00 is levied exactly 1% of the total budget. Budgets under USD10,000.00 pay a flat fee of USD100.00.

Researchers often ask how to settle the Administration levy. There are various options: this can be a once off payment for the whole study or paid against the yearly budget as per the break down in the approved protocol. MRCZ requires written proof of funding from the funder for the research as part of research approval.

Fines

Regrettably, MRCZ often has to fine researchers for various misconduct. In order to deter researchers from doing unethical practice, the following penalties are charged by MRCZ:

- Late renewal: USD200 per month study is not renewed on time.
- Study search fee: USD 10 for students; USD100 for other researchers
- Late submission of Serious Adverse Event (SAEs): USD10 per each day a SAE report is delayed.
- Late submission of Adverse Event (AEs): USD10 per each day an AE report is delayed.
- Late submission of Protocol Deviations: USD50 per month
- Implementation of amendment without approval: USD100 per amendment per month.

Good Clinical Practice Inspections in 2023

By Sithembile Ruzario and Natasha Tsandukwa



Background to Good Clinical Practice in Zimbabwe

MRCZ is responsible for reviewing and approving health research in Zimbabwe. In addition to this function, the Council actively and passively monitors and inspects ongoing studies to ensure compliance to local and international guidelines. MRCZ's monitoring guidelines are based on those agreed by The International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH) on Good Clinical Practice (GCP). ICH GCP is an international ethical and scientific quality standard for designing, conducting, recording and reporting trials that involve the participation of human subjects. Compliance with this standard provides public assurance that the rights, safety and well-being of trial subjects are protected, consistent with the principles that have their origin in the Declaration of

Helsinki, and that the clinical trial data are credible. The inspections play a pivotal role in identifying potential risks to participants, mitigating risks and create a safe research environment for the participants.

Active monitoring

The MRCZ inspectorate (secretariate, members of relevant subcommittees and invited experts) routinely actively carries out GCP inspections. Inspections entail checking of study documents for adherence to approved protocols; visits to research sites and interviewing of study staff and research participants. Sometimes, the inspectorate will call for an ad hoc inspection following complaints by participants, major deviations from approved protocols or severe adverse event reports.

During 2023, routine GCP inspections were conducted for 5 active clinical trials. Generally, these studies were being implemented well. MRCZ credits this to the mandatory GCP training that is required before a study commences, as well as protocol trainings which keep study staff in check and up to date with what is required of them. Most studies were being run from Harare, and MRCZ statistics can confirm that the Capital City is the hub for health research. Sites in Harare were easy to access, and planning around inspection dates was not difficult. Regardless, MRCZ insisted on visiting sites out of Harare to check compliance there as well.

The inspectorate this year made an effort to reach study sites that are in the peripheral areas of the country. The idea was to ensure that guidelines and requirements were being adhered to in the same rigour as seen in Harare. MRCZ teams managed to reach as

Site Inspection Process

Before the Site Inspection: Before carrying out a site inspection, the MRCZ confirms an inspection in writing. An announcement letter is sent to the Principal Investigator (PI) stating whether is a “for-cause” inspection or a routine inspection. A pre-inspection meeting is held, and the following done:

- A special site inspection checklist shared.
- Date of inspection is agreed, ensuring availability of key study staff.
- Research team asked about an appropriate workspace for the inspectors.
- List of documents for checking is shared- including study related documents to be available.

Inspection Day: Opening meeting to confirm type and scope of the inspection, followed by facility tour taking into cognisance the MRCZ checklist. This is then followed by interviews with study staff and study participants if available. Lastly, a review of all study documents is conducted. At the end of each site inspection, the MRCZ carries out a debriefing meeting, sometimes called a closing meeting, with the research site team. Key issues identified, as well as recommendations on appropriate action to be taken are discussed and actions recommended as the site awaits final report. Timelines to rectify some of the findings are drawn and agreed upon.

What is checked?

- Verifying that the rights and well-being of study participants are protected.
- Verifying that the reported research data are accurate, complete, and verifiable from source documents.
- Verifying that the conduct of the research is in compliance with the approved protocol, GCP and the MRCZ requirements.
- Verifying that study team is implementing research as per approved protocol; and
- In the case of unscheduled visits in response to participants complaints or reported unexpected events; verify authenticity of complaints.

Post Inspection: The site inspection report is tabled during the ensuing monthly Ethics Committee meeting. Follow ups are done as per agreed timelines to ensure implementation of

far as Mutasa, (Hauna District Hospital, Hauna Clinic, Mutasa Clinic) and Beitbridge District Hospital. At these areas, study sites were operating under satisfactory levels of GCP compliance. In some cases, teams were impressed by the systems and processes set up to ensure quality data collection and participant care.

Passive Monitoring

Passive monitoring is standard and guaranteed for all active protocols. This is achieved through the review of protocol deviation and severe adverse event reports, and the review of annual renewal applications. It is through submission of these documents that MRCZ is able to note study progress, as well as pick up issues of concern that might need attention.

Tips and pointers- preparation for an inspection

To the researcher who has not yet had the ‘*pleasure*’ of receiving an inspection notification, this section is definitely for you. The for the seasoned researchers, these are timeless hacks on how to adequately prepare for a GCP inspection: -

- a) Download and familiarize yourself with the updated

- inspection guide accessible from our website www.mrcz.org.zw
- b) From the onset of your study, create regulatory binders or folders that are clearly labeled and well kept to avoid panic when an inspection notification is issued.
 - c) Train all study staff on ICH-GCP and the approved protocol (keep records of all trainings).
 - d) Develop internal quality assurance and control systems. Alternatively, conduct internal monitoring and inspections routinely. The quality of data and monitoring preparedness will significantly improve.
 - e) Adhere to Good Clinical Practice, Good Documentation Practice, MRCZ and other local requirements as given to you at the start of your study. Check the quality of your work, and check research participants, feedback.

Common issues from past monitoring

The following are common issues identified through passive and active monitoring:

- Failure by the research team to follow what the protocol says eg failing to follow inclusion and exclusion criteria.
- Failure to appropriately document and report any medically necessary protocol deviations and reporting and management of adverse events
- Inadequate record keeping eg non-documentation of study related training and working practices.
- Beaches of Informed Consent:
 - Study staff signing as witness.
 - Study staff signing on behalf of participant.
 - Incomplete consent form

- Specimens placed inappropriately, e.g. fridges along corridors where they can be opened by anyone; specimen temperatures not checked and sometimes fridges not under lock and key.
- Inadequate accountability for the investigational product.
- Implementation of research amendments without MRCZ approval
- Conducting research without MRCZ approval
- Filing system being in disarray.
- Poor data storage facilities that are not secure, fire, dust, and waterproof
- No study/ work related meetings done to show effective study coordination.

Conclusion

Inspection activities are never fault-finding missions, they exist to monitor, support, and promote health research in Zimbabwe. They continue to be exciting; we always learn something new. The same should apply to researchers, the myth around them being difficult and oppressive should be washed away. Demanding? maybe a little, and rightfully so. But difficult? Not at all. We look forward to the 2024 schedule, hoping to meet and interact with more of our researchers.

Site inspections employed by the Medical Research Council of Zimbabwe are effective in auditing ethical practice. If these inspections are done to every study, the ideal situation, this can lead to improved ethical conduct of protocols by research teams as well as improved protection of the rights of research participants.

Revolutionizing Healthcare: The Power of Artificial Intelligence



Figure 14: Lowance Gomo

Introduction

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans. It involves the development of computer systems capable of performing tasks that typically require human intelligence, such as understanding natural language, recognising objects, making decisions, and solving problems. AI research was founded at a workshop held in 1956 at Dartmouth College and among the founders are Alan Mathison Turing, together with John McCarthy, Marvin Minsky, Allen Newell, and Herbert A. Simon.

AI has emerged as a transformative force across various industries, and its impact on healthcare is nothing short of revolutionary. From improving diagnostic accuracy to enhancing patient care and streamlining administrative tasks, AI is reshaping the landscape of the healthcare sector. This article explores the diverse applications of AI in health, highlighting its potential to revolutionize healthcare delivery and improve patient outcomes.

1. **Enhancing Diagnostic and Disease**

Detection: AI algorithms have demonstrated remarkable capabilities in analysing complex medical data, such as medical images, genomic data and patient records. Machine learning models can identify patterns and subtle anomalies that may elude human detection, leading to more accurate and timely diagnoses. For example, AI powered algorithms have shown impressive results in detecting early signs of diseases like cancer, enabling early intervention and potentially saving lives.

•

2. **Personalised Medicine and**

Treatment: AI holds great promise in advancing personalised medicine, tailoring treatments to individual patients based on their unique characteristics and medical histories. By analysing vast amounts of patient data, AI algorithms can identify patterns and predict treatment outcomes, helping healthcare providers make informed decisions. This approach not only improves patient outcomes but also reduces healthcare costs by avoiding unnecessary procedures and treatment.

3. **Drug Discovery and Development:**

The process of discovering and developing new drugs is time-consuming, expensive and often inefficient. AI is transforming this landscape by expediting the drug discovery process. Machine learning algorithms can analyse vast amounts of biomedical data, including genetic information, molecular structures, and clinical trial results, to identify potential drug candidates and predict their efficacy. This enables researchers to focus their efforts on the most promising candidates, accelerating the development of new treatments.

4. **Intelligent HealthCare Systems:** AI powered systems are streamlining administrative tasks and improving the efficiency of healthcare operations. Natural Language Processing (NLP) algorithms enable intelligent medical coding and documentation, reducing the burden on healthcare professionals and minimising errors. AI chatbots and virtual assistants provide patients with round-the-clock support, answering common inquiries and directing them to appropriate resources. Additionally, AI algorithms can analyse large volumes of data to optimise resource allocation, improving hospital workflows and reduce wait times.

5. **Remote Monitoring and Telehealth:**

The integration of AI and remote monitoring technologies has revolutionised healthcare delivery, particularly in remote or underserved areas. AI-powered devices can continuously monitor patients' vital signs, detect abnormalities, and alert healthcare providers in real-time. Telehealth platforms leverage AI to

enable remote consultations, allowing patients to receive medical advice, diagnosis and treatment from the comfort of their homes. This not only enhances access to healthcare services but also reduces the strain on healthcare facilities.

Advantages of AI

- *Automation and Efficiency:* AI can automate repetitive and time-consuming tasks leading to increased productivity and efficiency. It can perform tasks with accuracy and at a much faster rate than humans.
- *Decision Making:* AI systems can analyse large amounts of data, identify patterns and make data-driven decisions. They can provide valuable insights and assist in making better decisions.
- *24/7 Availability:* AI systems can work round the clock without getting tired or needing breaks. This allows for continuous operation and availability.
- *Handling Complex Tasks:* AI can handle complex tasks that are difficult or dangerous for humans. For example, AI-powered robots can be used in hazardous environments, exploration, or space missions.
- *Personalisation:* AI can analyse user data and behaviour to personalize services and recommendations.

Disadvantages of AI

- *Job Displacement:* AI and automation can lead to job loss in certain industries. Tasks that were previously performed by humans may be replaced by AI systems, leading to unemployment or the need for reskilling.
- *Lack of Human Judgement:* AI systems are based on algorithms and

data which may lack the human ability to understand context, emotions, or morality. This can lead to biased or ethically questionable decisions.

- *Dependence on Technology:* Over-reliance on AI systems can make human dependents on technology and reduce human skills and abilities.
- *Privacy and Security Concerns:* AI systems often require access to large amounts of data, raising privacy concerns. There is also the risk of AI systems being manipulated or hacked, leading to security breaches.
- *Cost and Complexity:* Developing and implementing AI systems can be expensive and complex. It requires substantial resources, expertise and infrastructure.

It is important to note that AI technology is still evolving and there are ongoing discussions around its ethical implications and impact on society.

Ethical Issues

AI is ideal, it goes with the times, but one major ethical issue is lack of moral compass. AI is "GIGO" – Garbage In Garbage Out. As the technology rapidly moves from sci-fi to real life, concerns about its safety have been echoed across the world. Particularly, in an industry where the ethical foundation of "do no harm" is sacrosanct, we must evaluate whether AI for health is ultimately an opportunity or a threat.

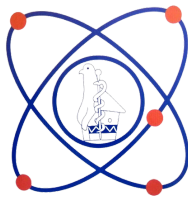
Conclusion

AI is reshaping the healthcare landscape, empowering healthcare providers and improving patient outcomes. From enhancing diagnostics and personalising

treatment to expediting drug discovery and streamlining healthcare operations, AI is revolutionizing healthcare delivery. As AI continues to evolve and its capabilities expand, it is crucial to ensure ethical considerations, data privacy, and regulatory frameworks are in place to maximize its potential benefits while minimising risks. With continued advancements and collaborations between AI experts and healthcare professionals, the future of AI in health holds tremendous promise for transforming patient care and ushering in a new era of improved healthcare outcomes.

Resources used

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