



LeMSIC

Lebanese Medical Students'
International Committee
اللجنة الدولية لطببة الطب في لبنان

LeMSIC Policy Document

Access to Research and Research Education

Proposed by: the National Officer on Research Exchange and
the Vice-President for External Affairs 2020-21

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Policy Statement

Introduction:

The modern-day practice of medicine worldwide is guided almost entirely by the principle of Evidence-based medicine (EBM). The evidence for this principle is found in the scientific literature and is essential for all clinical practitioners, herein, advising patients on decision making with input based on evidence should be the minimum for primary care physicians. Regardless, studies show that only 18 % of clinical recommendations are based on high-quality evidence.

EBM could not exist without access to research and research education given that literature provides an often-used core of information about disease etiology, natural history, difficult questions and prognosis.

Further, a COVID-19 Working Group identified the gaps in the global research infrastructure, where the issues ranged from building better analytical support systems, conducting randomized controlled trials with the required scale, and increasing the number of publications in peer-reviewed journals.

Hence, it is important for us to understand how we can bridge this gap from accessing research publications to accessing research knowledge.

LeMSIC Position:

The Lebanese Medical Students' International Committee (LeMSIC) acknowledges the importance of EBM principles and strongly believes in access to research and research education as solutions for the inequities in the current research and knowledge systems, bearing in mind the added educational and economic obstacles faced in Lebanon. LeMSIC also affirms that open science practices and a comprehensive research curriculum should be implemented worldwide, with a pressing need for additional work nationally. This will ensure equitable access to information and adequate medical development of students, future physicians, since they will experience research early on and acquire its competencies such as scientific thinking, critical appraisal, data interpretation, ethical considerations, risk analysis, and study management.

LeMSIC calls to Action:

The Lebanese government to:

- Allocate funds for health research and conduct studies around socio-economic issues that would guide public communication and decision making.
- Invest in national science technology and innovation systems, in computing facilities, in reliable internet connectivity and bandwidth and digital public health infrastructure.
- Encourage Open Access practices within publicly funded research projects and foster equitable public-private partnerships for Open Access.
- Support and encourage Lebanese schools to incorporate research early in the curricula to enhance critical thinking and follow up with the advancements at an early age.



Medical Schools to:

- Invest in capacity building for access to research, research education competencies, information and data literacy, and open access awareness.
- Integrate research competencies, in accordance with the TDR global competencies framework, in the medical education curricula as a mandatory topic.
- Provide medical students with access to a broad repository of journals, data, articles and manuals.
- Provide students with research internship opportunities early on in their medical careers and facilitate the contact between medical students, doctors, research facilities and researchers in order to provide local and national research opportunities for medical students.
- Perform student-centered evaluation of their current research programs to assess their impact and identify their gaps. Share the findings to help other medical schools and to ensure transparency
- Ensure academic recognition of SCORE Exchange program and offer support with both human and logistical resources.
- Collaborate with Open Access Journals in order to promote early exposure to medical research and educate students about the opportunities and benefits that come with open access research

International Organizations (mainly WHO and UNESCO) to:

- Establish and encourage regional and global networks for information-sharing and collaboration between researchers, and develop platforms for dialogue between researchers and policy-makers
- Endorse SCORE Exchanges program in order to increase academic quality and ensure academic recognition of this program.
- Allocate funds and conduct studies around socio-economic and health issues while ensuring meaningful youth engagement in data collection and analysis.

IFMSA NMOs and LeMSIC local committees to:

- Promote inter-NMO and inter-SC research collaborations, in order to promote local, national, regional and international research opportunities, promote advocacy efforts on access to research and research education, utilize research findings to achieve IFMSA priorities and tackle different SC focus areas.
- Organize research workshops, in accordance with the TDR research competencies framework, to share knowledge and exchange expertise
- Promote inter-NMO collaborations to implement a bilateral Research Exchange Program accessible to all medical students regardless of financial, cultural and geographic barriers.
- Work together with educational institutions to ensure a sustainable collaboration. And advocate to universities for research courses in medical curricula and increase the participation of students in research projects.

Position Paper

Background:

Research is the basis of all the knowledge we know today. Clinical practice guidelines stemmed out of high-quality evidence-based research. And these have been playing an integral part in maintaining the value of medical practice.[2] Research is also typically used in policy making to guide the approach towards implementation of the policy and to improve health and wellbeing.[1]

There is a major discrepancy between the developed and developing world with regards to research. The Eastern Mediterranean Region (EMR) has suffered for quite a while from sociopolitical upheaval. This has resulted in deficient health systems. Lack of investment in health research and skills immigration have largely led to low research productivity.[4] EMR health systems have been dependent at large on western research that are contributing to much of the publishing body. Journals often have expensive subscriptions; as a result, developing countries are put at a disadvantage in gaining access as compared to developed countries. Researchers don't have enough material to conduct their own initial research or even training. [3] As a result, research that addresses health challenges, proposes new topics and modalities to explore, and calls organizations and governmental bodies to action is missing. [4]

There is no research education without access to research, and medical trainees are deficient in both, particularly in developing countries. Open access is a global modality emanating from issues of financial disparity and largely revolutionizing the way we do research. The level of access to research in the developing world is deficient and fickle, and open access has great potential in nurturing sustainable development of secure research systems. [3]

Discussion:

Access to data and knowledge advancement

Knowledge can only advance if information is free to spread and reach many. It is of little value if it is not shared. It is only when a researcher shares their research data when they will be contributing to knowledge production. When information is disseminated, it will have practical implications in science, society, and clinical practice. Limiting access to data can have extensive costs on knowledge production. As soon as the data is formulated in a comprehensive and complete manner, it is more efficient to have it shared with other researchers instead of having them do the research all over again. Thus, resources would be allocated where they are needed. [4]

Economically, innovation is dependent on research investments. So, when research is impaired by restricting access to it, this will reflect to a large extent on economies

worldwide. Adding to that, international collaborations among researchers are hindered as well. When researchers don't have access to data, they won't be able to know if this data is of any value to them or to their research. As a matter of fact, verifying the accuracy of the data will be hindered as well. This would be jeopardizing the validity of research and the trust that the scientific community puts in it. On a final note, researchers in economically- deprived settings may not be able to access data and this reflects on public health, economic output, and society's welfare. [4]

Creating knowledge involves a rigorous, continuous, and snowballing progression. If one part of this progression is missing, the snowball will stop from rolling. In other words, ensuring access to data allows researchers to build up on already existing knowledge from others and generate additional knowledge. Instead of having the wasteful experience of several researchers studying the same topic and reaching the same conclusions, we would be having researchers building new knowledge from already accepted knowledge. Therefore, openness promotes the development of knowledge. [8]

The response to the COVID-19 pandemic serves as a testimony for this statement. The United Nations Educational, Scientific and Cultural Organization (UNESCO) set up Open Education Resources (OER). These contained open access to peer-reviewed journal articles with scientific information that aim to promote faster research in reaching a vaccine or medication, provide the necessary information to guide policy making strategies in public health, and educate the public while safeguarding against misinformation [5]. As a result, this time researchers were able to reach a vaccine from development to deployment in "lightning speed" [9].

Most frequently, the terms and conditions of a research grant or contract necessitate authors to provide access to their data. In providing this open access, the primary barrier to face is that of confidentiality and anonymity. Before sharing the data, any identifier that may threaten the anonymity of the sample must be eliminated prior to data release. There have been growing efforts to protect confidentiality while permitting sharing of data.[4]

For some medical research data, privacy and confidentiality obstacles can be overcome by removing identifiers prior to the private sharing of data or the public release of data. However, this remains an area of ongoing concern and investigation. Efforts are now under way to make medical research data available while maintaining anonymity or confidentiality of the participants. [4] One example is de-identification of patient data. Developing de-identification systems is imperative in data sharing and creating guidelines that will optimize the success and effectiveness of their use. Researchers and their institutions should be obliged to follow these indications to allow knowledge advancement and protect patient privacy [10]. However, these efforts are set by the data repository itself. At the same time, there are growing concerns regarding data ownership and these are met by general consensus that patients should be owners of their data. They are allowed to share it if they consent, and to keep it private if they wish to do so [11].

A major aspect controlling the accessibility of data is its funding. The data generated from a study that is funded by public agencies is usually made publicly available. [6] On the other hand, privately funded research takes a different approach. In this sector, the researchers usually withhold their results as a prospective source of profitable benefit such as developing a patent or product and they would invest in producing this data to a lesser extent, because they are not the sole owners of it.[7]

Researchers want to release their results. Disseminating them plays a major role in promoting their recognition, the recognition of the knowledge and its advancement. However, researchers have had scarce incentives to make the data they produce available, even though they are highly valuable for other researchers and ensuring access to data can ensure the swiftness of knowledge production. [4]

Evidence-Based Medicine

With the constantly growing literature base, improvement of modern medicine and the limited time among physicians to uncover new findings, evidence-based medicine (EBM) shows the perfect ground for healthcare professionals to rely on, upon clinical questions [12].

In fact, knowledge, comprising the latest and best available research evidence, is a necessary groundwork for making informed healthcare policy decisions in the care of individual patients [13;14]. The ultimate aim of the EBM movement is to increase the standard of care in patient's management by combining clinical experience and patients' values with high quality clinical research [15]. And with no better example than the combat against COVID-19, access to research and its dissemination to everyone in the society, or so-called open science, proved the need for unrestricted access for publications, data sharing, international collaborations and interoperability of networks of large electronic health records providers [16].

The practice of EBM by physicians, is a lifelong process that requires self-reliant, problem-based learning, that could be learnt and skilled throughout their medical education, early in life, portraying the crucial aspect of research education. The development of systematic reviews and meta-analyses has been a cornerstone in the movement of EBM that summarized the best available evidence in multiple published studies, regarding a specific topic, after critically analyzing them [17]; helping physicians to access high quality information in a reduced amount of time.

The mean number of published journal articles in MEDLINE between 1978 and 1985 exponentially increased by 46% in 2001, where we noticed a huge shift from basic science to clinical research [18], only to outline the importance of research education among physicians and especially medical students, early in their career, that certainly facilitate them to keep ahead of new achievements in medical research by critically analyzing, evaluating, appraising and assessing studies.

Incorporating EBM in developing countries, with limited resources, is surely a challenge, especially with language barriers, limited resources and time availability. A model in Perú took in place where 5 intensified EBM courses running through 5 years, to students and physicians in training, consisting of 3 days of 3 sessions of 45 minutes (significance of EBM, study design, basic statistical concepts) followed by 3 interactive workshops (discussing case scenarios, critical appraisal of a preselected article and guided discussion). This model showed significant increase of self-reported

improvements, and readiness to incorporate them in clinical practice, after personal evaluations. Other models might also prove beneficial, but they won't surpass the difficulties and barriers that developing countries, like Lebanon, have to face [19].

Basic research competencies

A “research competencies” curriculum

Research education plays a crucial role in medical development. It has become evident that medical students are growing a passion for research and they are demanding its integration into their educational journey. However, the medical curricula worldwide still lack formal and informal training around required competencies [20]. This applies to Lebanon, where a recent AUB study around undergraduate research in the medical field showed that “the majority of students had a positive attitude towards medical research in terms of medical research being valuable, exciting, enjoyable, complicated, and time-consuming”, however, they still identified multiple barriers [21]. Research education is becoming a necessity in Lebanon, where 78.3% of the students viewed lack of training and 76.6% considered lack of mentoring and guidance as research obstacles [21].

Adopting a “research competencies” curriculum is challenging to say the least, but this does not hinder its feasibility. The WHO and its partners (UNICEF, UNDP, the World Bank) developed a “TDR global research competencies framework for clinical research”. This document does not only organize the research process, it also builds the grounds for a comprehensive, standardized and flexible training curriculum [22].

The framework discussed 50 competencies divided into 5 major groups:

1. Scientific thinking (number of competencies: 9)

This part aims to introduce students to the research design, planning, and interpretation of results. Hence, students need to acquire a dual knowledge of health and research. First, they must understand the topic of a study to grasp its purpose and develop its components. At the same time, to participate in research, they should identify study methods, designs, data sources, funding sources, etc. Individuals must also develop skills to write all the research-related documents including but not limited to proposals, quality management system, questionnaires and other study forms. In addition, qualitative/quantitative data analysis and findings dissemination methods should be covered. [22]

2. Ethics, quality and risk management (number of competencies: 10)

The focus of this group revolves around participants' safeguard, quality assurance and research regulations. Therefore, the students must comprehend ethical theories applied in clinical research; identifying the harms and benefits of a study and managing the balance between risk and safety. Individuals should also know and apply the good clinical practice (GCP) guidelines, recognize the importance of subject protection and understand how to ensure

quality control. Finally, students should be introduced to research governance, requirements and guidelines. [22]

3. Study and site management (number of competencies: 13)

This part is based on the practical aspects of executing a study from start to finish. It tackles feasibility and risk assessments, progress and budget tracking, communication management and close-out activities organization. In addition, students will learn the basics of staff management along with resources planning and coordination. [22]

4. Research operations (number of competencies: 10)

The purpose of this group is to ensure the implementation of one's clinical and scientific experience into research. It covers data management (data collection, entry, verification, and interpretation) in addition to participants' enrollment, confidentiality and consent. Students must also have the chance to apply their understanding of pharmacology, biomedical products and lab work. [22]

5. Professional skills (number of competencies: 8)

This part sheds light on some expertise used while conducting research, including cognitive skills, strategic leadership, interpersonal skills, language and communication, organization, record keeping, IT and work ethics. This set of competencies ensures smooth work and efficient communication between research members. [22]

There are several research program initiatives worldwide and studies [24][25][33] showing their effectiveness. The great majority of the students rated their participation positively and noted an improvement in their critical thinking as well as their knowledge of the multiple research steps [26]. They also noticed an advancement in their self-efficacy and motivation to participate in future studies [25]. Some of them even got the chance to publish during their time at the program [27]. The latter should inspire involved parties to try implementing such programs and benefit from their evaluation.

The TDR research competencies framework offers an example of an extensive curriculum where students are offered equal opportunities to grow and gain research-related experience. It includes theoretical and practical learning that different educational bodies can apply.

How accessible is research and research education throughout Lebanon/ EMR Region

The idea of research accessibility, throughout the world, is impossible to measure, due to the lack of research studies focusing on this particulate matter, therefore this would be even harder in Lebanon where little to no studies have tackled this topic.

Europe has in total, the largest output of publications, being 24.34% in 2018 compared with 24% for all the other countries outside the top 10 [28]; but interestingly we're also noticing a shift in 2018 where developing countries like Iran and others are setting big

annual growth rates in publications [29]. Although Lebanon doesn't stand out in total publications, it has a place, being 35th in the top 40 countries with highest publications per capita in 2012 [30].

The regional and internal conflicts of Lebanon as well as the inadequate investments and funding for research and development have plunged Lebanon in all aspects of development compared to other MENA countries, especially in global research, scientific knowledge and health sector. In an analysis of biomedical publications from 1985 till 2004, Lebanon has published a total of 1964 articles, indexed in Medline compared to 5962 in Saudi Arabia [31]. The top 3 universities with the highest number of scientific publications are AUB first, LU and then USJ. Despite all sorts of constraints in particular internal conflicts, Lebanon noticed a dynamic improvement in the number of publications output and research interest from 1993 to 2003, where it has tripled, ranking Lebanon in third in the number of publications in the MENA region [32].

Lack of research culture as a major problem for conducting health research, insufficient research skills for rigorous research, delay and difficulties of IRB approvals and the absence of control on research ethics and finally the huge challenge of accessing data; these were all themes that emerged from a qualitative study on academics, humanitarian workers and public sector officials concerning the capacity of health research in Lebanon [33].

Moreover, among Lebanon's population of 4,143,101, the number of Internet users has grown from 300,000 in 2001 to 1,201,820 in 2011. In other words, 29.0 percent of the population has access to the internet presently in Lebanon, and the world of research [34]. Between 1993 and 2004, the global share of Lebanon's scientific publications climbed from 0.10 to 0.35, with medical research having the biggest share in disciplines [35]. This small share, although increased, is due to concentration of research in a small percentage of education institutions, absence of collaborations even though the number of universities is increasing and finally general disinterest and discouragement of the research culture [32].

Benefits of research for medical students

When the medical system has shifted to an evidence-based approach, students must adapt to the new era and acquire adequate skills. It appears that research can help students gain such competencies. Therefore, their early participation in research presents a set of benefits extending to professional and personal levels.

Several studies [23][24] showed that engaging in research ensures the application of EBM principles and the collection of diverse expertise. A Lebanese study showed that more than 98% of students viewed research as an opportunity to develop critical thinking, scientific knowledge, and career opportunities [21]. It also permits the improvement of critical appraisal, data interpretation, problem-solving, public speaking, writing, and efficient expression of thought. These same studies proved that research helps in career planning. While working on a study, students expand their knowledge on a topic, unravelling new interests and possible specialty choices. A study around a research-related program (the scholarly concentration program) [26] demonstrated its positive influence on both self-efficacy and engagement in a research career. It proved that participants at the end of the program had a better understanding of their interests and career goals, with an increase in the possibility of carrying on with research. Research experience ensures as well a stronger application to

residency programs, fellowships, or any post-graduate position. It also prepares the students for future professional responsibilities. At the same time, it provides networking opportunities since students will communicate with mentors and pioneers in the field.

Even on a personal level, such experiences allow medical students to enhance time management, patients' care, and health promotion. Research-active physicians proved to offer better health care services. Nowadays, patients can obtain health information using the internet and it comes down to the healthcare workers including medical students and physicians to stay up-to-date and disseminate accurate health knowledge. Therefore, students early on should be involved in the research field and know how to appraise literature.

Research funds

Any scientific project requires research funding to keep it moving. Each research project has its costs, such as for materials, equipment, and publication of scientific findings. [36] In 2021, the average price for a health science journal was \$2,460 and for a chemistry journal was \$6,681. However, the prices vary and rise each year.[37] Therefore comes the importance of research grant funding that can be done in various ways. In fact, most of the research grant funding in the USA comes from nonprofit organizations and companies such as pharmaceutical companies, and 36% of research fundings comes from the government. [36]

All types of fundings are crucial in order to advance scientific knowledge and produce more research output, however, it is important to note that pharmaceutical company funding systematically biases the clinical trials literature in favor of new drugs, therefore in order to mitigate this problem and benefit from pharmaceutical fundings there should be stronger disclosure requirements, rigorous trial reporting standards, and trial registries. [38]

Over the past twenty years, various countries have extended their public research funds. Ventures by Arab countries have shown a greater power and dominance over the national research system, building domestic capacity and directing research endeavors. The focus on such fundings strengthens the country's position in international rankings of academic quality, and encourages the production of knowledge and innovation. In addition, it helps in achieving the sustainable development goal (SDGs) [39].

However, Arab countries are still considered lacking in their research endeavors. They are only accountable for 1% of the world's research while they are home to 3% of the world's population. [40]

Providing funds for research projects proves to be more challenging in Lebanon, especially with the looming shadow of the economic crisis [41].

As a matter of fact, Lebanon is known for its excellent private healthcare and education system capability. However, due to the country's current situation, Lebanon is facing a dangerous depletion of economic and human resources. Thus, Lebanese human capital is collapsing. Over the years, we witnessed a devaluation of the Lebanese lira against the US dollar negatively influencing the banking systems, private universities, and the entry to education and healthcare.[41]

Moreover, the Beirut port explosion on August 4th 2020, weighed heavily on the medical system causing severe damages to the neighboring hospitals, medical centers, and caused a deficiency in medical supplies [42].

In addition, due to the internal and external pressure that Lebanon is witnessing, more than 380,000 immigration requests to western countries have been submitted in the foreign embassies. The immigration request number is still increasing day by day due to the current economic crisis which will eventually lead to a brain drain [41].

In fact, due to the lack of job opportunities, and due to the massive amount of damage in the healthcare, education, and banking systems, the Lebanese were left with one solution, immigration. This wave of emigration would affect Lebanon's healthcare, education and research system through the loss of its human capital. [41]

Adding to the economic crisis and the loss of human capital, Lebanon faces many research challenges. In fact, most scientific research in Lebanon is centered in a very small number of higher education institutions, there is an absence of significant Ph.D. programs, low national budget for research, limited clinical research/trials, and lack of collaboration between different researchers or groups working on related topics. Therefore, comes the need for national research funding in order to harvest a competitiveness that is appropriate to attract further funding, encourage and provide incentives for research in the fields of health and properly invest in human resources and in the potentials of youth. [43]

LeMSIC and Research Education

In the era of evidence-based medicine, research is becoming a more present and indisputable element in the medical curriculum. In fact, critical thinking and research skills can be developed at an early age by having a research-based integrated medical curriculum, and by providing medical students with 'hands-on' experience in participating in research projects, under the supervision and mentoring of research-qualified scholars [44].

Acknowledging the value of research, one must be armed with adequate skills to enter the scientific world. This is why the Standing Committee on Research Exchange (SCORE) in LeMSIC Lebanon offers many programs, workshops and activities to build the capacities of medical students and equip them with the necessary tools to dive into the research world and become young researchers themselves [45]. Some of these projects are listed down below:

- Coordinate the International Federation of Medical students Association (IFMSA) Research Exchange program:

The IFMSA Research Exchange Program was founded in 1991 and is a non-profit program managed through IFMSA that offers medical students the opportunity to deepen their knowledge in the specific area of their research interest. This program was designed to enable medical students worldwide from the different IFMSA National Member Organizations (NMOs) to experience research in different parts of the world and to develop both culturally sensitive students and skilled researchers intended to shape the world of science.

SCORE has run a program with more than 83 active NMOs, 3000 research projects and over 2400 medical students participating yearly worldwide. In LeMSIC Lebanon around 20 LeMSIC members per year are offered to participate in this program.

The program offers these medical students the opportunity to take part in research projects abroad for a defined period of time (from 4 to 8 weeks) under the guidance of supervising tutors who introduce exchange students to the basic principles of research, including literature search, data collection, scientific writing, laboratory work, statistics, and ethics [46].

The offered research projects fall under four categories:

- Basic laboratory research (lab work, literature study)
- Clinical research with Lab work (studying a highly specific clinical topic combined with basic research in lab)
- Clinical research project without Lab work
- Global action project (GAP) necessary skills for prevention, detection and treatment of endemic diseases or diseases that affect the majority of the population in a country

Upon completion of the program, students may be required to prepare a written scientific report, exchange report, abstract, or scientific poster.

The academic recognition of the research exchange program varies among medical schools. Some universities recognize exchange projects as a part of their curriculum and some universities award their exchange students with academic credits. There are cases where the program is officially recognized and supported by the medical school/university. In IFMSA 36.58% of NMOs out of 82 NMOs in total have any kind of academic recognition in more than 60% of their LCs [47]. However, in Lebanon LeMSIC is still working on the accreditation of our Research program.

Additionally, IFMSA Research Exchange Program is endorsed by several institutions such as, The World Federation on Medical Education (WFME) which recognized the IFMSA Research Exchange Program to be a professionally organized and absolutely worthy of endorsement and of being recommended to medical schools/faculties worldwide program, The Trainee Association of the European Society of Clinical Microbiology and Infectious Diseases (TAE ESCMID), the European society for emergency medicine (EuSEM), the Federation of European Neuroscience Societies (FENS), the 'Société internationale de chirurgie orthopédique et de Traumatologie' (SICOT), the International Federation of Gynecology and Obstetrics (FIGO), International Pediatric Association (IPA), the World Federation of Neurosurgical Societies (WFNS), the World Federation of Societies of Anesthesiologists (WFSA), the World Organization of Family Doctors (WONCA), Cardiovascular and Interventional Radiology Society of Europe (CIRSE) and the World Psychiatric Association (WPA)[48][49].

- Provide local and national research opportunities for our members

Similarly, to the IFMSA research program [46], LeMSIC developed a national research program in order to link Lebanese medical students with tutors on a specific research project. This program aims to promote inter-university collaborations and provide LeMSIC members with various research opportunities [50].

- Provide Capacity Building opportunities [51]

In order to build the capacity of our members on access to research and research education LeMSIC hosts many capacity building events (webinars,



educational activities, trainings/sessions...) one of them being the National Research Camp NRC.

The NRC is a four-day online camp that aims to provide a platform that connects professionals in the world of research with medical students aspiring to contribute to this field in the future.

- Integrate research in activities that tackles other Standing Committees focus areas
- Conduct Awareness campaigns, and worked on Open science advocacy



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