


COMMENTARY

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# Developing a national pharmaceutical research strategy in Lebanon: opportunities to bridge the gaps and reach the goals

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## Abstract

Pharmaceutical research can be structured into clear national strategies that optimize patient health and foster innovation. The objectives of this document are to assess the need for a national pharmaceutical research strategy based on the current situation in Lebanon, to identify the strengths and weaknesses of pharmaceutical research in Lebanon, and to suggest a pharmaceutical research strategy for Lebanon, including goals and objectives. In Lebanon, in the absence of a national health research policy, pharmaceutical research is conducted in academia or hospitals, although projects are the result of personal or team initiatives that should be organized to better serve the needs of the country. Many strengths of pharmaceutical research were identified, such as the pharmaceutical workforce and academics who are willing to contribute to research, while the implementation of the national pharmaceutical strategy represents an important opportunity to promote research. Among the weaknesses is the lack of research culture in some institutions and interinstitutional/interprofessional collaborations. Thus, the suggested strategy aims to structure pharmaceutical research in Lebanon, including the priorities towards which research is directed, the process by which research is conducted, and the workforce conducting research. It will mainly rely on the World Health Organization's interrelated goals (organization, priorities, capacity, standards, and translation). The implementation of the suggested pharmaceutical research strategy will only be achieved through the leadership of the pharmaceutical authorities and the collaboration of stakeholders.

**Keywords:** Strategy, Pharmaceutical research, Research policy, Projects, Research

## Background

### Health research strategies worldwide

Research strategies that organize and support research efforts are widely recommended to assess specific health needs, promote innovation, and make evidence-based decisions. In 2012, the World Health Organization (WHO) published its global research health strategy based on four pillars, i.e., the capacity optimization of

health systems, priorities assessment to meet health needs, standards for good research practice, and translation of evidence into practice [1]. Furthermore, many national research strategies have been developed worldwide through initiatives of governmental or non-governmental bodies. For example, in Australia, the Association of Australian Medical Research Institutes recommended a National Health and Medical Research Strategy in November 2021, based on three main pillars: research (identifying research needs, aligning strategic investment, integrating research, and healthcare delivery), workforce (developing sustainable and rewarding careers), and funding (building coordinated and sustainable funding

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mechanisms) [2, 3]. In Canada, the Association of Faculties of Medicine of Canada (AFMC) suggested a National Health Research Strategy in a position paper inspired by the success and importance of research during the COVID-19 pandemic. According to the AFMC, the environment and infrastructure currently in place should be improved to secure collaboration across all sectors and allow Canadians to address national health needs and contribute to global solutions. It also stated that “the close integration of academic research with industry is critical in responding to pandemics but is also critical in many other areas of healthcare” [4]. Moreover, research strategies have also been suggested in some developing countries, such as South Africa [5] and Bangladesh [6].

### Health research in Lebanon

In Lebanon, research is conducted through academia or hospitals, with a solid research capacity pillared on its knowledgeable human capital. According to the Lebanese structure of higher education and its governing regulations (namely, law number 285/2014), universities should develop their research capabilities and have an organizational infrastructure for conducting research; in addition, the quality evaluations of academics and institutions are widely based on research productivity [7]. A detailed analysis of biomedical research showed that biomedical research outputs quickly recovered in Lebanon following a long war (1974–1992), mainly supported by uninterrupted activities in private higher education institutes [8]. Between 1985 and 2004, 1964 medical articles were counted over a two-decade period; however, the growth rate of publication drew a decline passing from 202% (1990–1994) to 55.3% (2000–2004) [9]: the four most productive specialties (anesthesiology, internal medicine, gynecology, and pediatrics) published 611 articles (31.1%), mainly in Beirut [9].

### Pharmaceutical research scope and strategies

Pharmaceutical research encompasses steps that start from the development of a pharmaceutical product, its trial in animals and humans, and its use among patients; it includes various disciplines, such as basic pharmacology and toxicology, medicinal chemistry, clinical pharmacology, toxicology, pharmacokinetics, pharmaceuticals, pharmacoepidemiology, pharmacoeconomics, and pharmacogenetics. It also covers medication-related public health issues (antibiotic resistance, medication safety, and clinical toxicology), pharmacy education (initial, experiential, theoretical, and continuing), pharmacy workforce, and pharmacy governance. Pharmaceutical research further tackles the advancement of pharmacy practice; it strengthens pharmacist-provided services, builds the evidence base for developing and commissioning new

services, improves patient care, and contributes to health service knowledge [10, 11]. Research related to pharmacy education, workforce, and governance is also part of pharmaceutical research. It facilitates the implementation, monitoring, and evaluation of drug policies and their impact on national health services; it contributes to the assessment of drug access, quality, and rational use (prescribing, dispensing, and socioeconomic aspects) [12].

Pharmaceutical research should be structured into clear national strategies that optimize patient health and foster innovation, prioritizing actions and evidence-based policy making, such as New Zealand [13]; another example includes the Pharmaceutical Strategy for Europe that includes innovation and development of new medications as a major pillar [14]. Moreover, strategies' methods for drug research and development were detailed [15] in the literature [16]; they are also frequently used by pharmaceutical industry during the development of their innovative products [17].

### Pharmaceutical research Lebanese context

In Lebanon, in the absence of a national health research policy, all available projects result from personal initiatives. Research topics in health, including the pharmaceutical topics, are sometimes duplicated, unrelated, or non-continuous. In addition, pharmaceutical companies contribute to pharmaceutical research in the country according to their agendas and priorities. Thus, even if some universities and hospitals have research policies and departments, a national research policy is essential to help decision-makers regulate and promote research in Lebanon, establish mandatory and nationally helpful research within institutions, and improve patient health and quality of life.

The Order of Pharmacists of Lebanon (OPL), the national pharmaceutical authority in Lebanon, has already been leading on strategic matters related to the pharmaceutical sector. In May 2022, it developed the National Pharmaceutical Strategy (NPS) in collaboration with all the relevant stakeholders [18]; the NPS will make an important part of the National Health Strategy (NHS) that is being developed by the Lebanese Ministry of Public Health. Its implementation plan is now being approved by the authorities. The NPS strategy includes many items that show the need to organize and support pharmaceutical research and report the absence of a national research strategy for pharmacy and pharmaceutical products.

### Objectives

This document aims:

- To assess the need for a National Pharmaceutical Research Strategy (NPRS) based on the current situation in Lebanon (bibliometric analysis and available research);
- To identify the strengths and weaknesses of pharmaceutical research in Lebanon;
- To suggest a pharmaceutical research strategy for Lebanon, including goals and objectives.

## Situation assessment of pharmaceutical research in Lebanon

### Pharmaceutical research productivity in Lebanon

A specific search on the pharmaceutical research conducted on Scopus on August 9, 2022, using the keywords (AFFILCOUNTRY (Lebanon) AND ABS ((pharma\*OR medication OR medicine OR drug OR treatment OR therapy))) returned 9299 documents. Publications in the pharmaceutical field started early in 1934, but the numbers began to increase significantly after 1990 (the end of the civil war). These numbers continued to grow exponentially, with the last 5 years showing substantial figures, i.e., 616 in 2017 up to 1027 in 2018. Among the top ten contributing authors, two are pharmacists (ranking second and fifth), while eight are physicians. Documents were classified according to the following areas: Medicine ( $n=6552$ ; 46.9%), Biochemistry, Genetics and Molecular Biology ( $n=1679$ ; 12%), Pharmacology, Toxicology and Pharmaceutics ( $n=943$ ; 6.7%), and Immunology and Microbiology ( $n=520$ ; 3.7%).

### Research conducted by pharmacists in Lebanon

In Lebanon, although research by pharmacists is valuable and promoted [19], research is conducted by academic and hospital pharmacists mainly, with low participation rates of pharmacists in the community, where several barriers were identified [20, 21], including lack of time, financial resources, support, knowledge, and education. A review of the literature has concluded that 792 studies [731 (92.3%) observational studies, 29 (3.7%) interventional studies, and 61 (7.7%) clinical trials] have been conducted by at least one academic pharmacist in Lebanon between 2010 and 2018. The most addressed areas/specialties were infectious diseases (10%), oncology (8.2%), public health (7.8%), pharmacy practice (7.3%), genetics (6.8%), behavioral psychology (6.7%), cardiovascular diseases (5.8%), and psychiatry (5.2%) [20].

### Pharmaceutical research in Lebanese institutions

In university hospitals, pharmacists conduct research in collaboration with physicians, especially when clinical research involves medications. A bibliometric study showed high productivity in the three largest university

hospitals in Beirut, i.e., the American University of Beirut Medical Center, Hôtel-Dieu de France Hospital, and Saint Georges University Medical Center [9]. As for the academic sector, there are five universities teaching pharmacy in Lebanon; research in these institutions is not a requirement, except for tenure track instructors, where research productivity is considered for promotion. However, the recent introduction of accreditation to all universities made research paramount, particularly for graduate studies programs [20].

In addition, to make evidence-based decision and work on clear strategic plans [22], the OPL has also been involved in several research projects, mainly in collaboration with the Institut National de Santé Publique, Epidémiologie Clinique et Toxicologie—Liban (INSPECT-LB) and other research teams. These projects were related to pharmacy workforce and practice, assessing workforce education [23], graduates planning [24, 25], continuing education [26] and practice [27–32]. Some of these projects could be used for decision-making that improves pharmacy practice [33–35]. Many research projects were also conducted during the COVID-19 pandemic and were helpful in assessing pharmacists' readiness and the need for optimization [36–40].

## SWOC analysis of pharmaceutical research in Lebanon

There is research in different pharmacy sectors in Lebanon, but a lack of research projects mapping and the absence of a database of national projects makes it difficult to optimize the available research according to the country needs. The Strengths, Weaknesses, Opportunities, and Challenges (or Threats) (SWOC) were analyzed and summarized, based on the conducted situation assessment (Table 1).

### Suggested strategy

Based on the situation assessment and the SWOC analysis, the new research strategy was suggested. Its purpose, vision, core values, suggested goals based on international guidelines (mainly the WHO), and suggested objectives for every goal were developed.

### Purpose, vision, and core values for the strategy

This national pharmaceutical research strategy aims to align the pharmaceutical research in Lebanon, including the priorities towards which research is directed, the process by which research is conducted, and the workforce conducting research. Its vision is to reach a point where Lebanon would be recognized as a regional hub for pharmaceutical research, contributing to patient quality of care and health. As for the core values, teamwork,

**Table 1** SWOC analysis of pharmaceutical research in Lebanon

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>- The pharmaceutical workforce is willing to contribute to research</li> <li>- Some researchers are working on pharmaceutical topics and becoming increasingly active</li> <li>- Researchers have access to internal funds from their institutions and sometimes international funds</li> <li>- Many academic institutions offer research-related master's degrees with good research practice and methods taught</li> <li>- Many assessment projects related to pharmaceutical research are being conducted</li> <li>- Can we discuss that researchers in Lebanon have good collaborations with international research teams?</li> <li>- Good visibility of researchers in international conferences/meetings?</li> </ul> <p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>- Researchers' workforce in Lebanon is not mapped</li> <li>- Research culture is not established in all institutions; many researchers are not valued</li> <li>- There is no official competency framework for researchers in Lebanon</li> <li>- Research in Lebanon is fragmented and not included in a strategy</li> <li>- The conducted research projects do not always answer priority needs in Lebanon</li> <li>- The impact of the research conducted in Lebanon on the decisions related to public and clinical health is not clear</li> <li>- There is a general lack of funding for research</li> </ul>	<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>- The implementation of the National Pharmaceutical Strategy is pending</li> <li>- Many academic and hospital institutions require research in their accreditation standards</li> <li>- Funding by international agencies is available for Lebanese researchers but might need to be consolidated</li> <li>- The pharmaceutical research culture is being promoted in many institutions, but it needs consolidation, especially to expose potential young researchers (students, research assistants, etc.)</li> <li>- Interprofessional Education and Collaboration (IPE/IPC) research should be implemented</li> <li>- There is a need for more collaboration within the same majors/domains (between research teams or laboratories of the same institution, for example)</li> </ul> <p><b>Challenges</b></p> <ul style="list-style-type: none"> <li>- Interinstitutional/interprofessional collaborations are hard to apply (competitiveness, people not used to working together, etc.)</li> <li>- Conducting large research projects with substantial funds is sometimes hard to manage</li> <li>- Political influences and the socioeconomic crisis might affect researchers' decisions to leave Lebanon</li> <li>- Establishing priorities should be objective and based on the available information (evidence-based) that is sometimes not readily available</li> <li>- There is no clear research axes/strategies at the institution/national level (even if some exceptions are noted for some institutions)</li> </ul>
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integrity, quality, equity, impartiality, and sustainability are suggested.

**Suggested pharmaceutical research strategy goals**

The suggested national pharmaceutical research strategy would mainly rely on the WHO's five inter-related goals [1] and would be based on the available evidence and SWOC analysis. Five main goals were defined: culture, prioritization, workforce, good practice and policy making (Table 2). Identifying the missing links and bridging the gaps between the current situation and the future vision is key to achieving these goals through smart objectives (Table 3).

The principal actor would be the national pharmaceutical authority (OPL), which should work on implementing the strategy in collaboration with the involved stakeholders (academia, hospitals, the CNRS-L, the National

Institute of Public Health, Clinical Epidemiology, and Toxicology—Lebanon (INSPECT-LB), the ministries of public health and higher education, the WHO national office, non-governmental organizations, and pharmaceutical companies). Priorities, timelines, responsible parties, and indicators would then be defined, and the implementation would start.

**Discussion**

This document is the first pharmaceutical research strategy suggested in Lebanon, in line with the WHO recommendations and goals. To be put in place, this strategy requires a consensus between the various stakeholders, added to a detailed plan that displays activities, responsible parties, involved stakeholders, priority level, timelines, and performance indicators (input, output, and

**Table 2** Suggested pharmaceutical research strategy goals based on WHO principles

WHO research strategy goals	National pharmaceutical research strategy goals
Strengthening of the research culture in WHO so that the Organizations can lead by example	Establishing a national research culture in the pharmaceutical sector
Focusing research globally on priority health needs	Focusing pharmaceutical research on national priority health needs
Helping strengthen national systems for health research	Helping institutions and workforce in developing sustainable pharmaceutical research
Promoting good practice in research strategy, setting norms and standards	Promoting good practice in research, setting norms and standards at the national level
Strengthening links between health research and health policy and practice	Strengthening links between pharmaceutical research and health policy and practice

**Table 3** Suggested objectives per goal**Goal 1: Establishing a National Research Culture in the Pharmaceutical sector**

It is suggested that pharmaceutical authorities take the following actions to keep pace with a changing research environment and communicate better research activities at the national level:

- Establishing a national center for pharmaceutical research to assess, monitor, and conduct pharmaceutical research in the country
- Raising resources to support strategy development and implementation
- Keeping abreast of health-related developments and information in Lebanon through a national pharmaceutical research observatory
- Networking and regularly exchanging with the national and international research community
- Improving scientific communication and dissemination of research results
- Developing an open-access repository of databases and results of all research

**Goal 2: Focusing Pharmaceutical Research on National Priority Health Needs**

The goal is to champion research on priority health needs. The strategy would help identify research priorities and mobilize the response. The range of health challenges is broad, and agreeing on priorities is not always easy. Actions to be taken by pharmaceutical authorities to achieve the priority goal include:

- Synthesizing data on gaps in national and global pharmaceutical research
- Convening consultations to identify the priorities and funding for research based on available information, gaps in data, and health priorities
- Reporting on national priorities and resources for pharmaceutical research
- Developing research agendas for priority areas
- Advocating support for research on national priorities
- Improving the coherence of research activities by reviewing research agendas, including criteria for initiating, adjusting, and ending research programs

**Goal 3: Helping Institutions and Workforce in developing a Sustainable Pharmaceutical Research**

Actions to be taken by pharmaceutical authorities, in collaboration with other stakeholders, to achieve this goal include:

- Mapping the research workforce in Lebanese institutions, assessing their plans, and projecting their future directions
- Attracting and retaining young and brilliant researchers and fostering potential future leaders in pharmaceutical research
- Promoting capacity building related to research in academia and hospitals and improving research competencies
- Supporting research projects that fall within the scope of national priorities
- Promoting interdisciplinary, inter-university, interinstitutional, and interprofessional research projects
- Reviewing the arrangements for working with partners and seeking partners from all sectors that impact sustainable pharmaceutical research

**Goal 4: Promoting Good Practice in Research and Setting Norms/Standards at the National Level**

Actions to be taken by pharmaceutical authorities, in collaboration with other stakeholders (particularly the Ministry of Public Health in Lebanon), to achieve this goal include:

- Developing a code of good research practice to be added to pharmacy curricula
- Strengthening ethical standards and peer review, using evidence to develop guidelines, and reviewing existing policies in the light of new evidence
- Promoting ethics committees' practice in institutions under the authority of competent ministries
- Developing and implementing quality standards for the accreditation of research laboratories

**Goal 5: Strengthening Links Between Pharmaceutical Research and Health Policy and Practice**

Actions to be taken by pharmaceutical authorities, in collaboration with other stakeholders (particularly MOPH), to achieve this goal include:

- Establishing a national committee that suggests relevant pharmaceutical policies based on research results
- Ensuring research results are transformed into health policies, as necessary, in collaboration with the involved authorities
- Promoting the culture of evidence-based decisions
- Assess the impact of pharmaceutical research on patient health in Lebanon, using appropriate methods (e.g., registries, electronic platforms)

impact tools would help evaluate the achievement of fixed goals in a timely manner).

The national pharmaceutical association, OPL, should consider the project a priority. Research culture and ethics would be spread through appropriate activities involving practicing pharmacists and pharmacy students in collaboration with academia. From the assessment aspect, there is a need to evaluate pharmaceutical topics rarely addressed by Lebanese researchers. Research workforce and teams that should be mapped to estimate the needs in fields of expertise that require bridging gaps in research topics.

The suggested strategy compares well with those of other countries, with adaptation to the Lebanese context, taking the positive facets and values from that of the UK [41], Canada [42], and Australia [2], with less emphasis on local sources of funding. Expectedly, it is closer to that of India, a developing country with some

difficulties similar to those of Lebanon [43]. Lessons learned from international strategies would help the Lebanese authorities anticipate the barriers and adjust accordingly.

Many roadblocks are expected, such as difficulties in applying the core values (teamwork, integrity, quality, equity, impartiality, and sustainability). These difficulties extend to all health aspects, where partnership culture and interprofessional collaboration remain to be established. There is also a need for expertise to manage large and top-notch projects, which is possible through international partnerships. Moreover, the political influence and socioeconomic hardship are also expected to slow the implementation process, mainly because of a brain drain and the lack of motivation of local researchers in a country that has been enduring due to geopolitical (wars, refugees, and hegemony) and internal (corruption and lack of expertise, consensus, and resources) predicaments.

Nevertheless, many facilitators and opportunities are foreseen, such as the application of national strategies in related fields (mainly the national health strategy by the MOPH and the national pharmaceutical strategy by the OPL [18]), the international funding to which Lebanese researchers can apply in association with international collaborators, and the accreditation culture that indirectly affects research quality in educational institutions and hospitals. Local academia (mainly the five universities with a pharmacy program), university hospitals (some of which harbor pharmacy residency programs), and research-oriented institutions/associations, such as the CNRS-L and INSPECT-LB, are potential collaborators in the implementation of the strategy. A helping hand would also be expected from the local or multinational pharmaceutical industry, which contributes to the local development of research through their outreach and promotion of science [44, 45]; in this case, the conflict of interest should be closely watched. International instances, such as the WHO and the FIP, could be solicited, mainly for capacity-building.

## Conclusion

Although pharmaceutical research is carried out in Lebanon, several gaps exist. Hence, implementing a national pharmaceutical research strategy is crucial and would only be achieved through the leadership of relevant pharmaceutical authorities and the collaboration of stakeholders. Bridging the gaps and achieving the stated vision is expected to optimize patient health through the rational use of medications in disease prevention and treatment and ameliorate the status of the pharmaceutical workforce in a country plagued by daunting problems.

## Abbreviations

CNRS-L: Lebanese National Council for Scientific Research; FIP: International Pharmacy Federation; IRB: Institutional Review Board; MOPH: Ministry of Public Health; OPL: Order of Pharmacists of Lebanon; REC: Research and Ethics Committee; WHO: World Health Organization.

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## Author contributions

PS designed the study; MA and AH drafted the manuscript; PS, HS, RZ, and CH assisted in drafting and reviewing the manuscript; PS supervised the course of the article, HS revised and edited the article edited for English language. All authors read and approved the final manuscript.

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## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

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### Competing interests

The authors declare that they have no competing interests.

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