

Development of pharmacy research priorities in Malaysia using a national, multi- stage participatory approach

Nor Ilham Ainaa Muhsin

Pharmacy Policy and Strategic Planning Division, Pharmaceutical Services Programme,
Ministry of Health Malaysia

See Wan Ho

Pharmacy Policy and Strategic Planning Division, Pharmaceutical Services Programme,
Ministry of Health Malaysia

Pui Lim Chan

Pharmacy Policy and Strategic Planning Division, Pharmaceutical Services Programme,
Ministry of Health Malaysia

Azzy Iyzati Ahmad Shanizza

Pharmacy Policy and Strategic Planning Division, Pharmaceutical Services Programme,
Ministry of Health Malaysia

Siti Nur Su'aidah Nasarudin

Pharmacy Policy and Strategic Planning Division, Pharmaceutical Services Programme,
Ministry of Health Malaysia

Noraini Nordin

Pharmacy Policy and Strategic Planning Division, Pharmaceutical Services Programme,
Ministry of Health Malaysia

Yi Huan Tan

Pharmacy Policy and Strategic Planning Division, Pharmaceutical Services Programme,
Ministry of Health Malaysia

Abdul Haniff Mohamad Yahaya

`dulha5@moh.gov.my`

Pharmacy Policy and Strategic Planning Division, Pharmaceutical Services Programme,
Ministry of Health Malaysia

Research Article

Keywords: priority setting, pharmacy research, Malaysia, pharmaceutical development

Posted Date: March 4th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-8697489/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background

Pharmacy research plays a crucial role in advancing healthcare and improving the well-being. Setting priorities in pharmacy research ensures that efforts are impactful, ethical and aligned with broader health goals. This study details the development process and key priorities for pharmacy research in Malaysia for 2024–2029.

Methods

The project, led by the Pharmacy Research & Development Sub-division in Pharmaceutical Services Programme, Ministry of Health Malaysia utilised multi-stage participatory approach. Initial situational analysis assessed the adoption of previous priorities, identified barriers and conducted literature reviews prior to prioritisation step based on selected criteria. Stakeholder consultations and expert panel inputs were integral to the process.

Results

Eight strategic priority domains were formulated including areas like medicine development, access to medicines, impact of pharmacotherapy optimization, impact of pharmacy services, medicine consumerism, digital-in-health, governance as well as capacity and capability building. The thematic analysis categorised 77 research gaps into these domains. Stakeholder engagements including focus groups and surveys helped ensures a comprehensive and relevant priority setting.

Conclusions

The Pharmacy Research Priorities in Malaysia for 2024–2029 were developed through a systematic and inclusive process emphasising both procedural fairness and consequential outcomes. This initiative aims to guide resource allocation and unite stakeholders towards addressing Malaysia's pharmaceutical needs.

Introduction

Pharmacy research is integral to Malaysia's health care setting, providing the evidence base that improves how medicines are discovered, regulated, supplied, prescribed, and used across the system. It strengthens patient safety through pharmacovigilance and medication-use evaluations, advances clinical outcomes by optimising therapy and adherence, and informs cost-effective decision-making via health technology assessment and pharmaco-economics. In a context marked by rising non-communicable diseases, antimicrobial resistance, and pressure on public financing, pharmacy research guides policy and service redesign—from formularies and guidelines to stewardship programmes and digital therapeutics. It also underpins medicine security by

assessing supply-chain resilience and equitable access, particularly for rural and vulnerable populations. By bridging practice, policy, and industry, pharmacy research enables Malaysia to deliver safer, more effective, and more sustainable pharmaceutical care aligned with national health priorities.

Essential to improving priority setting practices is having a sense of direction; a standard to be aimed for, and against which to evaluate the performance (Barasa et al., 2015; Smith et al., 2012). There are two distinct philosophical approaches in evaluating healthcare priority setting which are proceduralism and consequentialism. Proceduralism emphasises the importance of fair and just decision-making processes including transparency, inclusiveness, stakeholders' engagement and accountability while consequentialism highlights the outcomes achieved for the greatest number of people. In practice, healthcare priority setting often involves a combination of procedural and consequential considerations in addressing the complex ethical challenges inherent in allocating limited healthcare resources (Mitton & Donaldson, 2004).

Historically, pharmacy research agenda in Malaysia has been largely investigator-driven with limited input from other stakeholders including patients, caregivers, regulatory bodies, industry players and the community in generating measurable outcomes. Given the evident mismatch between the research interests of researchers and national healthcare needs (Lansang & Dennis, 2004; Viergever, 2013) had resulted in misdirected allocation of resources to areas of low priority or failure to address important needs of relevant stakeholders. Hence, this priority setting project for pharmacy research focuses on accentuating systematic, inclusive and transparent processes with major consideration on outcomes that should be achieved by the stakeholders. Well managed priority setting has the potential to unite stakeholders and bring together funders, researchers in the public and private sector, non-governmental organisations (NGOs), decision-makers in governments and civil society. Most importantly, the act of priority setting provides guidance about the most appropriate allocation of public and private resources to areas of strategic importance.

In 2021, a national priority setting project for pharmacy research was initiated with the aims of identifying existing knowledge gaps post-setting of pharmacy research priorities in 2018 and constructing relevant research topics needed to address the latest and future pharmaceutical needs in Malaysia in the next six years from 2024 until 2029. We also aim for the priority setting processes to be conducted systematically, inclusive and driven by evidence, social values and deliberation among relevant stakeholders.

Methods

This project was initiated in 2021 until 2024 utilising a multi-stage participatory approach and was registered with the National Medical Research Registry (NMRR-21-1818-61291) with approval from the Medical Research and Ethics Committee (MREC) of the Ministry of Health Malaysia (MOH). All methods were performed in accordance with the Declaration of Helsinki and the National Institutes of Health Malaysia Research Guidelines and Policies for Research

Involving Human Participants, as well as applicable institutional policies and the Personal Data Protection Act 2010 (Malaysia).

The project began with a situational analysis to assess the adoption of prior pharmacy research priorities. It included identifying barriers and enablers for researchers in utilising these priorities, conducting literature reviews to identify any unanswered knowledge gaps and seeking inputs and suggestions through consultations with the expert panels, relevant stakeholders and senior management of the MOH. Subsequently, a systematic synthesis and analysis of the proposed research questions were conducted prior to prioritisation exercise. Table 1 illustrates the development process timeline, activities and key deliverables for the project.

Table 1
Development process timeline, activities and key deliverables

Year	Phase and activities	Key deliverables
2021	Planning and initial phase 1. Engagement with the secretariat of the Health Research Priorities for 12th Malaysia Plan (12MP-HRP) 2021–2025 from National Institute of Health (NIH), MOH Malaysia 2. Proposal on selected methodology and ethical approval 3. Establishment of technical expert team (TET) Situational analysis <i>Phase I:</i> Determining the adoption of 2018 pharmacy research priorities 4. Retrospective analysis of the Pharmacy Research Database (PRD) <i>Phase II:</i> Identifying barriers and enablers for researchers in utilising these priorities 5. Focus group discussions among pharmacy researchers in MOH	Establishment of TET Finalised methodology was agreed for the project Comprehensive evaluation of strengths and weaknesses of previous research priorities
2022	<i>Phase III:</i> Identifying critical knowledge gaps related to pharmaceutical services in Malaysia 6. Gaps analysis i. policy documents & literature reviews ii. two series of TET workshops to conduct comprehensive analysis from the reviews to identify key area of concern 7. Stakeholder survey 8. Consultation with higher management of MOH	Identified areas of concerns in pharmaceutical sector and services to inform the research priority setting activities
2023	Prioritisation activities <i>Phase IV:</i> Establishing the revised pharmacy research priorities in Malaysia 9. Selecting relevant criteria 10. Assigning weights to the criteria 11. Scoring and ranking the research questions 12. Thematic analysis Drafting and refining of the priority document Progress update presentations to the TET	Finalised research priority domains named as Pharmacy Research Priorities in Malaysia 2024–2029

Year	Phase and activities	Key deliverables
	Development of the research priority document Presentation to higher management of MOH Further refinement of the document	
2024	Launching of Pharmacy Research Priorities in Malaysia 2024-2029	

Insert Table 1 Development process timeline, activities and key deliverables

Technical expert team (TET)

Under the guidance of the Director of Pharmacy Policy & Strategic Planning Division at Pharmaceutical Services Programme (PSP), a TET was established. This TET comprises a core team responsible for coordinating all gathered information and evidence, along with an expert committee tasked with evaluating and recommending the current and future requirements of the pharmaceutical sector and services in Malaysia. The process was initiated by assembling a core team, which included pharmacists and research officers from the Pharmacy Research & Development Sub-division. Subsequently, an expert committee comprising 79 members from national pharmacy research clusters, namely clinical pharmacy (n = 14), pharmacy policy and practice (n = 15), regulatory and pharmacy enforcement (n = 8), pharmacoeconomics and outcome-based research (n = 15), pharmaceutical development analysis (n = 11) and pharmacoepidemiology and data analysis (n = 16) was commissioned. This TET worked collaboratively with the core team to assess the utilisation of data and evidence gathered from previous research. Their collective efforts aimed to formulate pertinent research questions that could effectively address current and future pharmaceutical needs in Malaysia.

Situational analysis

Situational analysis was conducted concurrently through three major methods: (i) retrospective analysis of the PRD, an official repository of MOH pharmacists’ research curated by the PSP for progress monitoring and oversight; (ii) reviews of relevant policy documents within Malaysia and journal articles on PubMed; and (iii) stakeholder engagement through focus group discussion, consultation sessions and survey. The situational analysis was aimed to evaluate the adoption of the previous pharmacy research priorities, to identify any unanswered knowledge gaps and to gather inputs and suggestions for future research questions.

Retrospective analysis

The core team conducted a retrospective content analysis of the PRD to systematically map and categorise research topics undertaken by MOH pharmacists. Research projects were classified according to the research domains defined in the previous pharmacy research priority frameworks, allowing comparison of research focus areas across time. The analysis involved

reviewing project titles as recorded in the PRD. Frequencies and trends across research domains were analysed to identify areas of concentration, under-represented domains, and alignment with existing research priorities.

The detailed methodology and findings of this retrospective analysis, including analytical procedures and domain-level results, will be reported in a separate publication.

Document review

The core team conducted a literature search for relevant input documents and scientific evidence to identify existing research gaps, which was defined as a clearly bounded, decision-relevant question for Malaysia in which available evidence remains insufficient, inconsistent, inapplicable or absent to guide policy, services or pharmacy practice over 2024–2029. Details of the methodology and findings of the review will be reported in a separate publication.

Pertinent policy documents were distributed to the TET members to facilitate their understanding and identification of knowledge gaps. The TET members were tasked with aligning the findings or evidence derived from prior studies reported in the PRD and research articles in the PubMed database with the requirements outlined in these documents. Cumulative volume of research, namely the extent of research that have satisfactorily answered the research questions based on the previous research priority domains were determined collectively by the TET members. The documents included were:

- i. Health Research Priorities for 12th Malaysia Plan (12MP-HRP) 2021-2025
- ii. Pharmaceutical Services Programme Strategic Plan 2021-2025
- iii. Ministry of Health Malaysia Strategic Plan 2021-2025
- iv. Malaysian National Medicines Policy, 3rd Edition 2017-2021
- v. Pharmacy Research Priorities in Malaysia 2018
- vi. 12th Malaysia Plan 2021-2025
- vii. The FIP Development Goals: Transforming Global Pharmacy 2020

Stakeholder engagement

Stakeholder representatives were divided into three groups for convening: (1) pharmacy researchers in MOH; (2) a targeted key stakeholders consisting of the head of pharmacy school at universities in Malaysia, head of pharmacy department from military and university hospitals and representatives from pharmaceutical industries and organisations; and (3) higher management from MOH. Engagements with the researchers were conducted in December 2021 via virtual focus group discussion due to movement restriction during COVID-19 pandemic in Malaysia. In order to gather insights and recommendations regarding the future pharmaceutical research requirements in Malaysia, an email-based online survey was disseminated among the specified key stakeholder groups. Additionally, consultation sessions were also held with the

senior management of MOH for prospective topics for inclusion in the research priorities. Details of the methods and findings from the engagement sessions will be reported in a separate publication.

Workshops

Two sets of two-day workshops were developed and carried out in May and October 2022 for the TET members. The primary objectives of these workshops are as follows:

- a) To elucidate the methodology plan for a comprehensive situational analysis aimed at identifying any existing knowledge gaps that remains unanswered;
- b) To engage the TET members in a process of due diligence, involving the assessment of pharmaceutical needs in Malaysia through a comprehensive review of previous documents.

Discussions within these workshops were also focused on the strategic framing of future research questions that could effectively address the identified needs over the next 1–10 years (Fig. 1).

Insert Fig. 1 The elements discussed during the workshops to formulate the future research questions.

Prioritisation activities

We adapted a multi-step participatory process from the Child Health and Nutrition Initiative (CHNRI) methodology (Rudan et al., 2008) and Multiple Criteria Decision Analysis (MCDA) (Norheim, 2018) to suit the needs of priority setting in Malaysia. The process entailed establishing prioritisation criteria (Table 2), incorporating stakeholders' values by assigning weights, scoring research gaps and calculating final score for prioritisation. Gaps were retained only if they were (i) materials to patients or health system, (ii) likely to have impact if addressed, and (iii) answerable or feasible within realistic resources. Details of the methods and findings from the prioritisation activities will be reported in a separate publication.

Table 2
Items within each criterion used for priority setting

Criteria	Items
A. Magnitude/ severity	A1. The problem is common in terms of burden to the healthcare system / community A2. The problem is severe to the healthcare system / community A3. The data is urgently needed for decision making
B. Importance/ potential impact	B1. The research will fill an important knowledge gap in achieving the national goal B2. The research is likely to shape future planning and implementation (e.g., policy, programme, etc.) B3. The research is likely to be beneficial
C. Answerability/ feasibility	C1. Study / studies can be designed to provide a practical solution / outcome C2. There is sufficient capacity to carry out the research C3. The cost and time required for the research is reasonable

Insert Table 2 Items within each criterion used for priority setting

Thematic analysis

The core team conducted a thematic analysis, employing both open and axial coding techniques to derive relevant themes and sub-themes for the research areas/ gaps. After mapping research gaps to their thematic domains, we ranked the gaps within each domain by weighted average score; a higher score indicates a higher priority.

In parallel, the core team conducted a supplemental review. This incorporated (i) additional inputs from PSP senior management and (ii) policy documents not captured earlier, with particular attention to materials published in 2023. Where policy makers identified gaps as strategically critical, these were designated “auto-prioritised.” Auto-prioritised items receive top priority irrespective of their numerical score and should be the first focus for researchers within the relevant domain.

Details of the methodology and findings of the analysis will be reported in a separate publication.

Drafting and refining of the priority document

The first draft was prepared by the core team before its circulation to the TET for further comments and inputs. Approval by senior leadership of MOH for the research priorities was required at several key points throughout the development process. Periodic progress updates were presented to the National Pharmacy Research & Development Committee and the final presentation took place at the Senior Director Policy Meeting in December 2023 to obtain input and approval from the top leadership of Pharmaceutical Services Programme, MOH. External experts and internal reviewers then reviewed the final draft before being officially released and launched by the Minister of Health Malaysia in August 2024 during the 12th National Pharmacy Research & Development Conference at KSL Esplanade Hotel, Selangor.

Results

Situational analysis

The retrospective analysis of the PRD, document review and TET workshops revealed that approximately 45.8% of the research areas outlined in the first edition of the PRPM were either fully or partially addressed since its launch in 2018. To determine the extent to which each research area had been addressed, the core team conducted a structured literature review of relevant policy documents and peer-reviewed journal articles indexed in PubMed, guided by the research areas specified in PRPM 1st edition. The findings from this review were compiled and presented to the TET members. TET members subsequently undertook supplementary literature searches and, drawing on their subject-matter expertise, collectively assessed each research area and classified it as fully addressed, partially addressed, or not addressed. A research area was considered *partially addressed* when available evidence existed but was insufficient in scope, depth, or contextual relevance to fully inform policy or practice.

Following extensive deliberations, the TET agreed that 77 research areas (46.4%) should be carried forward to the next edition of the PRPM, as shown in Table 3. In parallel, the online stakeholder survey identified 27 new research questions, with a response rate of 22.4%. Additional research questions were also proposed by TET members based on emerging issues and their technical expertise.

Table 3

Knowledge production retrieved from document review and deliberations by the TET during workshop for research gaps outlined in PRPM (1st edition)

Doman/ Sub-domain	Number of articles identified (n)	Answerability of research areas				Research gaps to be carried forward		
		Yes	No	Partially	Total	Yes	Different perspectives	Total
1. Access to medicines								
Affordability of medicines	79	1	10	1	38	2	7	25
Availability of medicines		0	15	1		4	2	
Health/ medicine financing		0	7	3		7	3	
2. Monitoring and evaluation of outcomes								
Drug safety	209	5	3	5	41	3	4	25
Effectiveness of care		0	8	4		1	9	
Pharmacoeconomics analysis		6	4	6		3	5	
3. Quality and safe use of medicine & sustainability								
Community empowerment	173	4	7	4	37	0	4	8
Health behaviour		3	4	4		0	1	
Quality use of medicine		1	2	3		0	3	
Sustainability		3	2	0		0	0	
4. Optimisation of therapy and pharmacy services delivery								
Human resource	56	0	5	3	31	0	1	8
Information and communication technology		3	3	4		3	1	
Pharmacy services innovation		6	5	2		0	3	
5. National databases/ Big data analytics								
Big data analytics	4	0	4	1	19	4	1	11
Medicines price/ Pricing database analysis		0	7	2		1	1	

Doman/ Sub-domain	Number of articles identified (n)	Answerability of research areas				Research gaps to be carried forward		
		Yes	No	Partially	Total	Yes	Different perspectives	Total
1. Access to medicines								
Medicine utilisation study		0	2	0		0	2	
National patient outcomes database/ registry		0	2	1		0	2	
Total		32	90	44	166	28	49	77

After careful review, interrelated and overlapping research questions were consolidated into broader research gaps. Ultimately, a total of 74 research gaps were finalised for inclusion in the forthcoming edition of the PRPM.

Insert Table 3 Knowledge production retrieved from document review and deliberations by the TET during workshop for research gaps outlined in PRPM (1st edition)

Domains for PRPM (2nd edition)

Upon conducting a thematic analysis, 74 research gaps were categorised into eight primary domains and 23 sub-domains as illustrated in Fig. 2. These domains exhibited a degree of similarity to those in the previous edition, with an emphasis on fundamental research for medicine development, pharmaceutical supply chain and its governance. The remaining domains expanded from the previous edition to assess both the direct and indirect outcomes and impacts of pharmaceutical services (Fig. 3). Additionally, these domains underscored the essential requirements of various stakeholders in the pharmaceutical sectors, including pharmaceutical industries, the general public and patients.

Insert Fig. 2 Research domains and sub-domains (national problems) listed in PRPM (2nd Edition)

Insert Fig. 3 Comparison of domains in PRPM across editions

Discussion

While there is no universally accepted method for prioritising health research, numerous strategies and approaches have been devised to streamline the prioritisation process and empower decision-making at both national and global levels (Barasa et al., 2015). The process of setting research priorities in pharmacy is complex, requiring a balance between diverse stakeholder interests and addressing the evolving needs of the healthcare system. The formulation of research priorities process for the Pharmacy Research Priorities in Malaysia (2nd edition) was guided by a similar effort previously carried out with strong emphasis on adhering to systematic and transparent processes. This involved extensive consultations with relevant

stakeholders to discern their perceived priorities and contribute to the identification of overarching research priorities.

The use of a multi-stage participatory approach provided an opportunity for broad engagement, ensuring that the voices of diverse stakeholders, including healthcare providers, industry experts, and policymakers, were heard. Crafting research priorities within the intricate landscape of pharmaceutical service in Malaysia posed a significant challenge, given that each segment of these services presented unique issues requiring immediate research attention (Awang et al., 2023). Negotiation and compromise played a crucial role among the TET to tackle this challenge, fostering an iterative, consensus-building approach particularly during workshops (Lomas et al., 2003). The reliance on online surveys to gather inputs from relevant stakeholders may restrict the in-depth exploration of knowledge gaps in pharmaceutical sector in Malaysia (Evans & Mathur, 2018; Wright, 2006). Hence, in-person interviews and focus group discussions should be considered for future strategic plan to review PRPM to overcome this limitation.

Although the adoption of thematic analysis to derive the key domains and sub-domains may be influenced by researcher's subjectivity, two independent coders (NIAM and HSW) had several rounds of deliberations to resolve disagreements to mitigate this issue (Joffe, 2011; Nowell et al., 2017). The thematic analysis had yielded 72 research gaps into eight strategic domains, such as pharmaceutical development, pharmacotherapy, and digital health, reflects an intentional effort to align research with current and future healthcare challenges. This approach mirrors strategies applied in other countries where health research priorities are designed to meet both national and global healthcare needs.

Monitoring, evaluating and reviewing are essential functions aimed at ensuring the implementation of pharmacy research activities outlined in PRPM document aligns with planned objectives and desired outcomes. Monitoring will be conducted on a quarterly basis for pharmacy research carried out by pharmacists within the Ministry of Health. Evaluation and review of the research priority setting will be undertaken every five (5) years, or earlier if deemed necessary. The systematic inclusion of stakeholders from different sectors—public, private, and academic—ensures that the developed priorities reflect the pharmaceutical needs across all levels of the healthcare system. However, it is essential to acknowledge that compliance with these priorities, particularly in sectors outside the MOH, such as private healthcare providers and educational institutions, may present challenges. Continuous engagement and advocacy efforts are crucial to ensuring widespread adoption and implementation of the identified research priorities. Additionally, conducting further inter-sectoral research collaborations that emphasise the needs outlined in PRPM is also essential. Future reviews for research priorities shall incorporate public opinions (Mitton et al., 2009) including patients as end users of pharmaceutical services for a comprehensive and well-rounded approach to priority setting.

Conclusion

The Pharmacy Research Priorities in Malaysia (2nd Edition) serves as a strategic framework to guide future research, ensuring that resources are directed toward areas of high importance.

The inclusive and systematic methodology employed in this project sets a benchmark for future priority-setting exercises, both nationally and globally. However, ongoing monitoring and evaluation will be essential to ensure that the research conducted aligns with these priorities and that the outcomes effectively address Malaysia's pharmaceutical needs. Future iterations of this process may also benefit from enhanced stakeholder engagement through in-person methods and the inclusion of patient perspectives, which are critical for a comprehensive understanding of pharmaceutical services.

Declarations

Funding

The research received no external funding.

Clinical trial number

Not applicable

Ethics approval

This study received ethics approval from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (Reference: NMRR-21-1818-61291). All methods were performed in accordance with the Declaration of Helsinki and the National Institutes of Health Malaysia Research Guidelines and Policies for Research Involving Human Participants, as well as applicable institutional policies and the Personal Data Protection Act 2010 (Malaysia).

Data availability

The datasets generated and/or analysed during the current study are not publicly available due to confidentiality undertakings with participants and institutional data protection requirements, but are available from the corresponding author on reasonable request.

Consent to participate

Informed consent to participate was obtained from all participants prior to the commencement of stakeholder engagement activities. Participation was voluntary, and participants were informed of their right to withdraw from the study at any time without consequences.

Consent for publication

Consent to publish was obtained from all participants before data collection began. All participants consented to the use of anonymised quotations or perspectives in the manuscript.

References

1. Awang S, Agins B, Ujang M, Narayanan IR, Zulkifli DN, N. W., Hamidi N. Development of the National Policy for Quality in Healthcare for Malaysia. Health Res Policy Syst.

- 2023;21(1):119. <https://doi.org/10.1186/s12961-023-01063-w>.
2. Barasa EW, Molyneux S, English M, Cleary S. Setting Healthcare Priorities at the Macro and Meso Levels: A Framework for Evaluation. *Int J Health Policy Manage*. 2015;4(11):719–32. <https://doi.org/10.15171/ijhpm.2015.167>.
 3. Evans JR, Mathur A. The value of online surveys: A look back and a look ahead. *Internet Res*. 2018;28(4):854–87. <https://doi.org/10.1108/IntR-03-2018-0089>.
 4. Joffe H. (2011). Thematic Analysis. In D. Harper & A. R. Thompson, editors, *Qualitative Research Methods in Mental Health and Psychotherapy* (1st edn, pp. 209–223). Wiley. <https://doi.org/10.1002/9781119973249.ch15>
 5. Lansang MA, Dennis R. Building capacity in health research in the developing world. *Bull World Health Organ*. 2004;82(10):764–70.
 6. Lomas J, Fulop N, Gagnon D, Allen P. On being a good listener: Setting priorities for applied health services research. *Milbank Q*. 2003;81(3):363–88. <https://doi.org/10.1111/1468-0009.t01-1-00060>.
 7. Mitton C, Donaldson C. Health care priority setting: Principles, practice and challenges. *Cost Eff Resource Allocation*. 2004;2(1):3. <https://doi.org/10.1186/1478-7547-2-3>.
 8. Mitton C, Smith N, Peacock S, Evoy B, Abelson J. Public participation in health care priority setting: A scoping review. *Health Policy*. 2009;91(3):219–28. <https://doi.org/10.1016/j.healthpol.2009.01.005>.
 9. Norheim OF. How can MCDA tools improve priority setting? Four critical questions. *Cost Eff Resource Allocation: C/E*. 2018;16(Suppl 1):44. <https://doi.org/10.1186/s12962-018-0119-6>.
 10. Nowell LS, Norris JM, White DE, Moules NJ. Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *Int J Qualitative Methods*. 2017;16(1):160940691773384. <https://doi.org/10.1177/1609406917733847>.
 11. Rudan I, Gibson JL, Ameratunga S, El Arifeen S, Bhutta ZA, Black M, Black RE, Brown KH, Campbell H, Carneiro I, Chan KY, Chandramohan D, Chopra M, Cousens S, Darmstadt GL, Gardner M, Hess J, Hyder SY, Kapiriri AA. L., ... Child Health and Nutrition Research Initiative. (2008). Setting priorities in global child health research investments: Guidelines for implementation of CHNRI method. *Croatian Medical Journal*, 49(6), 720–733. <https://doi.org/10.3325/cmj.2008.49.720>
 12. de Savigny D, Adam T, Alliance for Health Policy and Systems Research, & World Health Organization. (2009). Systems thinking for health systems strengthening / edited by Don de Savigny and Taghreed Adam. *Pour Une Approche Systématique Du Renforcement Des Systèmes de Santé / Édité Par Don de Savigny et Taghreed Adam*, 107.
 13. Smith N, Mitton C, Cornelissen E, Gibson J, Peacock S. Using evaluation theory in priority setting and resource allocation. *J Health Organ Manag*. 2012;26(4–5):655–71. <https://doi.org/10.1108/14777261211256963>.
 14. Viergever RF. The mismatch between the health research and development (R&D) that is needed and the R&D that is undertaken: An overview of the problem, the causes, and solutions. *Global Health Action*. 2013;6:22450. <https://doi.org/10.3402/gha.v6i0.22450>.

15. Wright KB. Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services. J Computer-Mediated Communication. 2006;10(3):00-00.
<https://doi.org/10.1111/j.1083-6101.2005.tb00259.x>.

Figures

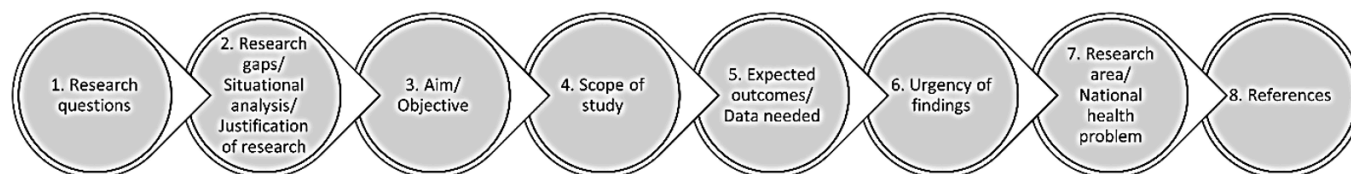


Figure 1

The elements discussed during the workshops to formulate the future research questions.

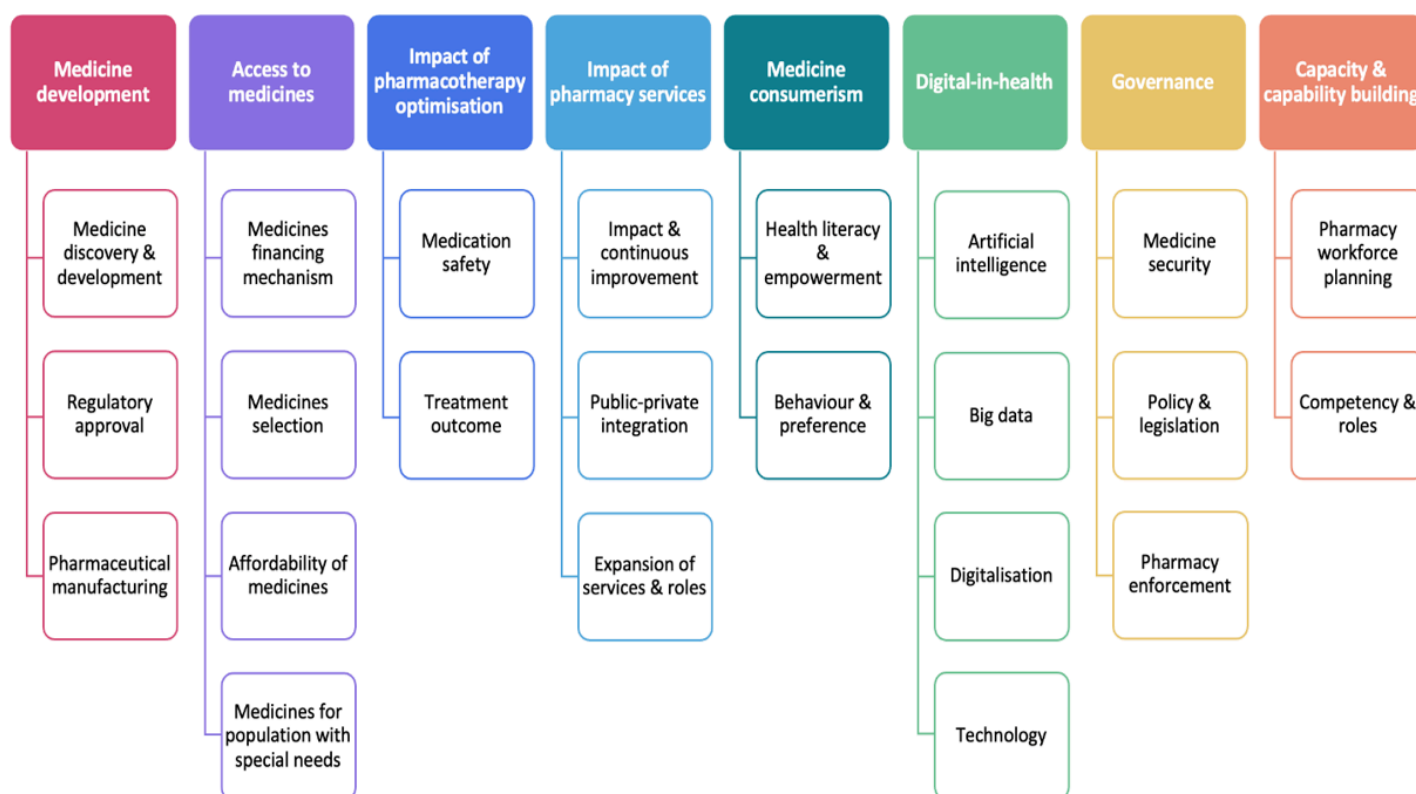


Figure 2

Research domains and sub-domains (national problems) listed in PRPM (2nd Edition)

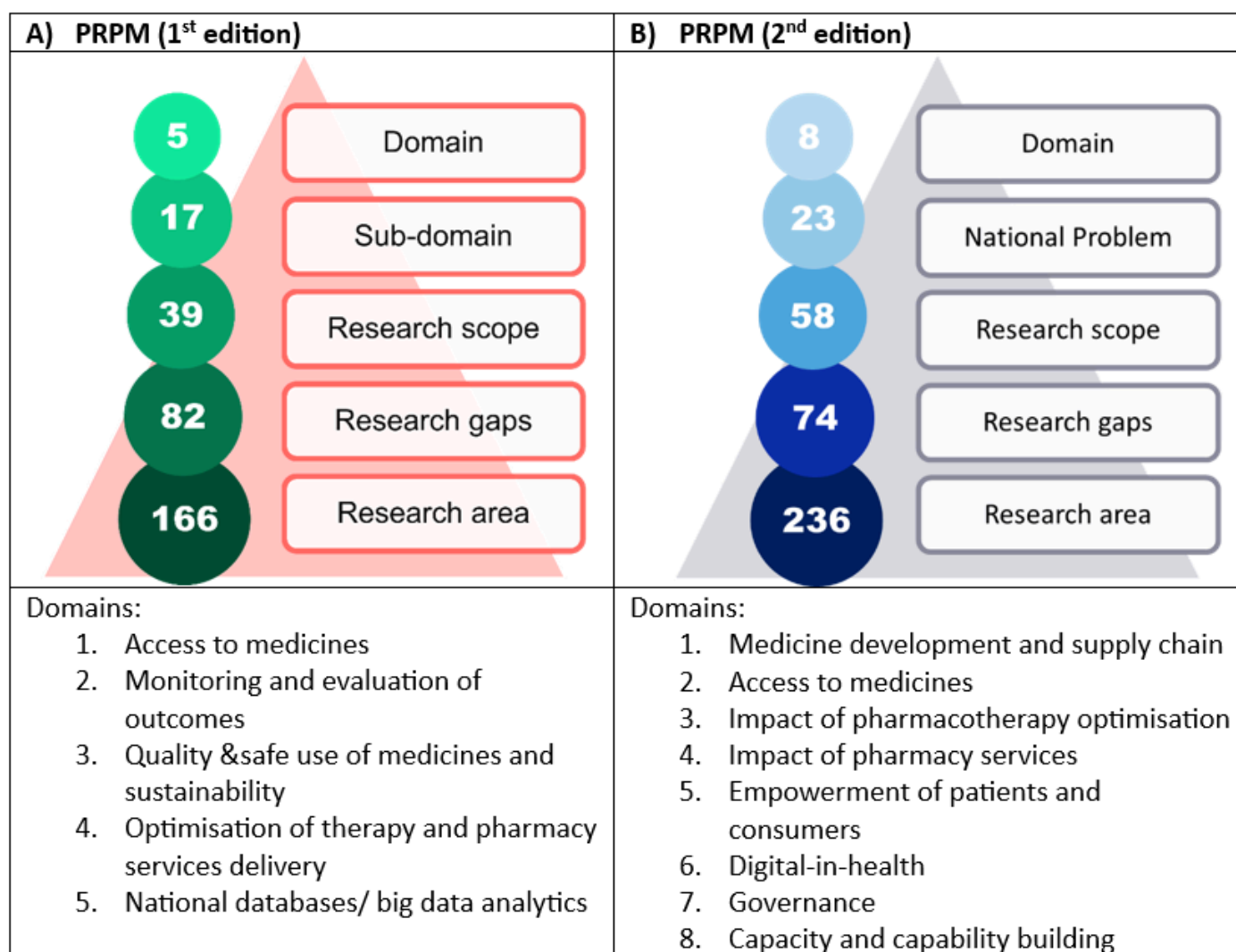


Figure 3

Comparison of domains in PRPM across editions.

A) PRPM (1st edition)

B) PRPM (2nd edition)