

Practice-relevant research-based education at the intersection of Health Economics, Policy, and Management

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The paper presents the Master's Program in Health Economics, Policy, and Management (HEPM Program) at the Department of Learning, Informatics, Management and Ethics (LIME) at Karolinska Institutet (KI). Through selected examples of master theses, it illustrates how the program fosters evidence-based thinking in health economics, policy, and management by educating and training future decision-makers.

The theses demonstrate the application of different methods, including qualitative methods, budget impact analyses, and health economic evaluations, to assess a range of healthcare technologies and health care resource utilization. Together, they contribute to a deeper understanding of healthcare prioritization, cost-effectiveness, hospital productivity, and budget consequences. Although representing a limited sample, these theses reflect methodological breadth and practical relevance, offering valuable insights to support informed decision-making aimed at improving health outcomes within constrained healthcare budgets.

1. Introduction

Medicine has long striven to improve the care patients receive by generating and building upon evidence. In this way, science has been an integral driver of care innovation and practice improvement based on scientific discoveries, aggregated knowledge in the form of evidence-based medicine, and technological advances [1]. However, health economics, policy, and management decisions have not been built on a similar realistic understanding evidence-base of what works, for whom, and in what circumstances [2], [3].

This paper presents and illustrates how the Master's Program in Health Economics, Policy, and Management (HEPM Program) at the Department of Learning, Informatics, Management and Ethics (LIME) at Karolinska Institutet (KI) in Sweden, through collaboration between research groups and external stakeholders, brings evidence-based thinking to health economics, policy, and management by educating and training tomorrow's decision-makers.

2. Methods

We conducted a rigorous self-evaluation of the program, which involved students, faculty, program managers [4]. Quantitative data was retrieved from university admissions and internal data systems, including bibliometric data and the learning management system Canvas. The self-evaluation was followed up with an external evaluation of the program led by an external review committee consisting of three content and workplace experts. Their process included interviews of key stakeholders such as students, faculty, program management, and external organizations who have accepted students for thesis work and/or employed graduates of the program. This paper builds upon and adds to this evaluation by providing a short summary of the program and then illustrating, through a qualitative analysis of a selection of master theses, how the HEPM Program has the potential to contribute to an enhanced understanding of the healthcare sector and effective prioritization of resource utilization to improve health.

3. Master's Program in Health Economics, Policy, and Management

The HEPM program aims to build competencies in health economics, policy, and management to improve healthcare decision-making in the context of limited resources. The program has evolved to focus on integrating these three disciplines to address healthcare challenges effectively. It is highly competitive, with only 7% of applicants matriculated.

Why was the program started?

The HEPM program at Karolinska Institutet (KI) was established at the Medical Management Centre (LIME/KI) in 2011 to meet a need for an educational program at the master's level in Sweden with a focus on developing practical skills and competencies in health economics and health economic evaluation, medical management, and health policy. Several factors contributed to this decision. There was the realization that medicine could benefit from management thinking in implementing lab bench learning into bedside practice [5]. Health care providers and Health Technology Assessment (HTA) agencies required professionals with the expertise to assess the value of new, often costly treatments, to inform decisions on pricing, reimbursement, and prioritization to improve health. This was due to societal demands for better health outcomes, improved patient experiences and staff well-being, and managing increasing costs of new often expensive health technologies. The idea was that HEPM alumni could contribute to more well-informed and evidence-based decisions throughout the health-care sector.

The program was initially launched as a specialization within the Public Health Sciences program. In 2017, it became an independent degree program that utilized specific competencies at LIME in the areas of health economics, medical management, and health policy, in close collaboration with the Department of Global Public Health. These areas continue to form the core syllabus of the program.

Three pillars of the HEPM curriculum

The interdisciplinary program is structured around three main pillars: Health Economics, Health Policy, and Medical Management. The curriculum includes foundational courses in the first year and specialized coursework in the second year, culminating in a thesis project that allows students to explore their specific areas of interest in depth. Courses include foundational and advanced courses in the financing of health care, health outcomes measurement, economic evaluation of health care programs, modelling in economic evaluations, medical management, and health systems & policy. The program also emphasizes the development of analytical and quantitative skills through courses in statistics and econometrics.

Courses and assignments focus on real-world challenges, applications, and interdisciplinary collaboration. Students develop their competencies through workshops, hybrid teaching, field studies, and case teaching. These teaching scenarios build upon and integrate ongoing faculty research projects. By the end of the program, students have gained not only a comprehensive understanding of health systems, but the ability to manage and develop them to improve their

future impact on population health. The program was involved in and has adopted the pedagogical policy developed for the Karolinska Institutet that builds on and strives to maintain the creativity, courage, and curiosity that students come to the program with through student-centered and active learning, the scholarship of teaching and learning, and psychological safety [6], [7].

Research and Practical Experience

Students have the opportunity to participate in research projects that provide practical experience in the field during the master thesis work. All faculty are engaged in research and have a broad international network. Research experiences are designed to enhance students' understanding of real-world health care issues and prepare them for careers in academia, government, and the private sector. The program encourages collaboration between students and faculty on research initiatives, allowing students to contribute to the advancement of knowledge in health economics, management, and policy.

Preparing Students for Future Healthcare Challenges

While the curriculum is challenging, the caliber of students is high with approximately 90% of students graduating within two years. HEPM offers a robust foundation for students seeking to make a meaningful impact and contribution to the health care sector. Through a combination of rigorous coursework, innovative pedagogy, research opportunities, and practical case study experience, the program equips graduates with skills and insights needed to address health care challenges of today and the future. Graduates of the program are prepared for a variety of career paths, including roles as health economists, policy analysts, consultants, health services researchers or health care managers working in both the private and public sectors. The strong emphasis on quantitative skills and qualitative analytical training ensures graduates are equipped to contribute to the development of effective health policies and management strategies across the globe.

4. HEPM's Role in Advancing our Understanding of Health Care

Since the start of the program in 2011, approximately 300 Master's theses have been written. The master's thesis can be seen as the culminating expression of the program. They allow students to follow their own curiosity and delve deeper into one or more of the three HEPM pillars to demonstrate students' mastery of a subject. This has led to a variety of methodological approaches (See Table 1) as well as the generation of valuable and publishable insights. To illustrate these potential contributions, we present eight recent theses:

1. *Cost-effectiveness and budget impact analysis of AI-based myopia screening in children* [8]

The aim was to determine the cost-effectiveness and budget impact of implementing an AI-based mobile screening tool compared to standard screening for French children aged 6–8 years, from the healthcare payer perspective. Childhood myopia presents a growing global health burden, associated with long-term visual impairment and substantial healthcare costs. Early detection is essential, yet cost-effective strategies tailored to national settings remain underexplored. The thesis found that the AI-based myopia screening tool is a clinically superior, cost-effective, and scalable alternative to current practice. Its integration into national school screening programs may yield meaningful public health and economic gains.

2. *Cost-utility analysis of trans-nasal evaporative cooling for out-of-hospital cardiac arrest: A trial-based economic evaluation* [9]

The aim was to determine the cost-effectiveness of intra-arrest trans-nasal evaporative cooling (TNEC) compared with in-hospital hypothermia initiation. Survival rates after cardiac arrest vary, ranging from 8% to 18% across Europe, with the majority of deaths occurring prior to hospitalization or during intensive care. In Sweden, 5,000-10,000 out-of-hospital cardiac arrests occur annually with a survival rate of 10-12%. Over the past 15 years, only modest improvements in survival and no improvements in neurological outcomes after cardiac arrest have been observed. Therapeutic hypothermia is promising, but evidence on the cost-effectiveness of early cooling is lacking. The base case analysis conducted found that over 90-days, trans-nasal evaporative cooling was not cost-effective. Given the high upfront costs of TNEC, minimal gain in quality adjusted life-years (QALYs), and with a very short time horizon, the results suggested the need for research using more detailed cost data and longer-term outcomes beyond initial follow-up.

3. *A Cost-Effectiveness Analysis of Oral Nutritional Supplements Compared to Standard Care for Malnutrition in Older Adults in Swedish Nursing Homes* [10]

The aim was to better understand the cost benefits for older adults of oral nutrition supplement (ONS) according to the current national malnutrition guideline in Sweden. Malnutrition can lead to multiple adverse outcomes, e.g. poor wound healing, falls, hospitalization, and exacerbate chronic illnesses. Up to 50% of older adults in Swedish nursing homes risk malnutrition. Daily consumption of ONS has been shown to improve nutritional outcomes and quality of life in nursing home residents at risk of malnutrition. The results demonstrated that ONS use has the probability of being cost-effective. Despite an increased cost, quality of life and life-years improved. Based on Swedish willingness-to-pay thresholds, this cost increase is justified by the outcomes.

4. *Impact of Internal Governance and Autonomy on Nurses' Job Satisfaction and Intention to leave: Two Wave Cross-Sectional Study in a Swedish Hospital* [11]

The thesis explored factors related to nurses' intention to leave in a Swedish hospital. Nurse retention is a critical issue for health systems globally as job dissatisfaction, burnout, and poor organizational conditions drive high turnover. The Magnet model emphasizes internal governance, professional autonomy, and leadership as pathways to improve nursing work environments and outcomes and thereby improve retention. Results showed that job satisfaction was consistently associated with lower intention to leave. Autonomy and governance did not have significant direct effects but showed significant indirect effects via job satisfaction. Burnout was positively associated with intention to leave, largely through its negative effect on satisfaction. Efforts to retain nurses should therefore focus on strengthening professional satisfaction through shared governance, supportive leadership, and opportunities for autonomy.

5. *Drug Market Dynamics in Sweden: A Longitudinal Study of Price and Volume Changes Following the Loss of Market Exclusivity* [12]

The aim was to increase the understanding of how drug prices and sales volumes developed after the introduction of generic competition in the Swedish outpatient pharmaceutical market. Loss of exclusivity marks a pivotal point in the lifecycle of pharmaceuticals, transitioning drugs from a monopoly to multi-actor competition. In Sweden, policies such as mandatory generic substitution and price caps govern this process. However, the trajectory of market outcomes may vary depending on pre-entry conditions, therapeutic context, and the extent of competition. Generic entry was associated with notable price reductions and volume responses were heterogeneous, likely shaped by structural, behavioral, and therapeutic factors. The findings underscored the importance of accounting for drug-specific characteristics and competitive intensity in pharmaceutical policy and highlighted the value of flexible, time-sensitive modelling strategies to capture market transitions effectively.

6. *Perceptions of well-being and professional motivation of doctors in Kyiv in the context of the Russian-Ukrainian war: A qualitative study* [13]

The aim was to identify factors that influenced doctors' psychological, physical, and professional well-being in the context of war and to explore the support they perceived necessary to cope with the challenges posed by the conflict. The full-scale invasion of Ukraine has caused extensive damage to the country's infrastructure, including healthcare facilities, and significantly impacted the well-being of the population and healthcare workers. It has led to an increase in trauma cases, disrupted medical supply chains, and placed immense psychological strain on healthcare professionals, many of whom

remain on the front lines. The findings showed that personal resilience and peer support have been vital for retention of medical staff. The findings also describe an urgent need for institutional reforms, including enhanced psychological services, improved emergency protocols, and equitable remuneration, to support healthcare professionals.

7. Chief operating officers: exploring a new managerial role in the Swedish healthcare context emergency hospitals [14]

The aim was to increase the understanding of the scope of work of Chief Operating Officers (COOs) in Swedish healthcare and their ability to execute the work. Healthcare management decentralization in Sweden increases responsiveness to local needs, but also poses risks, e.g. lack of coordination and inefficient resource use. Government reports highlight a "productivity crisis" in healthcare with increasing expenses and declining productivity. They call for new guiding principles that prioritize efficiency within and between hospital departments. The COO role has emerged as a new managerial position in Swedish hospitals to meet this call. The study found that COOs operate at the intersection of centralized and decentralized management within their healthcare organizations, bridging this gap. For COOs to exercise their authority, they needed to establish well-functioning collaborations and mutual trust with clinic managers and CEOs. An understanding of healthcare facilitated this. When successful, COOs could play an important role in building bridges that improve healthcare system performance.

8. Balancing productivity: Analysing a staffing model for inpatient wards in two Swedish healthcare regions [15]

The aim was to increase the understanding of productivity levels across defined ward categories within a staffing model based on patient complexity and care intensity. Swedish regions strive to balance healthcare productivity, care quality, and staff workload. The need to enhance productivity has been intensified by the shortages of medical staff in inpatient care settings, demographic challenges, and financial strains. One potential countermeasure would be to implement staffing models that include productivity measurements in order to assess current staffing and align it with workload demand. The results showed that the suggested staffing model helped inpatient ward managers identify potential adjustments for staff allocation to improve productivity, excepting paediatric and maternity wards, where the model's categories did not fit the work-as-done. The scope and scale of the model could be improved through the establishment of productivity targets and standardised assessment tools for each ward category.

5. Discussion and conclusions

The eight master theses illustrate the role the three pillars of health economics, policy, and management have in understanding how to improve the effectiveness, quality, experience, and efficiency of health service delivery. The theses were situated in the domains of testing and translating interventions into improved policy and practice. They were topical, addressing issues related to innovative technologies (e.g. AI) and innovative medical practices (e.g. transnasal evaporative cooling), as well as demands emerging from the polycrisis (psychosocial, staff retention) [16]. They employed several methodologies, e.g. cost-effectiveness and cost-utility analysis, budget impact analysis, longitudinal market analysis, cross-sectional surveys, and qualitative interviews to assess diverse healthcare technologies and managerial approaches.

While most theses were conducted in Swedish contexts, they addressed globally relevant challenges (malnutrition, workforce retention, pharmaceutical market dynamics, healthcare delivery in conflict, and cost-effective resource use). Collectively, they enhance our understanding of prioritization based on information about cost-effectiveness and whether the costs are justified by the health benefits, hospital ward productivity, and budget impact. They highlight the importance of early detection, workforce stability, market structure effects on drug pricing, resilience and peer support in crisis settings, and managerial roles in improving health system performance. Although representing a small sample of the HEPM program's output, they illustrate methodological diversity and practical relevance, offering valuable evidence to support informed healthcare decision-making.

HEPM appears to offer a practice-relevant research-based education at the intersection of Health Economics, Policy, and Management. Given this and the preceding analyses, we are confident the program will continue to offer significant contributions to health policy and practice, supporting evidence-based decision-making aimed at improving health outcomes within the constraints of limited healthcare resources if student-centered practices and the link between research and practice-relevance are maintained and sustained.

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