Drug Designing: Open Access
ISSN: 2169-0138

Vaidya, Drug Des 2014, 3:2
DOI: 10.4172/2169-0138.1000111

Commentary Open Access

# Drug Designing and Development: Emerging Role of Health Technology Assessment

**Anil Vaidya**[1,2*]

[1]*Department of Clinical Epidemiology and Medical Technology Assessment (KEMTA), Maastricht University Medical Centre, Maastricht, The Netherlands*

[2]*O-Zone Health Economics and Outcomes Research Consultancy, Maastricht, The Netherlands*

[*]**Corresponding author:** Anil Vaidya, Department of Clinical Epidemiology and Medical Technology Assessment (KEMTA), Maastricht University Medical Centre, Maastricht, The Netherlands, Tel: +31 (0)43 38 81711; E-mail: anil.vaidya@mumc.nl

**Rec date:** Apr 24, 2014, **Acc date:** April 25, 2014, **Pub date:** April 27, 2014



## Introduction

Value driven drug development has changed the paradigm of conventional drug development. Need for proving the value of new drug against its cost is a new 'fourth hurdle' introduced in the last two decades after the three existing requirements of safety, efficacy and quality. Evidence on former three hurdles is required for licensing of the new drug but evidence on cost effectiveness is needed by the regulatory bodies in order to approve its uptake in the health care system [1,2]. Drug manufacturers need to demonstrate the 'value for money' to achieve the market access and reimbursement for a new drug. 'Value for money' refers to the value to the society and health system meaning that the drug provides incremental health gain at a justified cost [3]. It is important to maximize the health gain from the health care resources therefore 'value for money' from use of a new drug is seen as an important policy objective. The evidentiary requirements for a positive reimbursement decision by the health care payers and differences between licensing and market access requirements should be clearly understood by the drug developers.

In the current fiscal scenario where cost containment is the key strategy in all sectors, health sector is facing a dual challenge due to high costs of new drugs [4]. In this environment it is understandable that the health care providers are reluctant to pay for a new drug without knowing its long term clinical and societal value. In turn, many drugs fail to get reimbursement approval and market access thus, fail to return the investment on their development. The challenge of positive reimbursement decision for a new drug is likely to grow as health care payers want to contain costs by demanding more value for their money. This commentary examines the emerging role of HTA in drug designing and development and how HTA could be perceived as facilitator rather than barrier to the innovation and market access.

## Health Technology Assessment

Health technology assessment (HTA) is a multidisciplinary process to assess the 'added value' of a new drug. HTA bridges the gap between scientific evidence and the decisions of policy makers. It assists in decision making by quantifying the incremental benefit of a new drug against its cost. HTAs provide high-quality information to decision makers about the clinical effectiveness, cost-effectiveness, and broader impact of drugs on society and health system. With steadily growing expenditure on prescription drugs in many OECD (The Organization for Economic Co-operation and Development) countries, health care payers are turning to HTA for evidence based reimbursement decisions [5]. Most of the Western European countries, Australia and North America use HTA as a tool to assist in the purchasing and reimbursement decisions for approved drugs. Reliance on HTA is also growing in other European and Asian health care payers [6]. The importance of demonstrating 'value for money' is even more important now as NICE (UK) proposes 'value-based pricing' in the UK in 2014, and Germany passed new legislation effective as of January 2011 requiring manufacturers to provide evidence of an additional benefit compared with existing treatments to enter price negotiations. If the product is deemed to have no additional benefit; the product is immediately placed within a group of products with similar pharmaceutical and therapeutic characteristics for which maximum reimbursement prices have already been determined [7,8].

Successful drugs could demonstrate their clinical and societal value to all the stakeholders in the early phase of their development. Drug developers need to keep in view not just the need of the patients but also of health care payers, HTA and other regulatory bodies. Positive reimbursement and market access for new products could be achieved by understanding the evidence requirement by the regulatory bodies, recognizing the hurdles and identifying strategies to deal with these hurdles. In the development phase of a drug HTA may provide a foundation for relevant evidence synthesis and use by the developers for a successful market access and reimbursement for the drugs across key markets.

## Early Assessment for Investment Decisions

Typically HTA is conducted once the drug is proven to be safe, efficacious and of good quality (three hurdles). So, conventionally HTA is conducted from the demand side. This conventional assessment occurs at a point of time at which the development of the drug may no longer be influenced and invested resources are already utilized. Adoption of health economic principles at the supply side i.e. early stage development when effectiveness is unknown, may help inform investment decisions and indicate product's market potential and commercial viability. In early-stage assessment, there is usually only a limited amount of data available with regard to the performance of the new drug, leading to high uncertainty in the values of some of the inputs. This issue could be addressed by HTA decision analytic models using a unique approach of synthesizing evidences from multiple sources and performing sensitivity analysis to address uncertainty. Decision models can be used to support drug development decisions. These models could provide evidence based scientific advice to the drug developers in the early development phase for a successful outcome. FDA and EMEA have been a part of the pilot scheme to provide scientific advice to drug design protocols [9].

Models can be used to perform a threshold analysis for important characteristics like efficacy and price for the drug under development. This may guide the drug developer to calculate the minimum incremental benefit and maximum market price of the drug to be cost

effective and likely to receive a positive advice from the regulatory bodies regarding the reimbursement. HTA encompasses these crucial elements and provides a break-even drug price where financial benefits outweigh the drug cost hence positive expected returns on investment and worthiness of developmental process. Mc Ateer and colleagues have presented headroom analysis for the application of HTA in the early development of health technologies [10]. Headroom analysis is a threshold analysis based on the most optimistic assumptions in the plausible range. The maximum net incremental cost for which the technology would still be considered cost effective is calculated and termed as 'the headroom'. Another article co-authored by Mc Ateer stresses the importance to revisit economic analysis with new information as it becomes available during the development process regarding the likely effectiveness of the drug [11]. A headroom analysis is primarily useful as a barrier to misguidedly investing in those drugs that can never be cost effective. As research progresses, estimates of costs and effectiveness can be updated.

Pietzsch et al. [10,11] have published a framework describing HTA at that early stage is a form of risk analysis and requires structuring the possible scenarios for future costs and benefits, computing their probabilities, and assessing their consequences. To support investment and design decisions at an early stage, Pietzsch suggest the following steps: (i) identify performance and outcome measures most relevant for later evidence-based assessment, (ii) evaluate the possible spectrum of expected performance of the drug, (iii) identify the main drivers of product performance and of related critical outcome measures.

These frameworks could be applied in the early phase of drug development and could guide the investment decisions. The use of early-stage HTA as a tool for informing product investment decision making seems especially useful at the intersection between "investigation and technology transfer" and "development and validation [12]. The drug could be made financially attractive and societally cost-effective using pricing decision based on early HTA. If there is little or no chance the drug could be marketed at a price that would keep the maximum incremental cost below the threshold then the technology should not attract further investment.

HTA methods and processes earlier in the product development cycle facilitate the design and adoption of more effective, cost effective and useful health innovations. There is an increasing role of HTA on the horizon during the drug development for a successful market access and positive reimbursement decisions. Extensive interaction with stakeholders as patient, health care payers, regulatory/HTA bodies would help in advance mapping and defining the 'value' of new drugs. Their inputs will pave the way for the development process. All the stakeholders involved in drug development and commercialization need to plan for a future where evidenced based medicine, health technology assessment and outcomes research are used together to inform views on the value of drug innovations.

## Conflict of Interest

The author declared no conflict of interest.

## References

1. Paul JE, Trueman P (2001) 'Fourth hurdle reviews', NICE, and database applications. Pharmacoepidemiol Drug Saf 10: 429-438.
2. Taylor RS, Drummond MF, Salkeld G, Sullivan SD (2007) Development of Fourth Hurdle Policies Around the World. In: Freemantle N, Hill S (Eds) Evaluating Pharmaceuticals for Health Policy and Reimbursement. Blackwell Science Ltd.
3. Kleinke JD (2001) The price of progress: prescription drugs in the health care market. Health Aff (Millwood) 20: 43-60.
4. Rapoport J, Jonsson E, Jacobs P (2009) Introduction and Summary. In: Cost Containment and Efficiency in National Health Systems. Wiley-VCH Verlag GmbH & Co. KGaA.
5. OECD Health Data 2013: Pharmaceutical expenditure per capita at current prices and PPPs.
6. International Society for Pharmacoeconomics and Outcome Research (ISPOR). Directory of health technology assessment worldwide.
7. Adamski J, Godman B, Ofierska-Sujkowska G, OsiÅ„ska B, Herholz H, et al. (2010) Risk sharing arrangements for pharmaceuticals: potential considerations and recommendations for European payers. BMC Health Serv Res 10: 153.
8. Carlson JJ, Sullivan SD, Garrison LP, Neumann PJ, Veenstra DL (2010) Linking payment to health outcomes: a taxonomy and examination of performance-based reimbursement schemes between healthcare payers and manufacturers. Health Policy 96: 179-190.
9. Scientific advice and protocol assistance to companies involved in developing medicines.
10. Pietzsch J, Paté-Cornell ME, Krummel T: A Framework for Probabilistic Assessment of New Medical Technologies. In: Spitzer C, Schmocker U, Dang V (2004) Probabilistic Safety Assessment and Management. Springer London.
11. Pietzsch JB, Paté-Cornell ME (2008) Early technology assessment of new medical devices. Int J Technol Assess Health Care 24: 36-44.
12. Lal JA, Vaidya A, Gutiérrez-Ibarluzea I, Dauben HP, Brand A (2013) The Learning-Adapting-Leveling model: from theory to hypothesis of steps for implementation of basic genome-based evidence in personalized medicine. Personalized Medicine 10: 683-701.