



provide basic health care; (4) establishing a national essential drug system; and (5) piloting public hospital reform.' (1)

Following the 2009 reform, five sets of comprehensive policies were introduced (5). They are summarized and quoted below as follows:

- Medical security: to achieve universal coverage through insurance systems for urban residents (urban employees' and residents' basic medical insurance), farmers (New Rural Cooperative Medical Service), and those living in poverty in both urban and rural areas (medical assistance).
- Public health services: full government funding for a minimum package of nine essential services (including maternal and child health, immunization, mental health, aged care, chronic disease management, and health education) with a view to equal access to public health services for all.
- Primary care: establishing a comprehensive network of basic health services through a three-tier rural network and urban community health services, with Chinese medicine integrated into these service delivery networks rather than as a free-standing system.
- Pharmaceutical supply system reform: setting an essential drug list that is linked to basic medical insurance and cooperative medical service, with open tender based on government reference price.
- Pilot hospital reforms: trialing strategies for ownership and government, quality, regulation, training, and revenue oversight.

These new policies did not completely eliminate the earlier policies. Thus, the post-2009 policies coexist with many pre-2009 policies. Given the number and complexity of these policies it would be difficult to obtain their 'big picture' from the corresponding text documents. Despite the best intentions of the policy makers, the complexity of the formulation process and the associated negotiations are likely to introduce differential emphases and biases (5-7). It is necessary to map the text of the policies systemically and systematically to discover their emphases and biases. Such an analysis will help the health policy-advisors and -makers formulate better policies. It can provide feedback on the current policies and feed-forward to future ones (8).

### **Ontology of Health Care Policies**

The ontology of health care policy represents our conceptualization of the health care policy domain (9). It is an 'explicit specification of [our] conceptualization,' (10) and can be used to systematize the description of a complex system such as national health care policies (11). The ontology organizes the terminologies and taxonomies that constitute health care policies. 'Our acceptance of [the] ontology is... similar in principle to our acceptance of a scientific theory, say a system of physics; we adopt, at least insofar as we are reasonable, the simplest conceptual scheme into which the disordered fragments of raw experience can be fitted and arranged.' (12)

The method of constructing and presenting an ontology for a domain is an iterative process (13, 14) that systemically and systematically deconstructs health care policy into its dimensions and associated elements. It is a new method of analyzing and synthesizing knowledge in a domain



















- A method of mapping the national health care policies onto the ontology based on the original text of the policies (in this case Chinese); and
- A method of analyzing the dominant, less dominant and non-dominant focus of a nation's policies, and the consequent gaps in them.

China's health care policies have undergone waves of reform (4). In making these reforms there is a need for policy makers to understand the implications of the above findings for future planning, and prioritizing for formulation (and reformulation) of policy. Our research will allow the policy makers to ask, as discussed above, for example: Are the dominant foci e.g. preventative care, illness-episodic care, quality, and safety balanced against the low focus elements such as illness-chronic care, palliative care, and accessibility? Do they need to be? Ultimately ontological analysis such as this can provide a pragmatic basis for deliberations (7) by policy makers and interest groups for policy formulation.

The framework, the method, and the results can be useful to advance health policy making in general and China's health policies in particular. It can be used to assess the strengths and weaknesses of a country's health policy, and to compare and contrast policies of different countries based on a common framework. The present study is a continuation of our study of Chile, India, and Australia's healthcare policies and programs. Understanding the antecedents and consequences of the emphases in other countries can provide insights into the policies of the parent country.

In ending the discussion, we should also highlight some of the limitations of the research. The ontology may be incomplete or over-specified. In the future, should it be necessary, the ontology can be extended, reduced, refined, or coarsened as appropriate.

Considerable effort has been expended in the translation of the ontology, construction of the glossary, and the monitoring of coding to minimize errors. While the coders tried to stay true to the text of the policies without imputing their own expectations, one cannot exclude the possibility of over-coding and under-coding. Given the large population of programs (289) and the significant variation in the frequency of the elements, despite the potential errors, the results are likely to be robust.

Given the data, errors in the ontological map are unlikely. However, there is room for variation in the interpretation of the luminosity of the different elements. Since the method of construction of the map is completely transparent, it would be easy to compare and contrast different interpretations of the same.

In summary, despite the limitations, the insights are strong. Their explanation as to why the corpus is as described may vary, but there is little room for variation in the description of the policies corpus.

## Financial Disclosure

This study is partially supported by the Chinese National Social Science Fund 15BGL104 and Chinese Ministry of Education of Humanities and Social Science Youth Project 12YJC630028. The views represented in this article are those of the individual authors only.

## References

1. Hsiao WC, Li M, Zhang S. Universal Health Coverage: the Case of China. 2013.
2. Yip WC, Hsiao WC, Chen W, Hu S, Ma J, et al. 2012. Early appraisal of China's huge and complex health-care reforms. *Lancet*. 379(9818), 833-42. [PubMed http://dx.doi.org/10.1016/S0140-6736\(11\)61880-1](http://dx.doi.org/10.1016/S0140-6736(11)61880-1)
3. Xiao N, Long Q, Tang X, Tang S. 2014. A community-based approach to non-communicable chronic disease management within a context of advancing universal health coverage in China: progress and challenges. *BMC Public Health*. 14(2), 1-6. doi:10.1186/1471-2458-14-s2-s2. [PubMed](http://dx.doi.org/10.1186/1471-2458-14-s2-s2)
4. Yip WC, Hsiao WC. 2015. What Drove the Cycles of Chinese Health System Reforms? *Health Syst Reform*. 1(1), 52-61. doi:<http://dx.doi.org/10.4161/23288604.2014.995005>.
5. Lin V, Zhao H. Health Policy Reform in China. In: E. Kuhlmann et al., editor. *The Palgrave International Handbook of Healthcare Policy and Governance*: Palgrave Macmillan; 2015.
6. Kornreich Y, Vertinsky I, Potter PB. 2012. Consultation and Deliberation in China: The Making of China's Health-Care Reform. *China J*. (68), 176-203. doi:<http://dx.doi.org/10.1086/666583>.
7. Korolev A. 2014. Deliberative Democracy Nationwide?—Evaluating Deliberativeness of Healthcare Reform in China. *J Chinese Polit Sci*. 19(2), 151-72. doi:<http://dx.doi.org/10.1007/s11366-014-9287-1>.
8. Ramaprasad A. On the Definition of Feedback. *Behav Sci*. 1983;28(1):4-13. doi:10.1002/bs.3830280103. PubMed PMID: ISI:A1983QA64700002.
9. Gruber TR. Ontology. In: Liu L, Özsu MT, editors. *Encyclopedia of Database Systems*. New York: Springer-Verlag; 2008.
10. Gruber TR. 1995. Toward Principles for the Design of Ontologies Used for Knowledge Sharing. *Int J Hum Comput Stud*. 43(5-6), 907-28. doi:<http://dx.doi.org/10.1006/jhcs.1995.1081>.
11. Cimino JJ. 2006. In defense of the Desiderata. *J Biomed Inform*. 39(3), 299-306. doi:<http://dx.doi.org/10.1016/j.jbi.2005.11.008>. [PubMed](http://pubmed.ncbi.nlm.nih.gov/16311008/)
12. Quine WVO. *From a Logical Point of View*. Second, revised ed. Boston, MA, USA: Harvard University Press; 1961.
13. Ramaprasad A, Syn T. Design Thinking and Evaluation Using an Ontology. In: Helfert M, Donnellan B, Kenneally J, editors. *Design Science: Perspectives from Europe*. Communications in Computer and Information Science. 447. Switzerland: Springer International Publishing; 2014. p. 63-74.
14. Ramaprasad A, Syn T. Ontological Topography: Mapping the Bright, Light, Blind/Blank Spots in Healthcare Knowledge. Proceedings of the 2nd International Conference on Big Data and Analytics in Healthcare (BDAH 2014). Singapore2014.

15. Ramaprasad A, Syn T. 2015. Ontological Meta-Analysis and Synthesis. *Comm Assoc Inform Syst.* 37, 138-53.
16. Tate M, Furtmueller E, Evermann J, Bandara W. 2015. Introduction to the Special Issue: The Literature Review in Information Systems. *Comm Assoc Inform Syst.* 37, 103-11.
17. Núñez Mondaca A, Ramaprasad A, Syn T. National Healthcare Policies in Chile: An Ontological Meta-Analysis. In: Sarkar IN, Georgiou A, Mazzoncini de Azevedo Marques P, editors. MEDINFO 2015: eHealth-enabled Health. Studies in Health Technology and Informatics. 2162015. p. 1105.
18. Ramaprasad A, Sastry NKB, Syn T. National Healthcare Programs and Policies in India: An Ontological Analysis. Proceedings of the 10th Annual International Conference on Public Policy and Management (10 CPPM 2015). Bangalore, India2015.
19. Ramaprasad A, Syn T, Win KT. Ontological Meta-Analysis and Synthesis of HIPAA. Proceedings of the 18th Pacific Asia Conference on Information Systems (PACIS 2014). Chengdu, China2014.
20. Brennan L, Voros J, Brady E. 2011. Paradigms at play and implications for validity in social marketing research. *J Soc Market.* 1(2), 100-19. doi:<http://dx.doi.org/10.1108/20426761111141869>.
21. Horn BR, Lee I-H. Toward integrated interdisciplinary information and communication sciences: a general systems perspective. Proceedings of the 22nd Hawaii International Conference on System Sciences (HICSS 1989). 4. Kailua-Kona, Hawaii, USA: IEEE; 1989. p. 244-55.
22. Tufte ER. *Envisioining Information*. Cheshire, CT: Graphics Press; 1990.
23. Liu X, Tang S, Yu B, Phuong NK, Yan F, et al. 2012. Can rural health insurance improve equity in health care utilization? a comparison between China and Vietnam. *Int J Equity Health.* 11(1), 1-9. doi:<http://dx.doi.org/10.1186/1475-9276-11-10>. [PubMed](#)
24. Li T, Lei T, Xie Z, Zhang T. 2016. Determinants of basic public health services provision by village doctors in China: using non-communicable diseases management as an example. *BMC Health Serv Res.* 16(1), 1-10. doi:10.1186/s12913-016-1276-y. [PubMed](#)
25. Ou Y, Jing B-q, Guo F-f, Zhao L, Xie Q, Fang Y-l, et al. 2014. Audits of the quality of perioperative antibiotic prophylaxis in Shandong Province, China, 2006 to 2011. *Am J Infect Control.* 42(5), 516-20. doi:<http://dx.doi.org/10.1016/j.ajic.2014.01.001>. [PubMed](#)
26. Tang Y, Zhang X, Yang C, Yang L, Wang H, et al. 2013. Application of propensity scores to estimate the association between government subsidy and injection use in primary health care institutions in China. *BMC Health Serv Res.* 13(1), 1-7. doi:<http://dx.doi.org/10.1186/1472-6963-13-183>. [PubMed](#)
27. Yang L, Liu C, Ferrier JA, Zhou W, Zhang X. The impact of the National Essential Medicines Policy on prescribing behaviours in primary care facilities in Hubei province of China. *Health Pol Plann.* 2012:czs116. doi: 10.1093/heapol/czs116.

28. Li Y, Xu J, Wang F, Wang B, Liu L, et al. 2012. Overprescribing In China, Driven By Financial Incentives, Results In Very High Use Of Antibiotics, Injections, And Corticosteroids. *Health Aff.* 31(5), 1075-82. doi:<http://dx.doi.org/10.1377/hlthaff.2010.0965>. PubMed

## Appendix: Glossary

*Policy*: Health care policy.

*Scope*: Reach of the health care policy.

*Global*: Policy applicable in all countries of the world.

*National*: Policy applicable everywhere in China.

*Regional*: Policy applicable to a region of China.

*Local*: Policy applicable within a defined part of China.

*Urban*: Policy applicable within local urban areas.

*Rural*: Policy applicable within local rural areas.

*Provider*: Policy applicable to a health care providing institution.

*Focus*: Focus of the health care policy.

*Drugs*: Policies regarding drugs used in health care.

*Food*: Policies regarding food and nutrition in health care.

*Financial*: Policies regarding health care finance.

*Legal*: Policies regarding legal issues in health care.

*Insurance*: Policies regarding health care insurance.

*Technology*: Policies regarding health care technology.

*Information*: Policies regarding health care information.

*Treatment*: Policies regarding treatment.

*Personnel*: Policies regarding health care personnel.

*Physician*: Policies regarding physicians.

*General*: Policies regarding general physicians.

*Specialist*: Policies regarding specialist physicians.

*Nurses*: Policies regarding health care nurses.

*Staff*: Policies regarding health care staff.

*Administration*: Policies regarding health care administration.

*Outcomes*: The intended outcomes of health care policy.

*Accessibility*: The accessibility of health care to the population.

*Cost*: The cost of health care to the population.

*Quality*: The quality of health care delivered to the population.

*Satisfaction*: The population's satisfaction with health care.

*Safety*: The safety of health care delivered to the population.

*Parity*: The parity of health care delivered to the population segments.

*Timeliness*: The timeliness of health care delivery to the population.

*Care*: The different types of health care.

*Preventive*: Care to prevent illnesses and diseases in the population.

*Illness*: Care of illnesses when they occur.

*Mental*: Care of mental illness.

*Physiological*: Treatment of physiological illness

*Episodic*: Care during illness episodes -- time bound.

*Chronic*: Care of chronic illnesses -- continuing.

*Occupational*: Treatment of occupational illness.

*Palliative*: Care to alleviate pain and suffering.

*Emergency*: Care of emergency illness

*Population*: The population targeted by the policy.

*Individual*: Individual recipients of health care.

*Children*: Children who are recipients of health care.

*Adolescents*: Adolescents receiving health care.

*Adults*: Adults receiving health care.

*Female*: Women receiving health care.

*Pregnant women*: Pregnant women receiving maternal health care.

*Workers*: Workers receiving occupational/work related health care.

*Disabled*: Disabled adults receiving health care.

*Other*: Adults other than mothers and workers.

*Aged*: Older people receiving elderly health care.

*Family*: Family, as an entity, receiving health care.

*Community/group*: Community/group as an entity receiving health care.