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Toward Equity under Health System Reform; A Systematic Review

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Abstract

Background: To improve health equity, many countries have undergone consistent health sector reforms during the two past decades although most of them still have some challenges ahead.
Objectives: This systematic review aimed to determine the impact of health system reforms on inequities and social determinants of health (SDOH) since the year 2000.
Methods: PubMed, Scopus, and Google Scholar databases were utilized to conduct a literature search of related records from January 2000 to August 2014. Out of 1,559 published articles, 29 were selected according to specified inclusion and exclusion criteria.
Results: Almost all investigated countries have considered financial interventions to address increases in governmental health expenditures and implement universal health coverage. While most countries stressed in-patient or outpatient care, primary care is often disregarded in many health system reforms. Although the aforementioned reforms have been somewhat successful, several socioeconomic groups continue to experience health inequities.
Conclusions: These results illustrate the vital role that socioeconomic and political determinants play in the success of studied reforms. Furthermore, emphasizing primary health care, implementing reforms in a stepwise and well-monitored manner, and utilizing quality control mechanisms can mitigate health inequity.

Keywords: Health Sector Reform, Socio-Economic Status, Equity, Utilization

1. Introduction

According to the world health organization's report in Rio de Janeiro's conference for social determinants of health, all people hold the right to live with the "highest standards of a healthy life" (1). Health sector reforms (HSR) - defined as purposeful and standard changes in the health sector aiming to improve equity, efficiency, and effectiveness- often assist in reaching such standards by reducing regional socioeconomic inequities and providing equal access to healthcare (2-5). As illustrated in literature, the most notable cause of global health inequities is socioeconomic inequalities among different groups within a society (6). Obviously, various socio-economic classes in each society comprise individuals with different health states, thereby establishing situations that leave certain parts of the population deprived from a healthy and high-quality life.

Health systems are complex because there are no linear relationships between different functions, components, or outcomes; this makes it difficult to evaluate health sector reform with respect to complex outcomes of health system. Yet ever since the 1990s, numerous frameworks have been introduced to analyze reforms and outcomes of health systems (7). Examples of such frameworks include six building blocks, four functions, and control knobs of health systems (7). Of these frameworks, the six building blocks approach is a valuable measure for pinpointing, describing, and prioritizing health system restrictions. It identifies where and why investments have to be focused, what happens as an outcome, and by what measures the changes can be overseen (7).

Over past 20 years, many countries focused on social determinants to reduce health inequities when implementing reformative actions. Most HSRs worked to expand health insurance towards universal health coverage (UHC) (3, 8-10). While many developing and developed countries with HSRs may have been successful in some areas, most countries experienced challenges and barriers. As an example, the Netherlands, (11) the United States, (12) Chile,

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(13) Turkey (14) China, (15) Thailand, (16) South Korea, (17) Brazil, (18) and Iran (19, 20) were able to take actions to promote their healthcare services despite the negative consequences.

Hence, this study aimed to utilize the six building blocks framework in determining the impact of HSRs on reducing inequities, particularly with respect to SDOH.

2. Methods

Using the population, intervention, comparator, and outcome (PICO) as a reference, the study attempted to answer the following question: what are the effects of HSRs on reducing health inequalities? The setting of this study included nationwide HSRs within the past 15 years that focused on improving health equity, while the target population was healthcare providers affected by those HSRs. Interventions within this study included HSRs of any type that were directed towards reducing health disparities. Pre and post reform health-related indices were evaluated as the measures of interest (comparators). The outcomes of HSRs were determined by comparing health insurance coverage, out of pocket (OOP)/government healthcare expenditures, and quality, access, and utility of health services.

2.1. Search Strategy and Data Sources

Based on guidelines set forth for systematic reviews, a comprehensive literature search was conducted for studies with similar research questions (21, 22). Protocols and systematic review search took place via different databases including the center for reviews and dissemination, and the Cochrane database of systematic reviews.

The researchers used Scopus, PubMed/Medline, and Google Scholar to find primary and secondary articles/documents published in English between 2000 and 2014. This timeframe was chosen to integrate measurable and recent impacts of HSRs on health indices. Search terms were chosen with respect to the PICO reference that included mesh terms such as “health sector/ system/ care reform”, “coverage”, “equity”, “residence”, “ethnicity”, “utility”, “gender” and “socio-economic status”. Upon entering search phrases into the databases, the document type was set to “article” and the search was completed in “all field”. The researchers utilized a protocol recommended by the Preferred Reporting Items for Systematic Reviews and Meta- Analyses (PRISMA) to conduct the search between August 20th and 30th, 2014.

2.2. Inclusion and Exclusion Criteria

Documents or articles highlighting health disparities-focused HSRs were included in this review. Although the review focused on HSRs that took place after 2000, many articles that referred to HSRs taking place during the mid-1990s were also included in the review. Exclusion criteria included studies about HSRs not being focused on equity, those with general explanations of HSRs or sub-national reforms, and those with qualitative designs. Other articles that were excluded were letters to editors, opinions and editorials, and case studies. This review process yielded 1559 articles, 29 of which met the inclusion criteria (Figure 1).

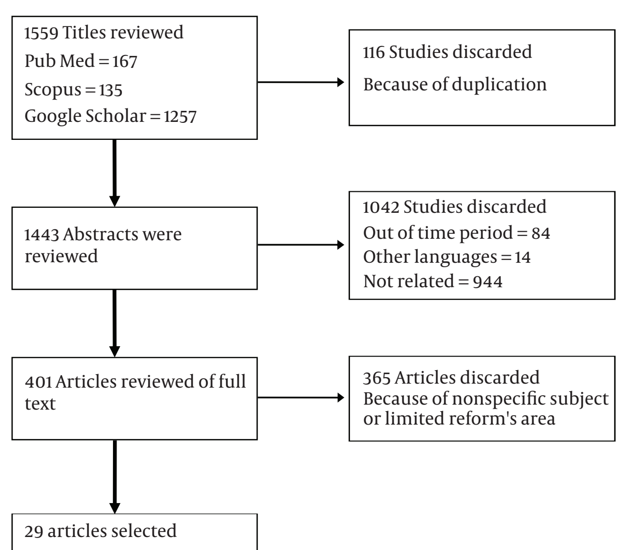

Figure 1. Flow Diagram of the Search Strategy

HSRs can be analyzed using a host of available frameworks, some of which include control knobs, four function, and six building blocks of health systems. As per WHO guidelines, we chose the latter framework to conduct our analysis because it provides insight into specific elements needed by health systems to reach certain milestones (23). The six building blocks approach includes leadership and governance, healthcare financing, medical products and technology, information, health workforce, and health service delivery.

3. Results

A closer look at the 29 articles yielded about 21 countries with equity-driven HSRs throughout the aforementioned timeframe. Financial interventions such as increasing insurance coverage and additional government health expenditures were considered by most countries under review. HSRs in countries like the Philippines, Turkey, China, Chile, Kosovo, India, and UAE incorporated more than three building blocks. All HSRs displayed both positive and

negative outcomes. Table 2 summarizes findings of HSRs and outcomes for each country based on the six building blocks framework.

In general, HSRs aim to enforce equity and efficiency in health care utilization. Most studied reforms utilized strategies in providing UHC and implemented financial interventions focused on expanding insurance coverage. Despite the implemented strategies, all HSRs have been associated with nuisances and challenges. Our findings suggest that many characteristics are effective in the success rate of HSRs, which are elaborated in the sections below:

First, countries must consider the socioeconomic and political context as well as health sector reform. Consistent with our results, global evidence indicates that applying a host of health equity-driven strategies without paying attention to socio-economic and political factors, has led to failures in HSRs in many developing countries. A notable example of this factor is China's overwhelming economic growth rate over the past few decades, leading to sustainable health care investment and HSR aiming at improving health status of its target population (Table 2). Yet, this notable economic growth rate intensified rural and urban health disparities, which demonstrates the impact of China's HSRs on equity-related outcomes (24, 25). Similarly, articles regarding HSRs in Chile point out to evident ongoing healthcare utilization disparities because of financial barriers and social factors such as education level, health literacy, and residency area (13, 26-28). In addition, introducing payment reforms to the Rural Health program in Georgia has attempted to offset health inequities; inequalities still remain among different socioeconomic groups, as seen in higher healthcare utilization among urban populations due to higher incomes when compared to rural ones (29, 30). In addition, the impact of socio-political context on HSRs is evident within the complex turmoil in Syria, where the civil war has diminished previous HSR success and resident living conditions (31). In contrast, the key to success in Turkey's HSR was political stability (14). Finally, gender and socio-economic disparities in Turkey have diminished HSR goals directed towards health equity, particularly in the most underprivileged provinces (32). For example, low SES women in Turkey experience heightened health problems because of interpersonal violence and discrimination. As is evident in Table 1, HSRs among most countries under study have led to positive economic growth rates (33-35). Only Iran and Mali exhibited negative growth rates during their HSRs; both also had intermittent positive growth. HSRs in Latin America, Kosovo, and the Philippines were associated with positive economic growth and shifting towards democratization (36-38). Mexico has displayed continued interest in combining various political stakeholders in favor of its reform (39). In sum, while the aforementioned cases illustrate the impact of health inequities on HSRs, health sector-related characteristics must also be considered in evaluating reforms (25, 29, 40) and.

The second important factor is focusing on strengthening primary health care (PHC) within health sector reforms. According to WHO, implementing PHC is the most beneficial in promoting equal access to a plethora of health services (41). There is an inter-connection between economic and social development with primary health care (42). Although PHC expands social benefits to the underprivileged, many countries have allocated resources to establish inpatient and outpatient care (3). More attention has been devoted to strengthening PHC in Armenia, India, Kosovo, Turkey, and China. Although these countries have achieved many successes with regard to expanding access to primary health care, in order to gain optimum results from this policy they still need more investment and infrastructures (15). Despite the anticipated benefits, the US displays shortcomings in implementing PHC (43). This lack of attention is associated with increased costs and health equity challenges when promoting health insurance coverage. The promotion of a simple and effective National Health Network system in Iran has led to improvements in health indicators and increased PHC access (43). Yet, the steady digression of stakeholders' interests towards treatment-oriented approaches has weakened this successful prevention-oriented system over time. However, we must note that an emphasis on PHC does not necessarily mean neglecting inpatient and outpatient care. Experiences from the Philippines and India confirm that neglecting this level of health services may deprive those with low SES access to comprehensive care (36, 44, 45). A stronger PHC infrastructure is generally indicative of continuity, comprehensive, and need-based care (46).

Taking quality of healthcare as well as quantity is the third contributing factor to improving health equity. The definition of equitable access emphasizes both quality and quantity (47). Since policy makers often aim to expand the short-term financial coverage of services for the underprivileged, many reforms often neglect quality of health services. While Mexico has developed beneficial quality-driven programs, it still has to bridge the gap of health disparities and outcomes between socio-economic groups (48). Despite the fact that Philippines' government has attempted to implement quality-driven strategies, a WHO review indicates inadequate quality care due to lack of coordination and incentives. Even though hospitals and private practices have established protocol for quality care, the lack of licensing standards diminishes the quality of primary health centers (49). Another successful reform is seen in Turkey's efforts for comprehensive health system

improvements. Yet, this change has not led to uniform improvements in quality of care among sectors and regions (50). Many countries, such as the United Arab Emirates, have implemented a master plan to promote health equity among low socioeconomic groups (51). While this may seem like a good short-term remedy, long-term impacts may deepen disparities between socioeconomic levels.

The fourth contributing factor to effective equity-driven reform is establishing a robust monitoring system from the beginning. Almost all studied reforms exhibit imperfect and discontinuous monitoring systems throughout different time points. Many countries did not display any sort of comprehensive monitoring system, even years after the reforms. As an example, China's health information system (HIS) has only been implemented for certain diseases and therefore, it lacks comprehensiveness and the ability to monitor diverse health outcomes (52). One of the main problems of Iran's health system is also weaknesses in implementing an inconsistent information system (53). Similarly, South Africa also lacks robust information management system regarding both supply and demand (54). Ambiguities in access and improvement in health outcomes among Georgian and Abu Dhabi health care systems post reform indicate the lack of a comprehensive health information system (30, 51). In addition, fragmentations within India's monitoring system obscure the impact of HSR on health outcomes (45). Yet, HSRs in Mexico and Turkey have led to the establishment of continuous and effective monitoring systems, thereby leading to better care coordination over time. Comprehensive information systems provide policy makers with readily available and high quality evidence that is necessary for effective decision-making (41, 55).

Finally implementing stepwise reforms instead of big reforms could better target health equity in developing countries with sparse resources and inconsistent infrastructure. While both are purposeful in nature, small reforms occur incrementally while big reforms occur strategically. Certain factors are necessary to implement a successful big reform. Such factors include coherent and reliable leadership, political support for reforms, sustainable healthcare financing, governmental stability, and skilled health workforce (42). Our findings indicate that HSRs among most countries experienced gentle and insufficient increases in health sector financing, particularly within the 2012 - 2013 window. As seen in Table 1, out-of-pocket health expenditures comprise over 20% of spending within 73% of the countries under study, which further confirms a shortage of financial investment in these countries. Therefore, the magnitude of the reforms should be adopted with required resources in long term to avoid stopping programs. Positive HSR outcomes due to long-term planning and sustainable management are evident within experiences of Chile, China, Mexico, and Turkey. Experiences in Syria (56) and Kosovo (37) indicate that there is no one formula that can drive HSRs or from within. With minimal examples of success, such findings indicate that big reforms are not appropriate to implement in developing countries. Finally, for those countries with stronger infrastructures, decentralization is an effective approach to improve health equity (42).

While this review utilizes a novel strategy to evaluate health equity-focused HSRs, there are some limitations. First, the literature search was limited to peer-reviewed articles and documents published in English. Second, we excluded information within the gray literature due to limited access to international journals.

4. Conclusions

Based upon the results of this study, we suggest five pillars in achieving HSR goals: 1) Taking into consideration the political and socioeconomic context and health sector reforms in order to ensure sustainability, 2) Prioritizing and strengthening PHC over inpatient and outpatient care, 3) Emphasizing healthcare quality along with financial investments to enhance comprehensive care for all socioeconomic groups, 4) Establishing a robust monitoring system early on to ensure appropriate resource allocation and prioritization for HSR interventions and 5) Promoting changes in infrastructure, along with enforcing incremental HSRs.

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Footnotes

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Table 1. Trends of Public Health Expenditure, OOP, and Economic Growth Rate Among Countries of Interest Over Time

Country	Per Capita Expenditure on Health (PPP int. $) (57)			GDP Growth (34)			Out of Pocket (35)		
	Year								
	2000	2012	2013	2011	2012	2013	2000	2012	2013
China	50	323	360	9.5	7.8	7.7	59	34.3	33.9
Iran	162	492	577	3.9	-6.6	-1.9	56.2	52.5	52.1
Chile	248	768	795	5.8	5.5	4.2	41.9	32.4	31.7
US	2074	4153	4307	1.6	2.3	2.2	14.9	11.9	11.8
Turkey	275	745	815	8.8	2.1	4.2	27.6	15.4	15
South Africa	254	528	543	3.2	2.2	2.2	13	7.1	7.1
Indonesia	31	108	114	6.2	6.0	5.6	46.5	45.3	45.8
Rwanda	10	93	95	7.9	8.8	4.7	24.8	18.8	18.4
Vietnam	31	124	129	6.2	5.2	5.4	66	48.8	49.4
Ghana	41	133	130	14.0	9.3	7.3	31.8	29.1	36.2
India	24	60	69	6.6	5.1	6.9	67.1	60.6	58.2
Kenya	31	40	42	6.1	4.6	5.7	43.2	45.3	44.6
Mali	23	38	49	2.7	-0.4	2.1	66.5	60.9	60.1
Nigeria	34	55.6	49.4	4.9	4.3	5.4	61.7	65.8	72.9
The Philippines	51	82	91	3.7	6.8	7.2	40.5	57.6	56.7
UAE	1444	1188	1570	4.9	4.7	5.2	16.1	19.5	18.8
Syria	63	77	78	-	-	-	59.6	53.9	53.9
Malaysia	211	494	514	5.2	5.6	4.7	33.7	34.9	36.1
Mexico	237	550	549	4.0	4.0	1.4	50.9	44.1	44.1
Kosovo*	-	-	-	-	-	-	-	-	-
Armenia	-	33	34	4.7	7.2	3.5		70.5	73.8
Georgia	29	116	150	7.2	6.2	3.3	82.5	64.7	61.9

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Table 2. Health System Reform Implementations and Outcomes Among Countries of interest according to the Six-Building Blocks Framework (2000 - 2014)

Country	Population	6- Building Blocks	Intervention(s)	Positive Outcomes	Negative Outcomes
China (Chen et al., 2012; Tang, 2008; WHO, 2010, Berman and Bitran, 2011; Zhou et al., 2014; Long et al., 2013; Brixi et al., 2013)	Chinese population	Financing	Modifications to payment type. Modifications to policies in healthcare financing. Improving government healthcare expenditure sustainability.	Increased the coverage of NCMS1, Improved health workers' income in poor areas, Reduced cost of patient care, Declined out-of-pocket in urban areas, Regressive trend of public resource allocation, Unified health insurance, Cutting the patients- physician financial relationship, Equitable financing in urban areas.	Shortage in funding for essential public health services. Reduced affordability among rural families. Resistance by the private sector to control fee. Higher burden of healthcare financing among low SES groups. Decreasing the Kakwani index in both rural and urban areas. Financing inequities in rural areas.
		Human Resource	Enhancing training of rural healthcare providers		
		Service delivery	Reducing incentives for high SES areas. Promoting accessibility and quality of primary health care.	Substantive decrease in maternal and child mortality. Improved equity in access to health services.	Significant discrepancies in maternal and child mortality among different SES groups. Outbreaks of diseases in underprivileged areas. Inequitable utilization.
		Governance	Reinforcing public health functions and services. Improving the public hospitals' management.	Rapid development of health sector. Increasing the role of private sector in health system.	Inadequate progress and output due to local authorities' resistance.
		Medicines and technology	Introducing an essential drug list.	Proposing guidelines for producing, prescribing, and pricing of drugs. Warranting the access and safety of essential medicines.	Challenges with providing township's hospitals with medicine based on essential list.
		Information system			Weak health information system except for special diseases.
Iran (Rashidian et al., 2013)	Rural population	Financing	Improving social protection scheme for rural population.	Enhancing the national budget for rural healthcare.	High cost of hospitalization.
		Service delivery	Implementation of family physician program.	Increased access to family physician and midwives among rural households. Increased accessibility to health facilities. Significant increase in hospitalization rates and hospital bed utilization.	Lack of enough attention to PHC.
Chile (13, 26-28)	All citizens	Financing	Rising government health expenditure. Reforms in health insurance.	Expanded health insurance coverage.	Inequitable financial contributions.
		Governance	Executing the Health Authority and Management Law. Implementing the Financing Governmental Expenditure Law. Passing the Regime of Explicit Guarantees in Health (AUGE) Law. Incorporating the private sector with the health care system.	Reinforced supervising capacity of health authorities for functioning in the health market. Encouraged decision-making decentralization and joint responsibility.	Market rules governing the health system.
		Service delivery		Rises in healthcare utilization. Higher inpatient and outpatient utilization by low SES groups.	Inequality of service utilization between different SES groups. Limiting the interventions to high burden and cost-effective ones. Increased horizontal inequity.
Turkey (14, 58)	Turkish population	Financing	Enforcing the pay for performance system. Raising in governmental health expenditure.	Provision of Universal health insurance. Reducing Out-of-Pocket payment.	Unsustainable financing due to geo-political problems.
		Human resources	Increase in number of general practitioners and specialists.	Rapid expansion of health workforce.	Shortage of family physician in some areas.
		Service delivery	Establishing the family physician program.	Enhancements in emergency medical services. Expanding access to PHC. Improvements in care of private and public hospitals. Improvement in technical productivity. Rising outpatient visits. Rises in the number of hospital beds.	Lack of improvements in public health productivity post reform. Lack of changes in hospital performance indicators. Downfalls of community-based prevention and screening programs.
		Governance	Health transformation program.	Developing the social security institution.	Sustainability of reform.
		Information system	Upgrading the health information system.		
South Africa (59)	South African population	Financing	Introducing well-financed health insurance, Vertical expansion of insurance coverage.	Expanded a relatively fair and sustainable coverage.	Chaotic risk pooling policy.
		Governance	Enforcing and regulating health insurance, Horizontal extension of public service.	A rapid governmental response to systematic changes.	Dysfunction of the quality role of private sector.

Syria (56)	Syrian Population	Financing	Using alternative financing methods, Targeting low cost services for poor people.	Reductions in infant and maternal mortality, Enhancements in NCD management and PHC, Extension of curative care availability, Enhancements in hospital performance and health sector management.	Disproportionate utilization of health insurance and quality care, Inconsistencies between universal coverage and payment methods, Complex financing protocols, Reductions in government health expenditure.
		Service delivery	Amendment of health service quality.		Lack of systematic protocols for aging and uninsured populations.
		Governance	Commercialization of health.		Lack of public involvement in reform.
Comparative Study in 9 countries (60)	Indonesian, Rwandan, Vietnamese, Ghanaian, Kenyan, Malian, Nigerians	Financing	Rises in government health expenditure, Implementing self-governing agencies to purchase healthcare, Using tax revenues to subsidize funding, Implementing demand-side financing mechanisms.	Decreased out-of-pocket spending, Extended health insurance coverage and benefits, Expanding the risk pool.	Lack of full coverage in all countries, Difficulties with maintaining financial sustainability, Administrative complexity, Increases in out-of-pocket expenditure.
		Service delivery	Expanding coverage of primary and preventive services.		Inconsistent care utilization, Rises in curative services over preventative services.
United Arab Emirates (51)	Abu Dhabi population	Financing	Obligatory health insurance.	High rate of enrolment in health insurance plans.	Rises in copayments for basic insurance recipients.
		Governance	Strengthening centralized regulatory system. Utilizing contracted providers. Private sector expansion.	Increased number of health facilities. Reinforced competition among providers.	Unequal improvement in healthcare utilization and quality care.
		Medicines and technology	Introducing a new system for pharmaceutical facilities.		
Malaysia (61)	Malaysian	Financing	New Health Insurance (NHI) scheme, Financial reform.	Rises in funding devoted for healthcare. Cross-subsidization of the rich by the poor	Lack of progress or equity, Possible reduction of poor people's access to healthcare
India (44, 45)	Indian	Financing	Structural reform. Financial reform. Introducing the User-fee. Decreasing public health expenditure.	Reducing catastrophic health expenditures for poor people	
		Service delivery		Improvements in some health indicators independent of health reform. Higher utilization of healthcare by low SES and rural groups, Higher utilization of private healthcare by mid/high SES.	Disproportionate healthcare utilization among SES groups. Poorly implemented PHC, Reductions in healthcare utilization and affordability.
		Governance	Decentralization, Inter-sectorial partnerships, Unification of health policy, Reform in Medical Education.		Lack of inter-sectorial collaboration. Fragmented monitoring system. Un-motivated doctors working in rural areas.
		Medicine and technology	Centralized logistics and distribution system.		Failure of the drug providing system.
Mexico (4, 39, 62, 63)	Mexican Population	Financing	Expanding public health insurance for general population. Implementing program that protects against catastrophic expenditures. Funding decentralization for essential services. Rises in expenditures for public health.	Increased inter-state equity in financing. Providing healthcare for the uninsured. Declining catastrophic expenditures for disadvantaged groups. Improvements in all financial protection indicators.	Ambiguity in resource allocation at the state level. Shortage of public funding.
		Service delivery	Implementing demand-oriented services.	Improvement of effective coverage for 11 interventions. Improvement of health indicators. Improvement of health production and participation. Reductions in coverage disparities between SES groups. Rises in efficacy and effectiveness of healthcare.	Disproportionate interstate improvement in health status. Discrepancies in programs for marginalized populations. Lack of responsiveness to patient concerns. Reduction in provider incentives. Indistinct care quality improvements.
		Governance		Designing a monitoring system to evaluate HSR progress. Incorporating federal tertiary funds	Resistance to decentralization at the national and local level. Miss-management of reform due to low participation of different actors in the reform. Indistinct reform impact on middle class. Disjointed health infrastructure.
Georgia (30)	Georgian	Financing	Primary care financing decentralization. Implementing capitation payment strategies.	Reduction in financial public health access barriers.	Indistinct impact on healthcare access. Inadequate financing by government.
		Service delivery	Implementing the National Rural Health Program.	Overall increase in service utilization. Decrease in self-treatment.	Persistent gap between different SES groups for service utilization. Higher rate of self-treatment among the poor compared to the rich.
Kosovo (37)	People of Kosovo; and rural healthcare providers	Financing	Rises in donor investments for HSR.		Inadequate government healthcare funding.
		Human resources	Training family physicians.	Putting the family physician at the center of healthcare delivery.	Severe shortage of healthcare providers.

		Information system	Establishing the Health Information System.		Unreliable information system.
		Governance	Reforming public health management.		Fragmentation in systematic infrastructure. Poor governance over the health system. External parties involved in HSR.
		Service delivery	Establishing the referral system for in-patients. Focusing public health on prevention.	Increase in immunization coverage.	Inequity of affordability to healthcare.
Armenia (64)	Armenian	Financing	Modifications to user charge.	Free PHC to general population. Slight increases in health investment by the government.	Socioeconomic disparities in hospital access. Rises in out-of-pocket spending. Expensive hospital-directed care. Failures in resource allocation.
The Philippines (36)	Filipino	Financing	Increasing coverage of Phil- Health. Constructing a new system for high quality and low price.	Rises in healthcare cost of higher SES over low SES groups. Attracting volunteers to partake in HSR.	Low healthcare expenditure. High Out-of-Pocket.
		Governance	Inter-regional cooperation in HSR. HSR Decentralization.		Health service delivery and health indicator disparities among different SES groups.
		Service delivery	Emphasis on outpatient care.	Rises in rural healthcare utilization. Rises in health status of general population.	Increases in curative care over preventative services. Reductions in health service availability.