

REVIEW

Health Systems: A Review of the Concept, Global Challenges and Reforms

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Abstract

The study of health systems (HSs) is an important but confusing field. Its unclear boundaries, overlap, and multiple interpretations of terms require conceptual clarification. In light of the available evidence, Firstly, it is very important to realize that the current HSs thinking addresses individual parts rather than the whole HS. Secondly, it fails to recognize that concentrating on the performance of one part of the HS may have damaging effects on the whole HS. Thirdly, current HSs thinking fails to address the views, interests and influence of human resources for health involved in the implementation of reform, and how people and communities are expected to benefit from it. Fourthly, it does not take into account the different meanings, perceptions, cultural values and beliefs that may influence the very different institutions and structures belonging to a HS and working towards the same goals. Fifthly, the structural parts of HSs are designed to work in a stable environment, rather than addressing the ever

changing context. Finally, HSs thinking does not provide a structural response to cope with the variety of healthcare stakeholders. The way HSs are currently understood may contribute to their weak performance. The current understanding is fundamentally functionalist, because the practice has focused on the definition of the structure, units and functions at different levels of recursion. The analysis of the literature demonstrates that most existing HSs are underpinned by functionalist approaches.

This review provides a conceptual framework for many of the studies that focuses on specific situations and localities and explores what other approaches and methodologies can offer, in order to develop a framework for a given HS, which is more relevant in theory and practice than the other functionalist frameworks that may have been adopted previously. This framework will hopefully also narrow the gap between HSs goals and performance.

Key words: Health systems, Health system strengthening, Human resources for health, Health system framework, World Health Organization, HSF Building blocks, Primary Health Care, Public Health System.

Preamble

This article reviews the literature of health systems (HSs), covering the concept, the global HS challenges at different levels of development, and the current HSs challenges and reforms, with a focus on the developing countries. Reference is made to the key health determinants and key problems and constraints encountered, including the HSs for which more adequate management is required. The current HSs thinking about these issues, focusing on the chronology of the way people have addressed HSs. It recognizes the complexity and diversity of HSs and the way HSs are currently perceived will be considered. Developments in HSs approaches will also be discussed, including different views on HSs and the levels of application. Different models of HSs will be illustrated. Finally, a critical analysis of current HSs thinking that analyzes current methodologies in HSs, and realizes their shortcomings in many aspects of health will be presented.

Overview

A system is a set of connected elements which form a whole, thereby possessing the properties of the whole rather than of its component parts (1). The literature advocates that a system is a comprehensive concept that can be used to express very different connotations and levels of analysis (2). A system's activity is the result of the influence of one component on another. These influences are called feedback, which can either be positive (amplifying) or negative (balancing) in nature (3). A system can be closed or open. A closed system is completely autonomous and independent of the activity around it, in contrast to open systems which interact with their environment (4).

Systems are dynamic and complex, made up of many interconnected and interdependent elements which form extensive networks of feedback loops with time delays and non-linear relationships; it is these characteristics that are the sources of dynamic complexity in systems (4). The concept of systems in sociological analysis without further clarification can raise controversies because participants may have different ideas in mind when they speak of systems. M'Pherson argues that the concept of wholeness (*gestalt* in German) in the structure and behavior of a natural, biological or societal organization is poorly conveyed by

the word 'system', loosely used in the common English language (2,5).

Given this interconnectedness and complexity, a system response occurs as a result of the interactions among its elements, rather than as the result of change in any part. This is the essence of system thinking i.e. the ability to see the world as a complex system comprised of several inter-connected and inter-dependent components (6). "Systems thinking is an approach to problem-solving that views 'problems' as part of a wider, dynamic system. [It] involves much more than a reaction to present outcomes or events. It demands a deeper understanding of the linkages, relationships, interactions and behaviors among the elements that characterize the entire system" (7).

Systems thinking, which has its roots in a range of disciplines such as computing, engineering, cognitive psychology and cybernetics, views a system as a whole rather than as its individual component parts. It takes into consideration the behavior of the system over time instead of a fixed 'snapshot' (3,4). System thinking is commonly used in many areas where interventions and systems are complex. The application of system thinking in the healthcare area is accelerating a more realistic understanding of what works, for whom, and under what circumstances (8,9).

HSs play an important role in improving health. The World Health Organization (WHO) estimates that between 1952 and 1992, half the gains in global health resulted from the application of new technology and knowledge in HSs, with the remaining gains due to income development and better education (10). The organization of HSs has long been considered more an operational problem and less a domain for research. This changed with the re-emerging attention to the Health System strengthening (HSS) and the demand of policy-makers for evidence to support their decisions. The scientific community has oriented itself towards HSs research, presently defining and developing the domain (11-15).

The way that the term 'health system' is currently perceived and used is vague and inconsistent, confusing and fragmented. Theory descriptions are inconsistent, and the words used to convey messages or mental images of related events, experiences, or perspectives are not standardized. They may mean different things to different people. The analysis and design of HSs according to selected properties or dimensions is sometimes difficult because of a lack

of conceptual ordering, or different views by different theorists. Another explanation could be the fact that HSs thinking is lagging behind the systems thinking movement.

Current HSs thinking does not address human relations or behavioral and cultural aspects that are so important in terms of health promotion. There is a need to sharpen the definition of the HS to enhance the clarity of its concept and make it more socially relevant. System ideas could help in understanding current HSs thinking, developing concepts and relationships to make up a consistent framework of thinking that could be used to explain and predict HSs phenomena. This would improve the dialogue among HSs theorists and practitioners (2).

The concept of health systems

HSs are defined as comprising all the organizations, institutions and resources that are devoted to producing health actions. A health action is defined as any effort, whether in personal healthcare, public healthcare services or through inter-sectoral initiatives, whose primary purpose is to improve health (16).

HSs are in principle meant to promote and improve the population's health; HSs of some sort have existed as long as people have tried to treat diseases and protect their health (16). Most countries have several distinct provision and health financing sub-systems, embracing several types of traditional practice as well as public, private and non-profit health facilities, sometimes offering services for limited population sub-groups such as civil servants (10).

HSs have undergone overlapping generations of reforms in the past 100 years, including the founding of national HSs, the promotion of Primary Health Care (PHC) as a route to achieving *Health for All*, and affordable universal coverage. A criticism of this route has been that it has given very little attention to people's *demand* for healthcare, and instead concentrated almost exclusively on people's perceived *needs* (16). This gave room to universalism in health – a form of public intervention that has governments attempting to provide and finance everything for everybody. This philosophy has dominated for about 20 years since the early 1970s, and it shaped the formation of well-established HSs that have achieved important health successes. However, universalism has failed to recognize both resource constraints and the limits of government.

Since the start of the new millennium, there has been

a gradual shift towards what the WHO calls the *new* universalism (10). This shift has been partially due to the profound political and economic changes of the past three decades, including the transformation from centrally planned to market-oriented economies, reduced state intervention, fewer government controls and more decentralization.

The WHO advocates a *new* universalism that recognizes government limits, but retains government responsibility for leadership, regulation and financing of HSs (10). The new universalism welcomes diversity and recognizes that services are to be provided for all, but not all services can be provided. It foresees that the most cost-effective services should be provided first. It welcomes private sector involvement but it entrusts the public sector with the fundamental responsibility to provide strategic orientations, stewardship, and finances to deliver care for all.

The key features for progress to a new universalism in health care: *membership*, defined to include the entire population, and *universal coverage*, meaning coverage for all, not coverage for everything. The *patients do not make the provider payment* at the time they use the healthcare service. Out-of-pocket payment results in an inequitable financing burden and barriers to access for the poorest; pre-payment allows more efficient purchasing services. Services may be offered by *providers of all types*, as long as health practices and facilities meet certain quality standards. Such arrangements will allow a very large number of private healthcare providers who are essentially the first points of contact with the HS to be brought within a structured but pluralistic HS (10).

Global health system challenges

The HS is a very important determinant of the health status of a population. HSs across the world have attained different levels of development; this has been determined by the countries' degree of socio-economic development, resource allocation, management capacity and technical-scientific developments in the health field. The WHO recognizes that in general, health development is directly related to economic development, and vice-versa (10). In the past, HSs were characterized by rigid bureaucratic and centralized administrations, a curative orientation, inequities between the rich and poor, and non-responsiveness to the needs of individuals and communities. HSs remain in a dynamic process of change, and therefore public health sector managers must deal with multiple problem-contexts

in this changing world.

A further issue is that weak managerial skills in healthcare organizations and the narrow vision of health, sometimes limited to the scope of medicine, are among the factors contributing to the failure of health reforms. The complex, pluralistic, multi-vital and dynamic definition of health as a 'state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' and the role of health in development create more challenges and call for a more systemic approach to health reform (17). The internal environment of HSs needs also to be re-thought and re-adapted to meet the challenges imposed by the changing external environment. It is proposed here that the application of new research methodologies contributes to expanding the knowledge basis particularly in terms of defining the key objects of HSs, defining HSs boundaries, addressing health determinants, accommodating the contexts of change (environmental, technological, demographic and epidemiological transitions), and being more responsive to individual and community needs and expectations.

At the policy level, fundamental issues are systematically raised. First, the health sector, in the context of development, is usually considered non-productive and resource-consuming, and is therefore not prioritized in terms of resource allocation. Secondly, what are the best ways to ensure sustainable healthcare financing without exacerbating existing inequities? Thirdly, why haven't the global policies, goals and initiatives led to meaningful changes in the health status of local communities?

Healthcare delivery in most of the developing countries is organized within the context of national health services (NHSs), and Ministry of Health (MOHs) are responsible for overall the HSs policies, reforms, development and management. The public sector plays an important role, particularly in preventive care and in the control of endemic diseases and epidemics. Following a study of basic healthcare services, the WHO concluded that most people in the world have limited or non-existent access to healthcare services (18). Healthcare services put emphasis on cutting-edge technology centrally located in many cities, which is often not relevant to the population's needs or local realities; there is also evidence of imbalances in promotive, preventive, curative and rehabilitative healthcare.

In addition, HSs in most developing countries are still

predominantly centralized in terms of policy development, management of resources, and delivery of quality healthcare. The decisive role is played by the government, with responsibilities that ranges from creating an enabling environment for the leadership and management of the health development process within evolving socio-economic contexts, to delivering the essential health interventions.

Current health system challenges and reforms

A health phenomenon is complex, and health conditions are related to health determinants. Some of these determinants are changing and some of the changes cannot be foreseen; therefore there is a degree of uncertainty in relation to factors that influence health. Diversity is another feature of HSs, with different health stakeholders having different interests and influencing the way health actions are processed, which consequently affects health outcomes.

The Commission on Social Determinants of Health (CSDH) recognizes the importance of inter-sectoral action for improved health and argues that healthcare is just one of the social determinants of health status; but the high burden of diseases responsible for appalling premature loss of life arises in large part because of the conditions in which people are born, live and work. It asserts that a toxic combination of bad politics, unfair economic arrangements and poor social policies is in large measure responsible for the fact that a majority of people in the world do not enjoy the good health that is biologically possible; and as a consequence, social injustice is killing people on a grand scale (19).

With the increasing access to Information and Communications Technology (ICT), awareness of recent health science breakthroughs and technological developments is more widespread, as is people's aspirations for their health. The implementation of HS reforms aimed at improving the performance of HSs and ultimately the health status of people is still far from providing universal access to quality healthcare and the achievement of the highest possible levels of health. Some of the intractable problems are related to governance, financing, resource management, health information systems (HISs), logistics, co-ordination, consensus-building, inter-sectoral collaboration, and community participation.

Narrowing the focus to the developing countries, a sub-Saharan study on HSs reform analyzed reports from 39

African countries and concluded that most HSs reforms occurred in four contexts (Table 1). The study also revealed that the most significant factors constraining the implementation of HS reforms have been inadequate HRH and financial resources; increasing poverty; political instability and civil strife; inadequate institutional capacity; resistance to change, even by potential beneficiaries; lack of national HS policies, plans, legislation, and guidelines; lack of appropriate HISs; ineffective inter-sectoral collaboration; and inadequate communities and people participation (20). In addition, the study shows that most of the components of reform are focused on the following policy objectives, in order of preference: improved access and coverage (i.e. equity), improved quality of healthcare, improved health status of the population, improved efficiency, the mobilization of more resources for health, improved community participation and patients’ satisfaction (PS), and revitalized local/district HSs (20).

It seems that many of these issues are systemic problems in a broad sense throughout most of the developing countries. The nature of the health problems can range from biomedical to social and managerial. Biomedical problems are related to the research and development of new health technologies for diagnosis and treatment and the prevention of diseases. Social and managerial problems are associated with limited progress towards pre-defined goals, issues of inter-sectoral co-ordination, and a lack of synergy among a HS’s components. Problems and complications arise from competing interactions between different health stakeholders, the inadequate management of human ecology, a high level of illiteracy (especially

among women), the absolute poverty of most of the people, and weak capacities for better management and improved response to people’s health needs. Most of the problems facing HSs are inter-related and call for a systems approach.

Although health-related problems are complex and interrelated, the policies design, planning and practice of current HSs are not maximizing the use of systems ideas and methods. The current literature on HSs reveals different models, with some success in their application but also with shortcomings in both goal attainment and accommodating people’s perceptions. There are also no clear criteria for defining what should be inside a HS and what belongs to its environment. A HS’s boundary judgment remains a critical issue still open for debate, and it is not clear who should define the boundary. The epistemic vagueness could be reduced by bringing more insights into the understanding of HSs thinking. Because of unclear theories and the limitations of current perceptions, the concepts of HSs remain ambiguous. Alternative social arrangements could empower HSs actors and promote effective community participation in the policy development of HSs, as well as the design of HSs and their management of healthcare. This could improve the overall performance of the HSs and their response to patient health needs and expectations.

Overview of different frameworks for health systems
Debates around HSs have dominated the international health agenda for many decades. A number of Health System Frameworks (HSFs) have been published, especially over the last decade. These have served different purposes, whether to describing, defining, explaining

Table 1. Context of health system reforms exemplified by a study from 39 sub-Saharan African countries.	
Health systems and healthcare services delivery	Poverty and inequity in access, poor quality of healthcare, inadequate financing, uncoordinated actions of health stakeholders, the existence of vertical programs, lack of drugs and supplies, poorly motivated HRH, inadequate community participation, institutional weaknesses, and poor responsiveness to patient expectations.
Health problems	Deterioration of health indicators, increasing demand for services, poor health status of the people, emerging diseases (e.g. epidemiological changes).
Political and policy factors	No clear definition of roles and functions, new international health initiatives, disasters, democratization and change in political leadership, donors, partner-driven reforms, and public HS reforms.
Economic factors	Rapid economic growth, economic crises and macroeconomic reforms, inadequate resources, and inefficiencies in resource utilization.
Reference 20	

or analyze existing situations, or being predictive or prescriptive. Comprehensive HSFs at the national level include the widely used WHO models (7,16,21), some of which were adapted for evaluation (22) or participatory planning (7). Other HSFs focus on specific 'building blocks', the interaction between actors, or on the interface between different components (22-25). Some give an analytical and comprehensive overview of the differences in existing HSFs (26). The arrays of HSFs arguably provide opportunities to identify various appropriate approaches to meet different country-specific challenges. At the same time, the multiplicity of HSFs also creates confusion at the country level as to which conceptual HSFs to refer to for designing HSS interventions. Additionally, most debates have focused on conceptualizing HSs objectives, functions and performance measurement approaches. Some are meant to describe or analyze existing situations, while others give guidelines for where to go and are more prescriptive. There has been rather less focus on identifying practical approaches to collective actions to strengthen HSs (26). Based on the literature review and the overviews of a number of notable studies, illustrative and/or dominant frameworks and models are highlighted below, mostly in chronological order (26,27).

Comprehensive frameworks for national level

Many of the following frameworks and models help to understand and improve financing and regulatory mechanisms:

Actors' framework

a rudimentary framework with four sets of actors (healthcare provider, population to be served, third-party payer, government regulator) and a description of the types of relationships between them (28). Green developed a framework that is based on a similar idea (29).

'Environment of health' framework

Blum proposed a framework in which he has combined the determinants of health within a model which includes the four fields of environment, lifestyle, heredity (genetics), and medical services (30,31). Blum suggests that the width of the four inputs contributing to health indicates assumptions about their relative importance. The four fields relate to and affect one another by means of an encompassing wheel containing population, cultural systems, mental health, natural resources and ecological balance. The key question to answer is how these four determinants operate when analyzed for different specific

diseases or in a state of wellness when no disease exists. Some public health theorists argue that the understanding of the interactions between 'man and environment' is critical for enhancing health and preventing diseases in individuals and communities (32).

HS structure and functional interrelationship

Kleczkowski, Roemer and Van Der Werff's introduced a complicated model with five main components, which are directly or indirectly related: the development of HS resources, the organized arrangement of resources, the delivery of healthcare, and economic support and management (33). The model describes many interrelated parts, with focus on healthcare services but there is no clear link with outcomes.

National HSs throughout the world

Roemer defines a HS as 'the combination of resources, organization, financing and management that culminate in the delivery of healthcare services to the population' (34). He describes a HS as five components: resource production, organization of programs, economic support, management, and delivery of services. He also offers a typology of HSs based on the extent to which governments intervene in the free market of private healthcare services.

Dimensions of HS reform

Frenk describes a HS as a set of relationships among five different actors (providers, population, state as collective mediator, organizations generating resources, other sectors contributing to health) (35). These relationships lead to typologies in healthcare modalities. In a later article, Frenk describes four levels of HS reform: systemic, programmatic, instrumental, and organizational (36).

HS Reform in Latin America

Londono and Frenk conceptualize the HS as relationships between populations and institutions (37). HSs must perform four basic functions: financing, service delivery, modulation, and articulation. Modulation involves establishing, implementing, and monitoring fair and transparent rules and regulations, which also involves strategic planning and guidance. Articulation reflects a continuum of functions that lie between financing and service delivery, and is distinct from policy formulation. It involves the organization and management of transactions between the population, financing agents, and providers. They propose a new organizational model to carry out these functions.

The Performance Assessment Framework

The Performance Assessment Framework (Figure 1) illustrates a HS as an entity which comprising all actors, organizations and resources whose primary purpose is to promote, restore or maintain population health in ways that are responsive to the populations served, which broadened the conventional conceptualization beyond healthcare service provision and management (16,38-40). The publication of the World Health Report (WHR 2000) was a landmark event in HSs thinking and brought new developments to the HSs concept (16). The functions of a HS include improving population health and protection against associated financial costs. The conceptual contributions of the WHR 2000 have become widely accepted, but the attempt to determine and quantify the performance of individual HSs was widely criticized (40,41). The World Bank (WB) supports a similar view that defines a HS in terms of functionality (42). This HS is defined by healthcare service inputs (resource management), service provision (public and private), health financing (revenue collection, risk pooling, and strategic purchasing), and stewardship (oversight).

The 'reforms/control knob' framework

This describes relations between the structural HS

components and their policy actions (control knobs) as being connected to the goals the system desires to achieve (43). Any change of the control knob will affect access to, or the supply and demand of, healthcare services by influencing the behavior of the people in their need and demand for healthcare services; the behavior of providers in the quantity, quality and efficiency of the services they supply; and the costs and prices of healthcare services. Every HS sets goals which are influenced by social values. Control knobs can be adjusted towards those goals, while they are constrained and affected by the politics and political institutions of that country.

The design of HSs

Mills and Ranson discuss the early attempts to classify HSs (44). They conceptualize a HS in terms of four key functions: regulation, financing, resource allocation, service provision, as well as four key actors. Their framework depicts the interplay between these four functions and the major stakeholders involved: government or professional bodies responsible for regulation, the population (including patients), financing agents responsible for collecting and allocating funds, and service providers. They further note that regulation involves government control over individuals and organizations in order to address market

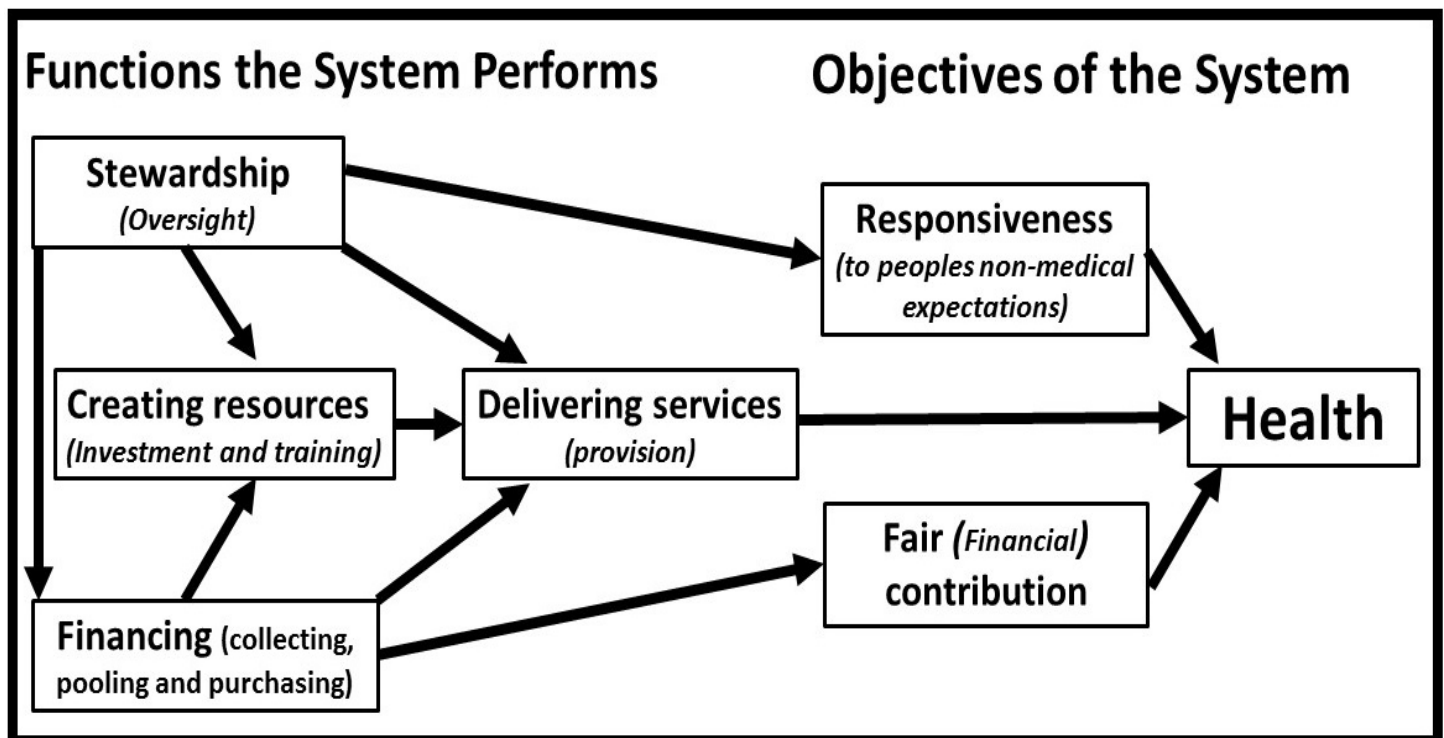


Figure 1. The WHO's Performance Assessment Framework (16).

failures or to achieve specific performance objectives (e.g. efficiency, equity, quality). In terms of resource allocation, their discussion focuses largely on the role of financing agents to contract with providers and the various payment mechanisms used, rather than how these serve as incentives to influence provider behavior. Finally, in the provision of service, they outline the various public and private providers involved.

WHO HSF ‘building blocks’

Another contribution from the WHO was the HSF building blocks (21). Figure 2 presents operational ‘building blocks’ as the HSF’s main elements and processes. The systems thinking document framework advocates looking at the interactions between the blocks (7). It is more a way to approach HSS interventions than a real framework as such. For each intervention, one is facilitated to make a conceptualization that takes all the building blocks into account. The HSF Building blocks is a helpful means to describe, classify and locate HS constraints, to identify where and why investments are needed, and to explain what will happen as a result and by what means the change can be monitored (26). Recognizing the dynamic inter-relations between blocks in this HSF, de Savigny and Adam developed

a framework on the basis of system thinking that draws attention to the complex nature of HSs, the interactions and feedback loops between the building blocks, the role of the people, and the resulting unpredictable effects of changes (7,45).

HSs in transition and HSs institutional characteristics frameworks

The framework that is used in the HSs in transition country profiles allows a very detailed description of HSs (46). It is appropriate for describing HSs that are in a relatively advanced state of development and differentiation. Another framework with a slightly more focused scope is that of the Organization for Economic Cooperation and Development (OECD), which describes in detail the mechanisms for healthcare delivery, financing, and financial access (47).

Framework for analyzing HSs and the context

This HSF interacts with the broader context in which it is situated (48). It is based on the assumption that a HS consists of components that interact to form a complex system (figure 3). The interactions of these components affect the achievement of the HS’s objectives. The HSF targeted health, financial protection issues and PS as the

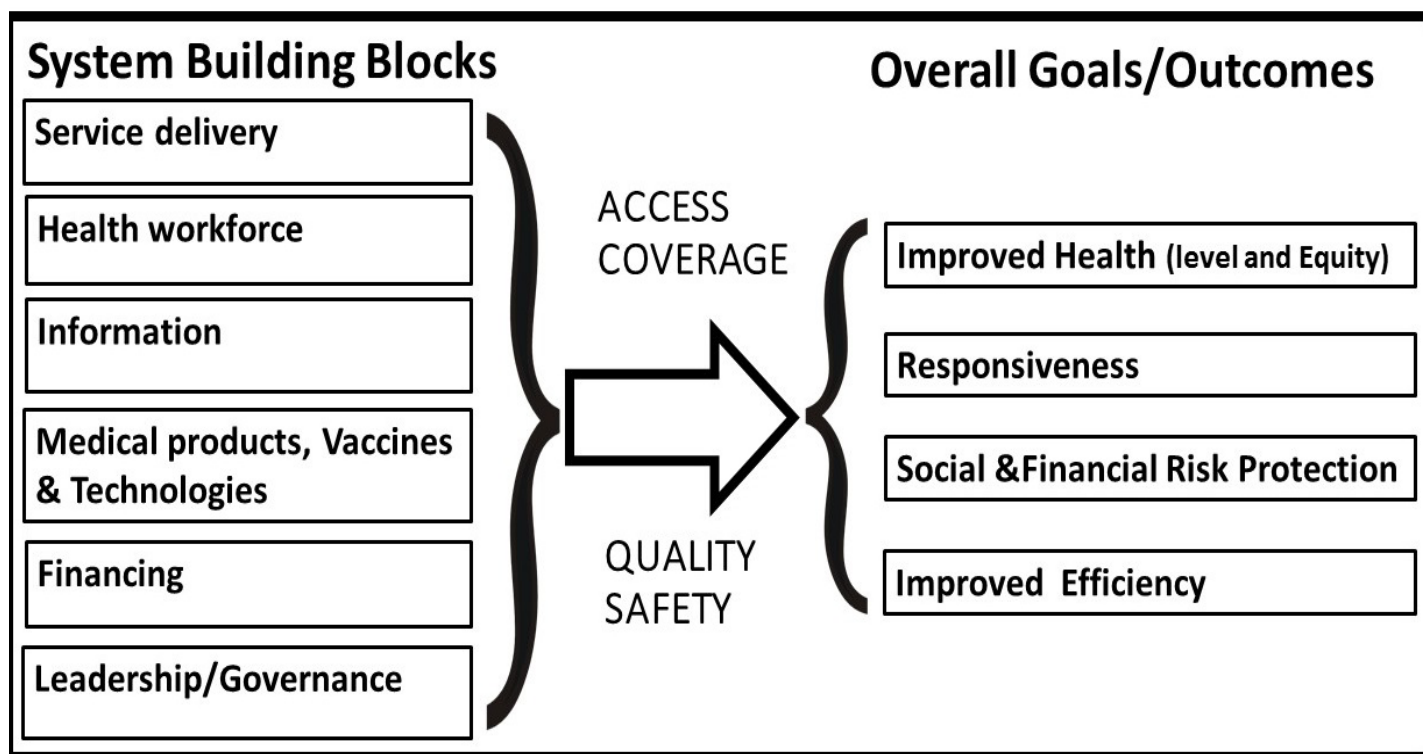


Figure 2. The WHO Health System Framework (Building Blocks) (21)

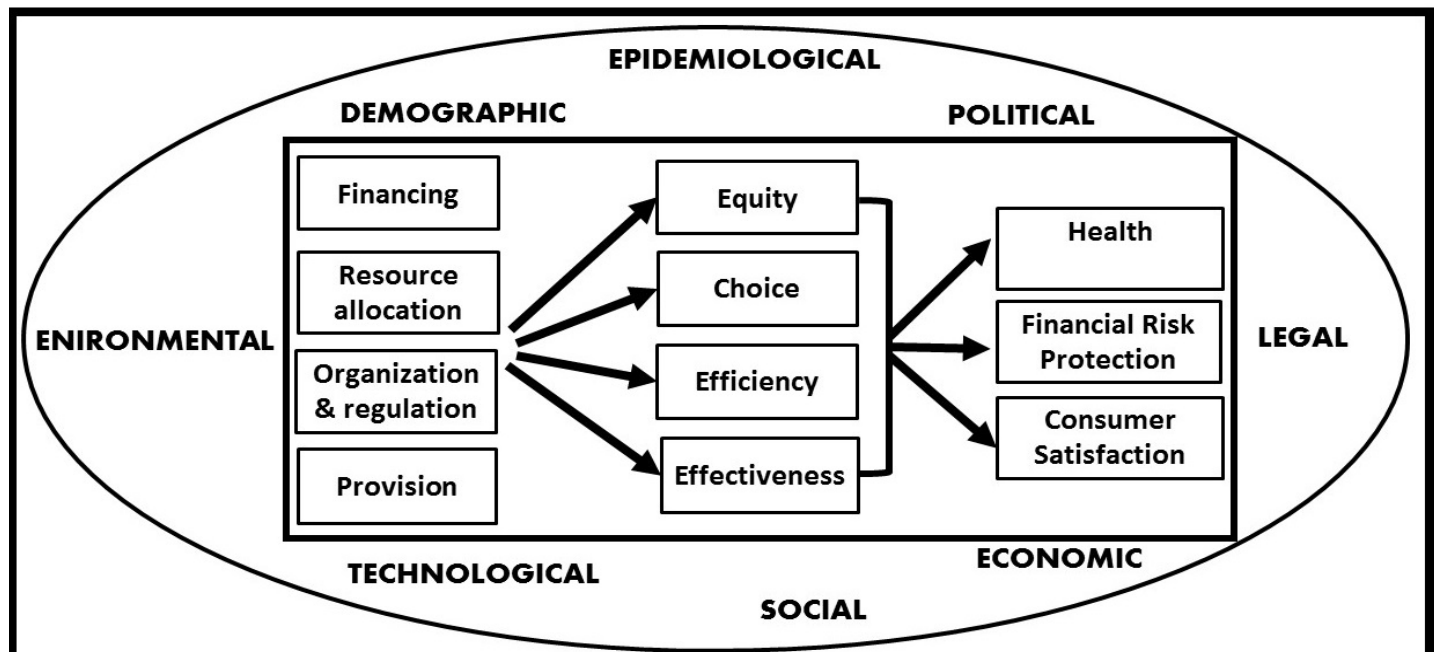


Figure 3. A framework for analyzing health systems and the context (48)

ultimate HS goals, but further expands them to take into consideration the contexts within which the HS functions – these are the demographic, epidemiological, political, legal economic, social, technological and environmental contexts. As every HS has a distinguished history that affects the course of system developments, the analysis of the context also picks up the political economy of the HS. The HSF is extended and used in developing a Systemic Rapid Assessment (SYSRA) tool that allows the examination of the broad context, the HS, and the features of health programs such as Communicable Diseases (CDC) control programs.

The dynamics HSF

The dynamics HSF authors emphasize that a HS should be geared towards outcomes and goals and should be based on explicit choices of values and principles (15,27). The HSF (Figure 4) consists of ten elements and their dynamic interactions. The authors argue that the dynamics HSF can analyze and strengthen HSs as it makes possible the description of any HS at national, intermediate or local level. Furthermore, it can be 'loaded' with specific values and principles so that it becomes a normative framework for analysis and assessment. The framework acknowledges that a HS only has a partial influence on the health outcomes of a population; social, cultural, economic, political, genetic and environmental factors determine

people's health. Moreover, many of these factors have a direct influence on the system's functioning. The dynamic dimension of this HSF is essentially considered as complex adaptive systems a view that emphasizes the interaction, feedback loops and interdependence between its elements, and the possibility of emergent, generative and non-linear processes (49). These interactions lead to the emergence of temporary equilibriums.

Frameworks for sub-systems

A HS analysis can focus on different elements, resulting in frameworks and models for sub-systems. Each element of a HS can be described as an operational sub-system in itself. Interactions between actors from different elements can be analyzed, and HSs can be looked at from different levels. Listed below are a few examples of such sub-system frameworks and models to show the different possible areas of focus.

The PHC frameworks

The International Conference on PHC held in Alma-Ata 1978 urged that the main social target would be the attainment by the year 2000 of a level of health that would permit all peoples to lead socially and economically productive lives (50). It expressed the need for urgent action to respond to the minimum requirements for health development worldwide. This is a public health philosophy

or approach that is expected to guide the organization and management of the national HSs. The WHR 2008 reflects the growing demand for PHC and explores mechanisms to make HSs more equitable, inclusive and fair (51). It insists on the need of putting people at the center of healthcare, and takes into account their expectations about health and healthcare, and ensuring that their voices and choices decisively influence the way in which healthcare services are designed and operate. The report also revisits the ambitious vision of PHC values and principles for guiding the development of HSs (51).

Governance frameworks

There are a number of frameworks and models that focus on governance. Siddiqi et al. (52) developed a framework for assessing HS governance which has been applied in Middle East and North Africa (MENA) countries at the policy and operational levels, and points to interventions for its improvement. The HS governance assessment framework includes the following 10 principles: strategic vision, participation and consensus orientation, rule of law, transparency, responsiveness, equity and inclusiveness, effectiveness and efficiency, accountability, intelligence and information, and ethics. Four existing governance

frameworks were considered in developing this framework: the WHO's domains of stewardship (16), the Pan-American Health Organization's (PAHO) essential public health functions (EPHF) (53,54), the WB six basic aspects of governance (55), and the United Nations Development Program Middle East's (UNDP) principles of good governance (56).

Financing, Supply and Demand frameworks

There are a number of frameworks and models that focus on the relationship and interaction between supply and demand and intermediary agencies (57,58), or classify healthcare providers and users in terms of supply and demand (59) and on financing systems (60). They often classify according to the relative importance of insurance schemes, the amount of tax funding, and direct out-of-pocket payments.

Healthcare delivery frameworks

There are several frameworks and models that focus on healthcare delivery, or parts of it. Peters et al. have developed a framework to look at interventions to improve the delivery of healthcare services, though their framework is comprehensive and takes into account many elements of the HS (61). The WHO has developed a comprehensive

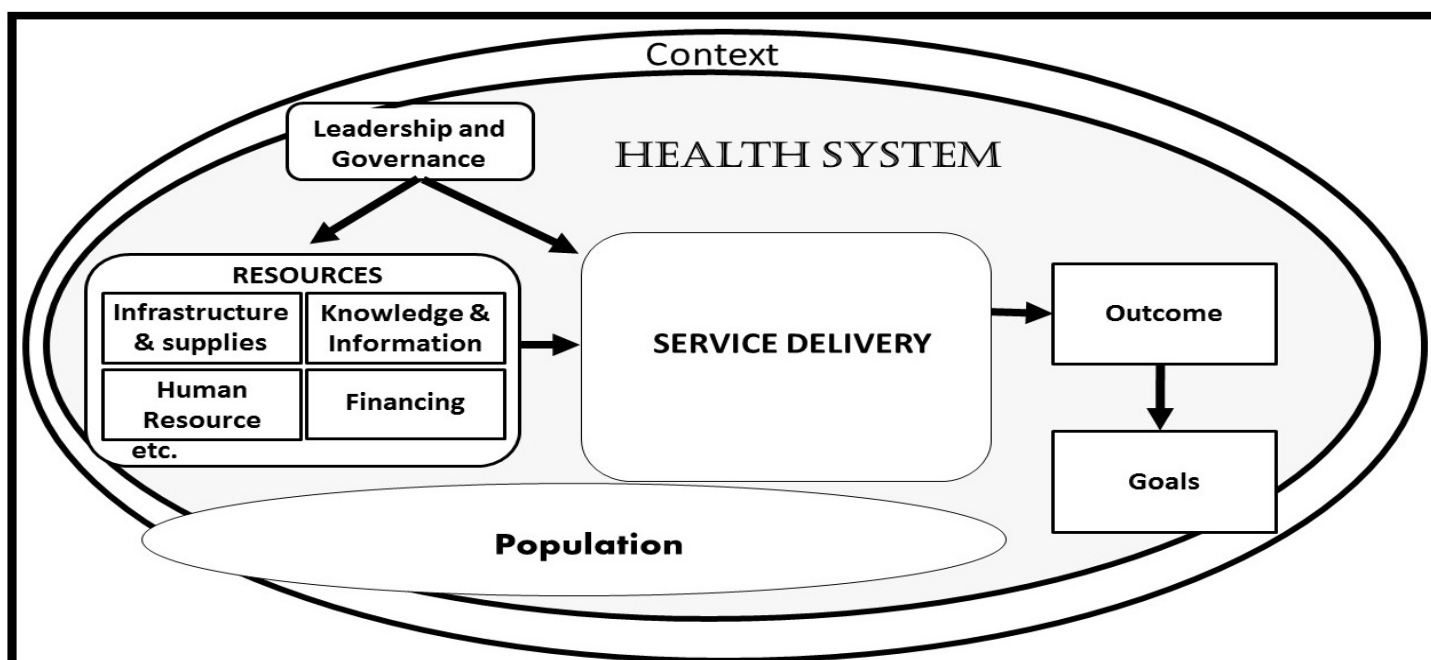


Figure 4. “The Health System Dynamics” framework (15).

framework for PHC that describes needed reforms in organization and policy at different levels (51).

Organizational structure and performance frameworks

There are frameworks and models that focus on the organizational level. The multipolar framework describes the goals, processes, context and values, and culture of an organization, and how these processes are aligned (62). The organizational framework of Mintzberg looks more closely at the structure of an organization and the internal co-ordination processes (63,64). He suggests that organizations can be differentiated along three basic dimensions: (a) the key part of the organization, that plays the major role in determining its success or failure; (b) the prime mechanism that the organization uses to co-ordinate its activities; and (c) the type of decentralization used – that is, the extent to which the organization involves subordinates in the decision-making process (65). Unger et al. have applied this framework to the public structure of a national HS (66).

Integration of Disease Control Programs (DCPs) and HSs frameworks

There are several frameworks and models for the integration of Disease Control programs and HSs. Criel et al. (67) developed a simple framework that focuses on the delivery of care, while Atun et al. (23,68) have developed more comprehensive frameworks that also take into account the other elements of the HS. Some proposed frameworks link to certain types of disease, for instance the WHO framework for chronic conditions (69).

Public health system frameworks

There are several frameworks and models for Public Health System (PHS), or parts of it. Handler, Issel and Turnock provided a conceptual framework for PHS as a fundamental way to facilitate the measurement of PHS performance (70). This comprehensive PHS framework includes various components and is affected by the (macro context) social, economic, and political environment in which the system operates. Questions about the context in which the PHS operates, as well as its impact on the PHS components and its relationship to PHS performance, have not been well formulated. A host of possible questions and measures exists; however, for many of the macro context constructs of interest (e.g. societal values), measures may be insufficient or nonexistent (70). Turnock developed a conceptual framework for PHS that attempts to bridge the gap between what public health is, what it does and how it does what it does. It also allows the examination of the

several elements of the PHS, which can better appraise how the pieces fit together (71).

A critical analysis of current HSs thinking

Before the PHC movement, the vision of international health favored an approach based more on health technologies with a special focus on cutting-edge technological curative healthcare concentrated in urban areas. Major biomedical research breakthroughs produced new technologies and medicines that inspired healthcare professionals and people with the sense that technologies were the answers to people's health needs. However, technology provides only part of the answer, and at a high cost that some people cannot afford. The PHC approach offered a social model of healthcare, but was understood to have a different emphasis according to the different contexts of the societies in which it was applied. Different aspects of PHC such as values and principles, specific public healthcare services, or even the levels of the healthcare pyramid were the focus of interpretation by specific countries.

The logic models are based on linear relationships between HS structures, resources, activities, processes, outputs and outcomes, and have been used widely to support HS development, reform and evaluation. While it is useful in describing HSs, the linear nature of the logic model makes it difficult to capture the complex relationships within large, multi-dimensional, multi-faceted HSs (2,4,26,27,45).

Systems are dynamic and complex; they are made up of many interconnected and interdependent elements which form extensive networks of feedback loops with time delays and non-linear relationships. It is these characteristics that are the sources of dynamic complexity in systems (4). Systems thinking postulates that disturbances in systems arise due to a particular kind of complexity, namely 'dynamic complexity'. Hence, an understanding of 'dynamic complexity' is a necessary step in understanding the underlying causes of complexity in systems thinking (Table 2). The response (effect) of the system to an action (cause) is not always linear proportional. The existence of such relationships in a system increases dynamic complexity because the response of the system to a disturbance will be different, depending on its current state. The same action could lead to totally unexpected consequences, as the response of the system is contingent upon the existing balance of power along the feedback loops (4).

Despite the comprehensiveness of the WHO's definition of

Table 2. Drivers and circumstances of “dynamic complexity”:	
Drivers of “dynamic complexity”:	“Dynamic complexity” arises when:
The presence of feedback loops	The short- and long-term consequences of the same action are dramatically different.
variable time lags between the cause and effect of an action	The consequences of an action in one part of the system are completely different from its consequences in another part of the system
The existence of non-linear relationships among the system’s elements.	“Obviously” well-intentioned actions lead to non-obvious counter-intuitive results.
References: 4,72-76	

health (17), the current descriptions of HSs are not holistic enough to capture all key health determinants in order to respond to the health needs of people and communities. Firstly, they address parts of the organization rather than the whole. Secondly, they fail to recognize that concentrating on the performance of one part of the HS may have damaging effects for the whole HS. Thirdly, they fail to address the influence of human nature, HRH, people and communities in the relationships among different parts of the HS. Fourthly, they are designed to work in a stable environment. And finally, they do not provide a structural response to cope with the variety of healthcare stakeholders. However, many scholars have argued that none of these frameworks reflect the most recent debates on HSs and their complexity and system dynamics (2,7,14,27,49).

To a large extent, these efforts have failed because attribution proved very difficult, measurement tools were not strong enough, and the number of variables was very diverse for a useful classification (47,77,78). Recently, researchers have called for the application of more appropriate research designs, with the aim of identifying mechanisms and assessing the influence of context in the pathways of change (13,14). The WB monograph on how to improve the delivery of health services (61) and the publication of ‘Good Health at Low Cost’ (79) aim to identify such patterns by in-depth case study analyses.

Summary and conclusions

The governments, NHSs and MOHs, especially in the developing countries, have been encouraged to use of particular HSFs. However, review of HS literature suggests that the current functionalist HS approaches e.g. the WHO’s HSFs (16,21) may not be particularly applicable to their situations for several reasons. Firstly, it is very important to realize that the current HSs thinking addresses individual

parts rather than the whole HS. Secondly, it fails to recognize that concentrating on the performance of one part of the HS may have damaging effects for the whole HS. Thirdly, current HSs thinking fails to address the views, interests and influence of HRH involved in the implementation of reform, and how people and communities are expected to benefit from it. Fourthly, it does not take into account the different meanings, perceptions, cultural values and beliefs that may influence the very different institutions and structures belonging to a HS and working towards the same goals. In addition, the structural parts of HSs are designed to work in a stable environment, rather than addressing the ever changing context and finally, HSs thinking does not provide a structural response to cope with the variety of healthcare stakeholders. The system idea does not appear to be well addressed, and there is a lack of comprehensiveness in ongoing attempts to map the HS’s reality; these are mostly limited to holders of political power, and so they fail to capture and respond to the perceptions and views of HRH and the people.

The author certainly advocates the use of the system idea and system thinking approaches and related methodologies (80) because of their comprehensive and holistic learning and administrative capacities to deal with various problem situations. They also expand the overall relevant elements from political, economic, social, cultural and environmental perspectives which, despite being outside the scope of the NHSs or MOHs, influence its conduct and performance as a system.

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References

1. Checkland P. Systems thinking, systems practice. Chichester: Wiley; 1981.
2. Sambo LG. Health systems thinking: the need for a more critical approach, PhD Thesis. University of Hull; 2009.
3. Senge PM. The fifth discipline: the art and practice of the learning organization. New York: Doubleday; 1990.
4. Atun R, Menabde N. Health systems and systems thinking. In: Coker R, Atun R, McKee, M. (eds.) Health Systems and the Challenge of Communicable Diseases: Experiences from Europe and Latin America. Open University Press for the European Observatory on Health Systems and Policies, Maidenhead; 2008: pp120-40.
5. M'Pherson PK. A Perspective on Systems Science and Systems Philosophy. Futures 1974;6:219-39.
6. Sterman JD. System Dynamics Modelling: Tools for Learning in a Complex World. California Management Review 2001;43(4):8-25.
7. de Savigny D, Adam T. (eds.) Systems Thinking for Health Systems Strengthening. Alliance for Health Policy and Systems Research, Geneva: World Health Organisation; 2009.
8. Best A, Clark PI, Leischow SJ, Trochim W. (eds.). Greater Than the Sum: Systems Thinking in Tobacco Control. Tobacco Control. Monograph 18, Bethesda, MD., U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2007.
9. Health Metrics Network (HMN). Framework and standards for country health information systems. 2nd ed. Geneva, World Health Organization; 2012.
10. WHO. The World Health Report 1999: Making a Difference. Geneva: World Health Organization; 1999.
11. Bennett S, Agyepong IA, Sheikh K, Hanson K, Ssengooba F, Gilson L. Building the field of health policy and systems research: An agenda for action. PLoS Med. 2011; 8(8): e1001081.
12. Gilson L, Hanson K, Sheikh K, Agyepong IA, Ssengooba F, Bennett S. Building the field of health policy and systems research: social science matters. PLoS Med 2011;8(8):e1001079.
13. Mills A. Health policy and systems research: defining the terrain; identifying the methods. Health Policy Plan 2011;27(1):1-7.
14. Sheikh K, Gilson L, Agyepong IA, Hanson K, Ssengooba F, Bennett S. Building the field of health policy and systems research: framing the Questions. PLoS Med 2011;8(8):e1001073.
15. van Olmen J, Criel B, Bhojani U, Marchal B, van Belle S, Chenge MF, et al. The health system dynamics framework: The introduction of an analytical model for health system analysis and its application to two case-studies. Health, Culture and Society 2012;2(1):1-12.
16. WHO. The world health report 2000: Health systems: Improving performance. Geneva: World Health Organization; 2000.
17. WHO. Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. Available from: [http://www.who.int/about/definition/en/print.html - accessed: 01.08.2016].
18. WHO. Organizational study on methods of promoting the development of basic health services (EB51/WP/1, 16 January 1973).
19. Commission on Social Determinants of Health (CSDH). Closing the gap in a generation: health equity through action on the social determinants of health. World Health Organization; Geneva 2008.
20. Lambo E, Sambo LG. Health sector reform in sub-Saharan Africa: a synthesis of country experiences. East Afr Med J 2003;80(6 Suppl):S1-20.
21. WHO. Everybody's business. Strengthening health systems to improve health outcomes. WHO's framework for action. Geneva: World Health Organization; 2007.
22. WHO. Toolkit on monitoring health systems strengthening. World Health Organization; 2008.
23. Atun R, de Jongh T, Secci F, Ohiri K, Adeyi O. Integration of targeted health interventions into health systems: a conceptual framework for analysis. Health Policy Plan 2009;25:104-11.
24. WHO. Preparing a health care workforce for the 21st Century: The challenge of chronic conditions. World Health Organization; Geneva; 2005.
25. WHO. World health report 2010. Health systems financing: the path to universal coverage. Geneva: World Health Organization; 2010.
26. Shakarishvili G, Atun R, Berman P, Hsiao W, Burgess C, Lansang M. Converging health systems frameworks:

- Towards a concepts-to-actions roadmap for health systems strengthening in low and middle income countries. *Global Health Governance* 2010;3(2):1-17.
27. van Olmen J, Criel B, Van Damme W, Marchal B, van Belle S, van Dormael M, et al. Analyzing health systems dynamics: A framework. 2nd ed. [Studies in Health Services Organisation & Policy 28]. Series editors: Kegels G, De Brouwere V, Criel B. Antwerp, Belgium; 2012.
 28. Evans RG. Incomplete vertical integration: The distinctive structure of the health-care industry. In Van der Gaag J, and Perlman M. (eds.), *Health, Economics, and Health Economics*. Amsterdam: North-Holland Publishing Company; 1981; p:329-54.
 29. Green A. The market and the State, In *An Introduction to Health Planning in Developing Countries*, Oxford: Oxford University Press; 1992;pp:9-15.
 30. Blum HL. *Planning for health: Development and Application of Social Change Theory*. New York: Human Sciences Press; 1974.
 31. Blum HL. *Planning for Health: Generics for the Eighties*. 2nd ed. New York: Human Sciences Press; 1981.
 32. Dever AG. *Epidemiology in Health Services Management*. Gaithersburg, Maryland, USA, Aspen Publishers Inc; 1984.
 33. Kleczkowski B, Roemer M, Van der Werff A. National health systems and their reorientation towards health for all: Guidelines for policy-making. *Public Health Papers* No. 77: 3-120. Geneva, Switzerland: World Health Organization; 1984.
 34. Roemer M. National health systems throughout the world. *Annu Rev Public Health* 1993;14(1):335-53.
 35. Frenk J. Dimensions of health system reform. *Health Policy* 1994;27:19-34.
 36. Frenk J. Comprehensive policy analysis for health system reform. *Health Policy* 1995;32(1-3):257-77.
 37. Londono J, Frenk J. *Structured Pluralism: Towards an Innovative Model for Health System Reform in Latin America*; 1997.
 38. Murray C, Frenk J. A WHO framework for health system performance assessment. Geneva, World Health Organization, Global Programme on Evidence for Health Policy (GPE Discussion Paper No. 6);1999.
 39. Murray C, Frenk J. A framework for assessing the performance of health systems. *Bull World Health Organ* 2000;78(6):717-31.
 40. Frenk J. The World Health Report 2000: Expanding the horizon of health system performance. *Health Policy Plan* 2010;25(5):343-5.
 41. Navarro V. Assessment of the World Health Report 2000. *Lancet* 2000;356(4):1558-601.
 42. World Bank (WB). *Healthy Development. The World Bank Strategy for Health, Nutrition, and Population Results*, World Bank; 2007.
 43. Roberts M, Hsiao W, Berman P, Reich M. *Getting Health Reform Right. A Guide to Improving Performance and Equity* New York, Oxford University Press; 2004.
 44. Mills A, Ranson MK. The design of health systems, In: Merson MH, Black RE, Mills A. (eds.) *International public health: diseases, programs, systems, and policies*, 2nd ed. Sudbury: Jones and Bartlett Publishers; 2006;pp:513-51.
 45. van Olmen J, Marchal B, Van Damme W, Kegels G, Hill PS. Health systems frameworks in their political context: framing divergent agendas. *BMC Public Health*. 2012; 12:774. Epub 2012/09/14.
 46. Mossialos E, Allin S, Figueras J. *Health Systems in Transition: Template for analysis*, WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies, Copenhagen; 2007.
 47. Paris V, Devaux M, Wei L. *Health Systems Institutional Characteristics: A Survey of 29 OECD Countries*. 50th ed. Paris: Organization for Economic Co-operation and Development. OECD Health Working Papers; 2010.
 48. Atun RA, Menabde N, Saluvere K, Jesse M, Habicht J. Introducing a complex health innovation – primary health care reforms in Estonia: multi-methods evaluation. *Health Policy* 2006;79(1):79-91.
 49. Paina L, Peters DH. Understanding pathways for scaling up health services through the lens of complex adaptive systems. *Health Policy Plan* 2012;27:365-73.
 50. WHO. *Primary Health Care, Report of the International Conference on Primary Health Care, Alma-Ata, 6-12 September 1978*, Geneva, World Health Organization; 1978.
 51. WHO. *The World Health Report 2008: Primary Health Care - Now more than ever*. Geneva, World Health Organisation; 2008.
 52. Siddiqi S, Masud TI, Nishtar S, Petersc DH, Sabria B, Bile K, et al. Framework for assessing governance of the health system in developing countries: Gateway to good governance. *Health Policy* 2009;90:13-25.
 53. Pan American Health Organization (PAHO). *Essential public health functions*. In: *Public Health in the Americas: Conceptual Renewal, Performance Assessment, and Bases for Action*. Washington, DC. Scientific and Technical Publication No. 589; 2002.

- p:57-69.
54. Pan American Health Organization (PAHO). Performance measurement of essential public health functions at the national level. In: X. Results of the workshop on application of the instrument conducted. March, 2002. p:25-27.
 55. Kaufmann D, Kraay A, Zoido-Lobaton P. Governance Matters. Washington: World Bank Policy Research Department. Working Paper No. 2196; 1999.
 56. United Nations Development Programme (UNDP). Governance for sustainable human development: a UNDP policy document. New York; 1997.
 57. Hurst J. Reforming health care in seven European nations. *Health Affairs* 1991;10(3):7-21.
 58. Cassels A. Health sector reform: key issues in less developed countries. *J Int Dev* 1995;7(3):329-47.
 59. Janovsky K, Cassels A. Health Policy and Systems research: issues, methods, priorities. In: Janovsky K. (ed.) *Health policy and systems development: an agenda for research*. Geneva: World Health Organization; 1996.
 60. Kutzin J. A descriptive framework for country-level analysis of health care financing arrangements. *Health Policy* 2001;56(3):171-204.
 61. Peters D, El-Saharty S, Siadat B, Janovsky K, Vujicic M. *Improving Health Service Delivery in Developing Countries*. Washington, World Bank; 2010.
 62. Sicotte C, Champagne F, Contandriopoulos AP, Barnsley J, Béland F, Leggat SG, et al. A conceptual framework for the analysis of health care organizations' performance. *Health Serv Manage Res* 1998;11:24-48.
 63. Mintzberg H. *Structure in fives: Designing effective organizations*. Upper Saddle River, NJ: Prentice Hall; 1992.
 64. Mintzberg H. *Tracking strategies: Toward a general theory of strategy formation*. New York, NY: Oxford University Press; 2009.
 65. Lunenburg FC. Organizational structure: Mintzberg's framework. *International Journal of Scholarly, Academic, Intellectual Diversity* 2012;14(1):1-8.
 66. Unger J, Macq J, Bredo F, Boelaert M. Through Mintzberg's glasses: a fresh look at the organization of ministries of health. *Bull World Health Organ*. 2000;78(8):1005-14.
 67. Criel B, Kegels G, Van der Stuyft P. A framework for analysing the relationship between disease control programmes and basic health care. *Trop Med Int Health* 2004;9(6):A1-A4.
 68. Atun R, de Jongh T, Secci F, Ohiri K, Adeyi O. A systematic review of the evidence on integration of targeted health interventions into health systems. *Health Policy Plan* 2010;25(1):1-14.
 69. WHO. *Innovative care for chronic conditions: building blocks for action: global report*. Geneva: World Health Organization; 2002.
 70. Handler A, Issel M, Turnock BJ. A conceptual framework to measure performance of the PHS. *Am J Public Health* 2001;91(8):1235-9.
 71. Turnock BJ. *Public Health: What It Is and How It Works*. Boston: Jones and Bartlett Publishers; 2004.
 72. Forrester JW. *Industrial dynamics*. Cambridge, MA: The MIT press; 1961.
 73. Richardson GP. Loop polarity, loop dominance and the concept of dominant polarity, *System Dynamics Review*. 1995;11(1):67-88.
 74. Sterman JD. Learning in and about complex systems. *System Dynamics Review* 1994;10(2-3):291-330.
 75. Mustafee N (Ed). *Operational Research for Emergency Planning in Healthcare: Volume 2. The OR Essentials series*. Palgrave Macmillan, UK; 2016.
 76. Sterman JD. Modeling Managerial Behavior: Misperceptions of Feedback in a Dynamic Decision Making Experiment. *Management Science*. 1989;35(3):321-39.
 77. Riley J. *Low income, social growth, and good health*. Berkeley: University of California Press; 2008.
 78. McPake B, Matthews Z, Channon A, Hadi Y, Chattoe-Brown A. *Health Systems Typology*. Southampton: HLSP; 2009.
 79. Balananova D, McKee M, Mills A. *Good Health at Low Cost. 25 years on. What makes a successful health system? London: London School of Tropical Medicine and Hygiene; 2011.*
 80. El Fallah MMB. *The Development of the Libyan Health System to Improve the Quality of the Health Services*. PhD Thesis. Manchester, UK: Manchester Metropolitan University; 2014.

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