

SUSTAINABILITY IN HEALTH AND HEALTH CARE PROVISIONS

Abstract

As health care systems face huge challenges, sustainability is seen as an important demand for creating them appropriate the long run. However, there's no accord with relation to either the definition of the term or the factors that characterize a “sustainable health care system”. Therefore, the aim of this text is twofold. First, is to provide samples of the prevailing literature regarding sustainable health care system and analysing this literature with relation to its understanding of sustainability regarding the strength and weaknesses of the various approaches. The work then identifies crucial factors for sustainable health care systems, and also resulting the sustainable healthcare system is the need of future development of our health and needful work in the field of healthcare an abstract framework consisting of 5 distinct and interacting factors, will be seen as a place to begin for any analysis. Improving the sustainability health services is an opportunity to improving the safety and quality of care, improve the health of the community

Keywords: Sustainable Healthcare Systems, Environment, Social, Sustainability, Conceptual Framework.

Authors

Harsha Rathore

Associate Professor
Department of Pharmacology
ShriRam College of Pharmacy
Banmore, Morena , India
harsharathore22@gmail.com

Ravindra Mishra

Associate Professor
Department of Pharmacology
ShriRam College of Pharmacy
Banmore, Morena , India
ravindra.mishra1412@gmail.com

Sarvesh Bhargava

Associate Professor
Department of Pharmacology
ShriRam College of Pharmacy
Banmore, Morena , India

Krati Dhakad

Associate Professor
Department of Pharmacology
ShriRam College of Pharmacy
Banmore, Morena , India

Nitin Solanki

Assistant Professor
Department of Pharmacology
Shriram college of pharmacy
Morena, India

I. INTRODUCTION

Sustainable healthcare systems will be outlined as “all the activities whose primary purpose is to market, restore and maintain health” [7], with health being a state of complete physical, mental, and social well-being and not simply the absence of disease or infirmity [2]. Healthcare systems are delineated as terribly complicated systems that include several stakeholders [3]. Moreover, it should be additionally taken under consideration that healthcare is an open system that incorporates a dynamic reciprocity with different social and environmental factors [1]. Kind of like the unclear boundary separating healthcare systems from different social systems, there's still no general definition of sustainable healthcare systems, that is one in every of the explanations why Muzyka et al. [4] expressed that “not everybody suggests that identical issue after they talk about ‘sustainable health care’”. Sustainability healthcare as a balance of the requirements of patients, economic issues, and environmental prices [8]. Due the quality of existing issues, sustainability science over the past ten years has developed approaches that step far away from the clear distinction between the three pillars and towards the applying of an integrated approach with cross-sectional terms, like intergenerational justice, quality of life, or social cohesion [6]

The healthcare systems need to cope within the medium term into four specific challenges.

1. First, new technology and treatments have initiated technology-driven demand whereas at identical time making inappropriate and wasteful health care interventions.
2. Second, the growing expenditures for meeting the requirements of an aging society have created demographic-driven demand challenges.
3. Third, hands capability and funding challenges are caused each by less employees conducive to the system’s services and by vital shortages within the health hands.
4. Fourth, quality and safety challenges demand each an exaggerated quality of health services and advanced components of preventive healthcare in order that sicknesses will be prevented before they emerge.

II. ROLE OF SUSTAINABILITY ON HEALTH

Global movements to create the healthcare business additional property centre on creating changes like minimizing waste, building inexperienced, being energy economical, and avoiding hepatotoxic substances like PVC and phthalates. These ways will result in savings that are invested in improving patient care.

Sustainable healthcare isn’t with regards to the setting, though; it’s additionally concerning having access to health care and preventing disease. Think about childhood respiratory disorder. It’s typically simple to treat with an inhalator and medicine. Several youngsters even ultimately grow out of it. However, if you don’t have access there to treatment, the respiratory disorder(asthma) gets worse. Eventually, it becomes chronic. Human health is central to any or all sustainability efforts. “All of those (food, housing, power, and health care), and therefore the stress that the dearth of them generate, play a large role in our health,” Hollis says.

They have an effect on your psychological state, too. “We even have to trust problems around stress from not having the ability to own any of those things, on high of stress from different things like climatical events or general racism,”. All these stressors will cause you to additional doubtless to own sickness and disease.

We need healthy, productive individuals thus society will keep up and developing. Sadly, all our advancements have taken a toll on the environment, causing water and air pollution. And it’s typically the poorest those that suffer the foremost from the consequences of pollution. This could cause illness, lost faculty or work, and fewer productivity. To combat this, sustainability practices get to confirm that everyone individuals, notably poorer populations, have a secure, clean environment and access to health care. This permits them to remain productive and powerful[7,8].

III. BROAD THEMES REGADING SUSTAINABILITY IN HEALTH

There are 3 broad themes with reference to property in health:

Sustainable environments for a healthy lifestyle
Implications of a dynamical climate
Sustainability in health system performance.

- 1. Sustainable environments for a healthy lifestyle:** In developed countries there are few visible indicators of the environmental impact on health, in contrast to in several developing countries wherever visible indicators embrace poor sanitation, litter, waste, smogginess and haze.

Health is, in part, dependent on the natural and designed environments. It is important to foster environments that defend and promote the health and wellbeing of communities. Many selections that ultimately have an effect on the health and wellbeing of various country, such as land use and transport designing policies and decisions, are created outside the health department. The department plays a key role communicating the importance of the natural and designed environments to health and wellbeing.

- 2. Implications of a dynamical climate:** The climate is dynamical and has identifiable effects on the health and wellbeing of all humans, although additional accurately on people who are already vulnerable. Such effects embrace an upward trend within the average annual range of hot days and connected deaths and hospitalisations, and a rise within the range and severity of bushfires and associated injury, death, metabolic process hazards and psychological state and wellbeing.

The department’s Environmental Health Unit provides connected data on managing climate and health-related impacts from events, as well as heatwave, bushfires and drought. Environmental health has additional data.

- 3. Sustainability in health system performance:** Due to the nature of the services, they supply health services use vital amounts of energy and water and generate giant volumes of waste. The department’s sustainability in healthcare - Environmental sustainability strategy 2018–19 to 2022–23 sets out our commitment for successive 5 years to further

improve the environmental sustainability of the health system and to adapt the health system thus it's resilient within the face of global climate change. The department runs variety of programs and initiatives to assist health services improve their environmental performance, that is further documented for such programs.

IV. WHY SUSTANABILITY IS IMPORTANT IN HEALTH CARE

1. Creating the commitment to environmental sustainability in health care organizations: Preserving the atmosphere are a few things most health care organizations acknowledge as vital; however, several don't have formal programs in situ to try to do so. Viewing sustainability as a “nice-to-have” instead of a prime priority will be damaging not solely to a health care organization’s surrounding community, however additionally to its bottom line. There are many reasons why it’s essential for health care organizations to shift their thinking to place sustainability front and centre in structure priorities.

- **Sustainability strategies keeps harmful things out of the environment:** Every day, hospitals, health systems, physician practices and different health care organizations contribute to the billions of pounds of medical and different venturous waste, a lot of which might be harmful to the atmosphere if not disposed properly. If these substances leach into the encircling landfills and waterways, they will probably harm ecosystems and cause negative health problems for the community. By developing these programs that ensures waste is properly collected, segregated, treated and disposed of every and each time, health care organizations will be assured undesirable materials will not make their way into the environment.
- **Proper medical waste disposal prevents fines and different financial repercussions:** Many communities have strict rules encompassing however waste and exercise are white and treated. If health care organizations don’t closely follow these rules, they will derail their community’s exercise and waste disposal efforts, probably contaminate the atmosphere and incur expensive fines. As such, it's essential to instil a comprehensive medical waste disposal program that ensures your workers systematically and properly segregate all medical, hazardous, sharps and drug waste. The program ought to embrace clear processes for addressing totally different waste streams to create certain they're rendered harmless. Not solely is that this smart for the atmosphere, it will facilitate your organization avoid expensive ramifications to its reputation and balance sheet.
- **Health care organizations are part of a community:** Due to their underlying missions, health care organizations have an obligation and responsibility to safeguard patients, workers and also the community—and a robust sustainability program may be a key part of that. Such a program entails reducing the organization’s carbon footprint, ensuring harmful substances don’t get into landfills and water systems and managing internal operations to conserve resources, like by using reusable containers wherever attainable, engaging in robust recycling, developing programs that mitigate the chance of environmental contamination so on.

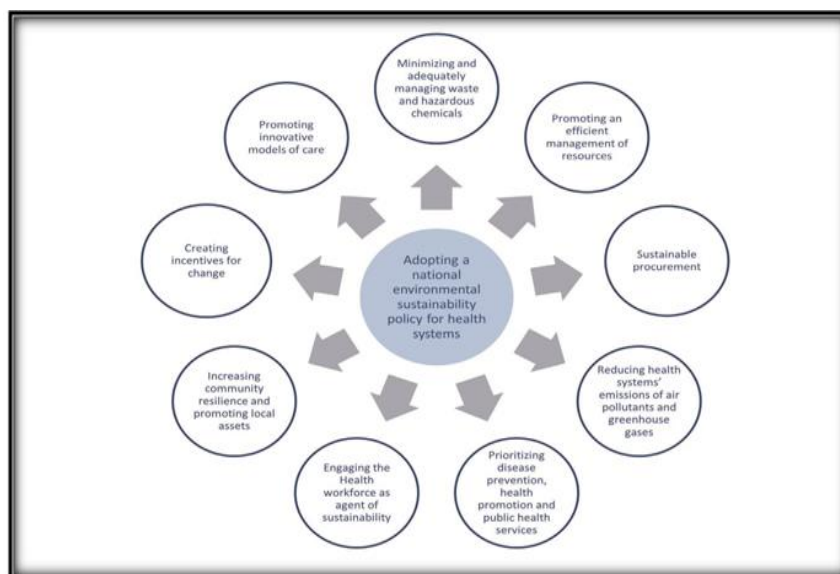


Figure 1: Possible elements of a national environmental sustainability policy for health systems

V. ALTERNATIVE WAYS OF ANALYSING HEALTH CARE SUSTAINABILITY

1. First, research dealing with sustainability of health care system was categorised as either expressly or implicitly relating understanding it. The 3 distinctive and dependent parts are development (economic, social, and ecological) was taken into consideration by the research products. Researches that didn't expressly discuss with the Brundt and definition had to show a minimum of the importance of taking the needs of future generations into considerably thinking about sustainability. Often, however, these approaches didn't show a deeper understanding of the 3 pillars of sustainability.
2. Second, research activities were differentiated by the question of whether or not the study or project aimed to investigate care systems by a cross-country comparison or by a deeper analysis of one care system (which might even be conducted on a lot of abstract level, of course).
3. The third differentiation was created between approaches targeting extremely industrial, high-income countries and their health care systems, and low- similarly as middle-income countries. Analysing countries with a history of high standards in healthcare for many years is totally different from the angle of analysing countries making a system throughout the amount of speedy economic process and tremendous social changes or countries with the health care system that doesn't perform however [10]. As essentially totally different analysis ways are needed for every, solely approaches that targeted high-income countries were considered for this study.

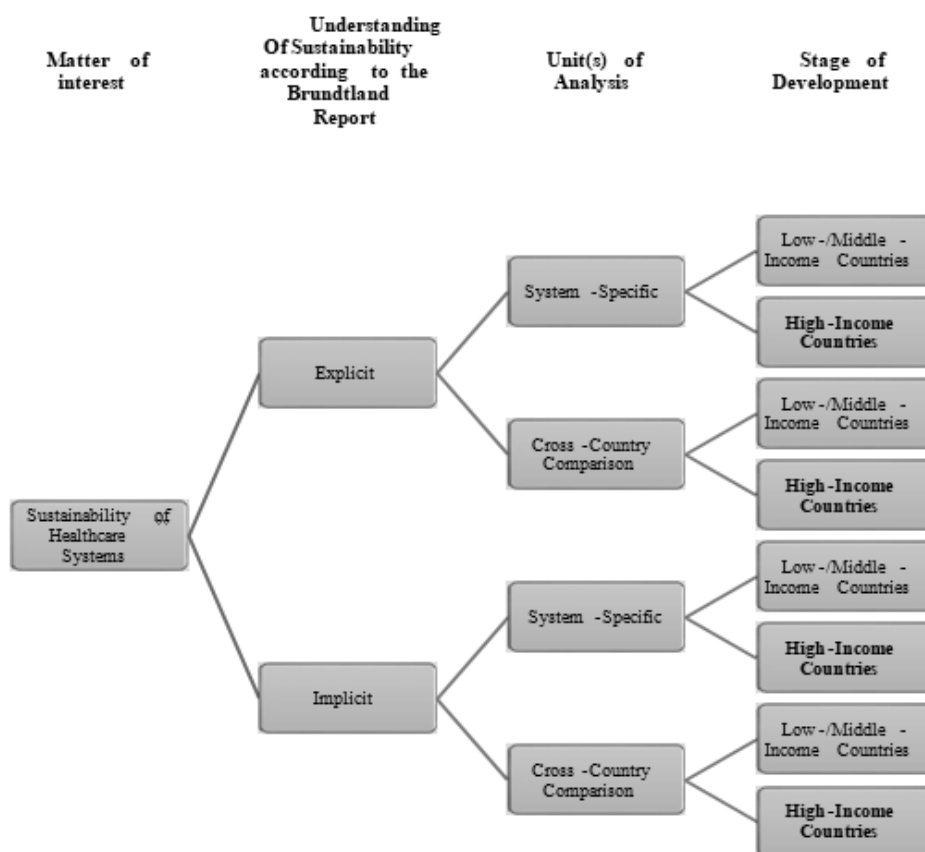


Figure 2: Alternative Ways of Analysing Health Care Sustainability

VI. CHARACTERIZING SUSTAINABILITY HEALTHCARE SYSTEMS

1. System-specific approach for a sustainability health care system

- Securing long-run financing; respecting moral norms relating to people, social structures and therefore the environment; and guaranteeing high-quality development through each innovative analysis and therefore the inclusion of sensible expertise.
- Neither favouring explicit interest teams nor being centred on short-run election periods.
- Stimulating the abilities of the individual (compliance and empowerment) through education and improved data channels (internet).
- Taking direct and indirect interference into consideration, the latter this means improved general health (not solely healthcare) conditions.
- Better integration the resources of all actors enclosed.
- Offering transparency with reference to uncovering hidden lobbying activities, cultivating knowledge base discussions, and providing economical paperwork in order that the medical personnel will target their actual tasks.
- Considering the legitimate occupational demands of the assorted stakeholders, which means not solely enhancements in payment however in their personal development through higher appreciation and an adaption with reference to continued training.

- Appreciating scientific and technical innovation for a qualitative improvement in performance and reducing body barriers, as an example by victimization the potential of e-health communication technology.
- Fostering scientific transfer and engagement for property development in low-income countries, taking world interconnection into consideration.
- Addressing ecological problems, which works while not oral communication.
- Fostering data exchange, doing analysis, and developing future methods inside a yet-to-be-established institution for the health care system.

2. Cross-country-comparison approach for a sustainable health care system

- Performance can't be measured by the money spent solely, as high performers, like Sweden's rank among the bottom spenders on health care.
- The management of publicly funded pharmaceutical prices through worth controls and trainings for doctors is crucial so as to stop escalating expenditures.
- Measures to market a happy and productive personnel, particularly on the far side remuneration, are central for a high-performing system.
- Health promotion, prevention, and investments in broader health determinants will decrease care expenditures within the long-term.
- A high share of senior folks isn't essentially followed by escalating prices once integrated approaches on the time of care are developed and applied.
- Workforce productivity can even be improved by investment in health-related data and communication technologies and by providing training and skill development.
- User fee strategies might have advantages with reference to the management of prices, however should not cause a tardy detection of symptoms as a result of folks don't consult doctors.
- Long waiting times should be avoided by making certain adequate surgical capability [12].

VII. RELEVANT DIMENSIONS FOR SUSTAINABLE HEALTH CARE SYSTEMS

Overall, the review of exemplary approaches appears to recommend that care systems have to be compelled to address some key factors so as to develop towards sustainability. Sustainability proposes the subsequent 5 categories: long-run strategic perspective and innovativeness; disease prevention and health promotion; quality; institutionalization of environmental concerns; additionally, as institutional accountability and individual responsibility.

1. **Long-run strategic perspective and innovativeness:** With reference to sustainability, the phrase long-run strategic perspectives and innovativeness usually reflects an economic perspective. The political actors are particularly vital here as they typically have the ability to create selections that fix the "rules of the game". This approach has 3 implications. First, a sustainable health care system should keep money prices in restraint. Unfortunately, each researcher and policy-makers disagree on a way to guarantee overall economic sustainability. Some agreement that changes with reference to each patient and supplier behaviour, additionally as a shift of resources to activities that improve health ought to be promoted [13]. Moreover, health care providers should be inspired to form the correct incentives so as to supply a most worth for cash [4]. Escalating pharmaceutical

prices have to be compelled to be controlled by, as an example, the utilization of price-controls, bulk shopping for, or a certified reduction of client demand for medication by education campaigns [12]. The applying of cost-control management procedures and a literary criticism of existing approaches are crucial problems [13].

The second issue is that they want for a strategic perspective among policy-makers. During a property care system, progressive decision-making has to get replaced by long-run coming up with supported strategic deliberations. The key to strategic management could be a realistic analysis of the present state of affairs, followed by the setting of clear, long-run goals and a close arrange of a way to bring home the bacon these goals. Muddling through and patchwork repair should get replaced by basic and lasting reforms, that balance social and money imperatives [14], and trade-offs in society have to be compelled to be clearly communicated and mentioned [4]. A property care system additionally should be sufficiently adaptational, which means the flexibility to react to changes within the inputs or outputs of the system [1]. This might be fostered, on the one hand, through agreement concerning care goals and, on the opposite hand, through constant and participative deliberations concerning care reforms across party lines.

The third issue is that the maximization of a system's innovativeness. Scientific and technological innovativeness is at the middle of this issue as a result of such innovativeness contributes to improving healthcare services, developing effective prescribed drugs, and reducing body barriers [11,13]. Staying innovative could be a key for keeping the long-run ability to remain competitive. However, it additionally includes the look for innovative funding models. Although there's very little agreement, reforms are inescapable. Recommendations like strengthening the non-public sector, user charges, or the separation of long-run care and high-cost medical aid [14], should be evaluated within the finish by their ability to stay prices as low as attainable while not harming the social following.

- 2. Disease prevention and health promotion:** Prevention and wellness programs are seen as crucial for a sustainable healthcare system [11,33]. Primary healthcare facilities are usually mentioned as most popular settings for strengthening prevention and promotion activities [4]. They will additionally contribute to higher outcomes for fewer cash inside a healthcare system [34] as a result of they will address issues at associate degree early stage and effectively facilitate to stop them. Therefore, a property attention system has to emphasize robust medical health facilities that leave patient-centred, simply accessible, and comprehensive services.

Another target is that the prevention of chronic diseases as a result of high variety of medical health visits are measure associated with chronic diseases [35]. As patients with chronic sicknesses face a better risk of developing extra chronic diseases [36], a sustainable healthcare system needs effective chronic illness hindrance by minimizing waiting times and providing fast and high-quality solutions for people involved with or facing the chance of chronic diseases [37].

It is crucial not solely to think about the population, however additionally the attention work force once it involves hindrance and health promotion. The goal is to take

care of a high level of employee's commitment and morale, that is important for providing high-quality service to patients. As doctors, nurses, and alternative healthcare professionals are measure oftentimes needed to try and do quite they will, slashed employee's morale and mental sicknesses like depression or burn-out have return to severely have an effect on the healthcare work force. For instance, inadequate staffing levels and work overload are studied as key determinants of clinical workforce's job turnovers [38].

Therefore, a sustainable healthcare system has to make sure that the work hours of healthcare staff are measure restricted to a accountable variety of hours which the services offered receive a good money reward. Just in case of mental issues, facilitate should be provided quickly. Additionally, a sustainable healthcare system should guarantee that employees members aren't stuck in one position for all their lives, however will develop professionally by taking advantage of coaching programs for life-long learning.

- 3. Quality:** According to the Institute of Medicine's (IOM) widely accepted definition, quality is outlined as "the degree to that health care services for people and populations increase the probability of desired outcomes and are measure according to current skilled knowledge" [39]. Indicators are measure required to live quality, and following Donabedian, these indicators consult with the structure, the processes, and also the outcomes of health services [40]. However, there are alternative ways how to translate the IOM's general definition in concrete imperatives, particularly with reference to outcome indicators.

Some of analyzed many health and healthcare frameworks of selected countries for potential dimensions of healthcare performance, and that they developed a healthcare system performance framework that was embedded during a broader health indicators framework. For them, core quality dimensions are effectiveness, safety, and responsiveness/patient-centeredness. In their review of alternative attention performance frameworks, extra performance indicators (e.g., acceptableness, care atmosphere and amenities, continuity, governance or safety) may even be found. In general, the factors used to confirm quality ought to be the results of wise to public debates concerning the goals and dimensions of healthcare. It absolutely was mentioned earlier that "sustainability" has been seen, if it's been thought-about in the least, as a segment in quality frameworks of healthcare systems. This text acknowledges the vital link between "quality" and "sustainability", however it argues that we want to think about "quality" as a key determinant of attention property, as a result of an absence of quality can cause slashed acceptance by the population and to higher prices for the complete system within the end of the day.

It has become more and more vital to speculate in health-related data and communication technologies (ICT) and to attach it with typical practices. Progressive technology should be commonplace altogether facilities, so information is analyzed effectively—more and a lot of vital is that the structured analysis of massive data—and a continuous assessment of its impact on patient care is conducted. Variation in attention and also the connected problems with over-treatment and under-treatment aren't solely issues on a world scale [41], however additionally a significant concern inside countries:

so, the goal of health policy should be the reduction of unwarranted variation: The distribution of the burden of paying for services likewise because the distribution of healthcare and its advantages has to be fastidiously monitored, and governments got to address inequalities, for instance by setting region-based targets and re-allocating resources in regions with low utilization rates, or by implementing changes in payment systems so as to stipulate lower use in areas wherever a high suspicion of overuse exists [42]. Of course, equitability is additionally a matter of accessibility. During a property healthcare system, native offer for all patients has to be secured, and patients ought to be served in line with their wants. This additionally includes the reduction of waiting times, that greatly have an effect on the means a given population perceives the final quality of the system, and also the fairness of minorities, like ethnic minorities, immigrants, individuals with special wants, or the old, looking on the region or state [4].

- 4. Institutionalization of environmental concerns:** This chapter argues that two varieties of environments should be taken under consideration so as to determine a holistic view of what determines a sustainable healthcare system: First, the overall social setting, and second, the ecological setting. The affiliation between the two will, for instance, be seen in discussions of environmental justice, that is, of instances once a group is disproportionately suffering from environmental hazards and subsequent negative health consequences, which, in turn, result in health inequalities among societies [43]. It's been ascertained in property science that the existence of sure values isn't essentially followed by concrete measures [16]. So as to beat this gap between consciousness and actual decision-making, it's crucial to run the speak and to proceed towards the concrete institutionalization of property in (health) policy making [17].

The first quite setting is mirrored within the integration of social problems that is named, followingg Schön's definition [11], "indirect prevention" during this article. As healthcare is associate open system [1] with several interdependencies, it's necessary to consider factors outside of the tending system. The idea of Dahlgren and Whitehead [18,19] that not solely individual behaviour however conjointly community networks, in addition as general socio-economic, cultural, and environmental conditions form human health, helps North American nation to grasp the importance of indirect bar and it corresponds to the holistic nature of the Brundtland report.

In order to form a sustainable healthcare system, broader socio-economic and cultural determinants of health like education, infancy development, income, and social rank in addition as interdependencies with families, community organizations, and employers got to be taken under consideration. So as to institutionalise these developments, one may consider a "Health Impact Assessment" of political measures within the completely different policy areas, the same as the Regulatory Impact Assessment because it exists in globally, for instance, or the Integrated Impact Assessment on the country level [20].

Even in industrial countries, environmental risk factors are still said to an average of 16%Factor Questionnaire of the burden of illness (measured in healthy life years lost), and will result, for instance, in chronic hindering pneumonic diseases, cardiovascular diseases, or bronchial asthma. Often, a vicious circle is observed: Environmental decline needs medical treatment, that once more damages the natural, for example within the kind

of medical waste, particularly disposable things in addition as infectious materials and bio hazardous agents, like serious metals and radioactive isotopes. Medical treatments conjointly usually lead, to present however another example, to a high energy demands. The consumption of prescription drugs is anticipated to extend within the next years, and though it contributes to the next customary of living, the assembly, application, and disposal are seemingly to cause serious pollution of the setting and high health hazards. Moreover, the final and sometimes irreversible loss of diverseness in several societies is movement serious threats to public health, as links between human and natural health become additional and additional obvious: diverseness plays a task in safeguarding air quality and water, will cut back the danger of communicable disease unfold and will stimulate social life, thereby reducing stress reduction, encouraging physical activity and increasing personal development. Additionally, the importance of diverseness for the assembly of prescription drugs and alternative medical practices has been stressed, though the relation between diverseness and human health is complicated and will typically even be negative [21-26].

Thus, during a sustainable healthcare system, the ecological environment should be recognized and addressed as an important issue. Following Schön [18], one may argue that the negative impact of the consumption of natural resources must be reduced at any time, for instance by developing effective and economical treatments which will cut back environmental waste. The reduction of prescription drugs, as mentioned by Götz and Deffner, could be a case in point: each neutral concerned in tending may contribute to an additional aware use of prescription drugs, and a three-pronged approach involving completely different stakeholders looks to be the foremost promising: Political measures (e.g., environmental objectives), communication measures (e.g., awareness-raising among the skilled stakeholders), and measures to facilitate changes in patient behaviour (e.g., prescription choices that stop the utilization of medicine or the introduction of co-payment) all ought to be a part of the solution [27]. The trend towards additional disposable things has been topic for quite an whereas already and needs to be challenged by the event of effective take-back systems and therefore the development of utilise potentialities while not affecting the health of patients [28]. The goal should be to supply a solution for the increasing and from time-to-time unneeded use of unidirectional things. In medical settings, water and energy consumption ought to be extremely economical, and renewable energies ought to be the first energy supply. This is often not regarding not exploitation non-renewable resources any longer, however regarding their aware usage. Additionally, the introduction of inexperienced tending facilities ought to be promoted, and therefore the tending manpower must be educated regarding acting environmentally friendly. In general, the interdependency of the natural and social environments with regard tending should be recognized and revered, and this understanding must be translated into health political.

- 5. Institutional irresponsibleness and individual responsibility:** In order to make sure a high acceptance by the population, so as to make sure a long stability of the whole system, and last however not last so as to determine the way to remodel the society and what resources it agrees to finally invest, the question of responsibleness emerges. This additionally includes the controversy concerning what the individual has to sacrifice so as to stabilize the total system. Therefore, the thought of responsibleness during this article is threefold.

First, it implies that a property tending system ought to be clear with competencies that are measure clearly distributed [18]. As a result of healthcare systems are in public funded, it's crucial to create clear wherever the cash goes to and UN agency is accountable for what and to what extent so as to realize public acceptance. What is more, because it was already shown that higher expenditure isn't directly associated with higher tending outcomes [29], the question arises if higher irresponsibleness couldn't solely manufacture a lot of economical results however additionally withdraw clearly inefficient structures and shift resources to different components of the system that are recognized as a lot of imperative through higher transparency.

Second, irresponsibleness means that the importance of together with several stakeholders within the decision-making method. The necessity for participation was seen as particularly vital for property development not solely with relevance the particular decision-making, however additionally with relevance a permanent discussion at intervals society concerning common aims for future development [30]. A lot of the literature stresses the importance of taking the population under consideration so as to mobilize support for changes among all stakeholders at intervals the tending system, that is required to finally settle for the trade-offs that societies are speculated to create within the future [31].

Third, the need to empower patients aims at sanctionative them to require possession of their individual health, a principle that's supported liberal political concepts and therefore the observation that enhancements in info and communication technology have contributed to intelligent patients UN agency have higher demands for higher info and are less keen about skilled gatekeepers. This could be done by providing direct info furthermore as act the necessity to patients to just accept responsibility for his or her own health. It doesn't essentially mean the privatization of the whole tending system; however, it emphasizes that a sustainable healthcare system should rely on maturity and therefore the can of its patients to worry about their lives on their own and partially while not the social framework [32].



Figure 3: Relevant Dimensions of Healthcare System Sustainability

REFERENCE

- [1] Coiera, E.; Hovenga, E. Building a Sustainable Health System. In *IMIA Yearbook of Medical Informatics: Biomedical Informatics for Sustainable Health Systems*; Geissbuhler, A., Haux, R., Kulikowski, C., Eds.; Schattauer: Celle, Germany, 2007; pp. 11–18.
- [2] Grad, F.P. The Preamble of the Constitution of the World Health Organization. *Bull. World Health Organ.* 2002, 80, 981–982.
- [3] Plsek, P.E.; Greenhalgh, T. The challenge of complexity in health care. *BMJ* 2001, 323, 625–628.
- [4] Muzyka, D.; Hodgson, G.; Prada, G. The Inconvenient Truths about Canadian Health Care. Available online: http://www.conferenceboard.ca/cashc/research/2012/inconvenient_truths.aspx (accessed on 12 December 2014).
- [5] Jameton, A.; McGuire, C. Toward sustainable health-care services: Principles, challenges, and a process. *IJSHE* 2002, 3, 113–127.
- [6] Grunwald, A.; Kopfmüller, J. *Nachhaltigkeit*; Campus: Frankfurt am Main, Germany, 2006. (In German) <https://www.health.vic.gov.au/sustainability>
- [7] Naylor C, Appleby J (2012). Environmentally sustainable health and social care. Scoping review and implications for the English NHS. *Journal of Health Services and Research Policy.* 18(2):114–121. doi:10.1177/1355819613485672
- [8] Adams J, Bartram J, Chartier Y, editors (2008). *Essential environmental health standards in health care*. Geneva: World Health Organization (http://www.who.int/water_sanitation_health/hygiene/settings/ehs_health_care.pdf. pdf, accessed 22 May 2017)
- [9] Berman, P. Health sector reform: Making health development sustainable. *Health Policy* 1995, 32, 13–28.
- [10] [11] Schön, R. *Nachhaltiges Gesundheitswesen. Für eine gesunde Zukunft, für ein zukunftsfähiges Gesundheitswesen*; Zentrum BATS: Zurich, Switzerland, 2004. (In German)
- [11] Prada, G.; Grimes, K.; McCleery, A.; Nguyen, D.; Pomey, M.P.; Reed, V.; Stonebridge, C.; Roberts, G. *Challenging Health Care System Sustainability. Understanding Health System Performance of Leading Countries*; The Conference Board of Canada: Ottawa, ON, Canada, 2004.
- [12] Prada, G.; Brown, T. *The Canadian Health Care Debate: A Survey and Assessment of Key Studies*; The Conference Board of Canada: Ottawa, ON, Canada, 2012.
- [13] Henke, K.D.; Schreyögg, J. *Towards Sustainable Health Care Systems: Strategies in Health Insurance Schemes in France, Germany, Japan and The Netherlands*; International Social Security Association: Geneva, Switzerland, 2005. (In German)
- [14] Brulle, R.J.; Pellow, D.N. Environmental justice: Human health and environmental inequalities. *Annu. Rev. Public Health.* 2006, 27, 103–124.
- [15] Leiserowitz, A.A.; Kates, R.W.; Parris, T.M. Sustainability values, attitudes, and behaviors: A review of multinational and global trends. *Annu. Rev. Environ. Resour.* 2006, 31, 413–444.
- [16] Heinrichs, H.; Laws, N. “Sustainability State” in the Making? Institutionalization of Sustainability in German Federal Policy Making. *Sustainability* 2014, 6, 2623–2641.
- [17] Dahlgren, G.; Whitehead, M. *Policies and Strategies to Promote Equity in Health*; World Health Organization: Copenhagen, Denmark, 1991.
- [18] Dahlgren, G.; Whitehead, M. Tackling inequalities in health: What can we learn from what has been tried? In *Working Paper Prepared for the King’s Fund International Seminar on Tackling Inequalities in Health*, September 1993, Ditchley Park, Oxfordshire; King’s Fund (Mimeo): London, UK, 1993.
- [19] European Commission. *Impact Assessment Board Report for 2013*. Available online: http://ec.europa.eu/smart-regulation/impact/key_docs/docs/iab_report_2013_en.pdf (accessed on 12 December 2014).
- [20] Prüss-Üstün, A.; Corvalán, C. *Preventing Disease through Healthy Environments. Towards an Estimate of the Environmental Burden of Disease*; WHO: Geneva, Switzerland, 2006.

- [21] Greene, V.W. Reuse of Disposable Medical Devices: Historical and Current Aspects. *Infect. Control* 1986, 7, 508–513.
- [22] Kümmerer, K. Pharmaceuticals in the environment. *Annu. Rev. Env. Resour.* 2010, 35, 57–75.
- [23] Harvey, A.L. Natural products in drug discovery. *Drug Discov. Today* 2008, 13, 894–901.
- [24] Newman, D.J.; Kilama, J.; Bernstein, A.; Chivian, E. Medicines from nature. In *Sustaining Life: How Human Health Depends on Biodiversity*; Chivian E., Bernstein A., Eds.; Oxford University Press: New York, NY, USA, 2008; pp. 117–162.
- [25] Randolph, S.E.; Dobson, A.D.M. Pangloss revisited: A critique of the dilution effect and the biodiversity-buffers-disease paradigm. *Parasitology* 2012, 139, 847–863.
- [26] Götz, K.; Deffner, J. Options for a More Environmentally Friendly Handling of Pharmaceuticals. In *Green and Sustainable Pharmacy*; Kümmerer, K., Hempel, M., Eds.; Springer: Berlin, Germany, 2010; pp. 149–163.
- [27] Collier, R. The ethics of reusing single-use devices. *CMAJ* 2011, 183, Article 1245.
- [28] Weinstein, M.C.; Skinner, J.A. Comparative Effectiveness and Health Care Spending—Implications for Reform. *N. Engl. J. Med.* 2010, 362, 460–465.
- [29] Agenda 21. United Nations Conference on Environment and Development Rio de Janeiro, Brazil, 3 to 14 June 1992. Available online: <http://sustainabledevelopment.un.org/content/documents/Agenda21.pdf> (accessed on 12 December 2014).
- [30] Lifvergren, S.; Docherty, P.; Shani, A.B.R. Chapter 4 towards a sustainable healthcare system: Transformation through participation. In *Organizing for Sustainable Effectiveness*; Mohrman, S.A., Shani, A.B.R., Worley, C., Eds.; Emerald Group Publishing: Bingley, UK, 2011; pp. 99–125.
- [31] Mohrman, S.A.; Shani, A.B.R.; McCracken, A. Chapter 1 Organizing for sustainable healthcare: The emerging global challenge. In *Organizing for Sustainable Health Care (Organizing for Sustainable Effectiveness)*; Mohrman, S.A., Shani, A.B.R., Eds.; Emerald Group Publishing: Bingley, UK, 2012; pp. 1–39.
- [32] Prada, G. Sustainability: What Does This Mean for Canada’s Health Care Systems. In *Proceedings of the Collaborative Meeting of the Conference Board of Canada’s Health-Related Executive Networks*, Toronto, ON, Canada, 16 April 2012.
- [33] Macino, J.; Starfield, B.; Shi, L. The contribution of primary care systems to health outcomes within Organization for Economic Cooperation and Development (OECD) countries, 1970–1998. *Health Serv. Res.* 2003, 38, 831–865.
- [34] Rapoport, J.; Jacobs, P.; Bell, N.R.; Klarenbach, S. Refining the Measurement of the Economic Burden of Chronic Disease in Canada. *Chronic Dis. Can.* 2004, 25, 13–21.
- [35] Thorpe, K.E.; Howard, D.H. The rise in spending among Medicare beneficiaries: The role of chronic disease prevalence and changes in treatment intensity. *Health Affair.* 2006, 25, w378–w388.
- [36] Morgan, M.W.; Zamora, N.; Hindmarsh, M.F. An inconvenient truth: A sustainable healthcare system requires chronic disease prevention and management transformation. *Healthc. Papers* 2007, 7, 6–23.
- [37] Baumann, A.; O’Brien-Pallas, L.; Armstrong-Stassen, M.; Blythe, J.; Bourbonnais, R.; Cameron, S.; Irvine Doran, D.; Kerr, M.; McGillis Hall, L.; Vezina, M.; et al. *Commitment and Care: The Benefits of a Healthy Workplace for Nurses, Their Patients and the System*; Canadian Health Services Research Foundation: Ottawa, ON, Canada, 2001.
- [38] *Medicare: A Strategy for Quality Assurance. Volume I*; National Academy Press: Washington, DC, USA, 1990.
- [39] Donabadian, A. Evaluating the quality of medical care. *Milbank Mem. Fund Q.* 1966, 44, 166–206.
- [40] Weiser, T.G.; Regenbogen, S.E.; Thompson, K.D.; Haynes, A.B.; Lipsitz, S.R.; Berry, W.R.; Gawande, A.A. An estimation of the global volume of surgery: A modelling strategy based on available data. *Lancet.* 2008, 372, 139–144.

- [41] Organisation for Economic Co-operation and Development (OECD). *Geographic Variations in Health Care: What Do We Know and What can be Done to Improve Health System Performance?* OECD Health Policy Studies; OECD Publishing: Paris, France, 2014.
- [42] Brulle, R.J.; Pellow, D.N. Environmental justice: Human health and environmental inequalities. *Annu. Rev. Public Health.* 2006, 27, 103–124.