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HOSPITAL VULNERABILITIES IN THE 21st CENTURY

Dan SAVA[1]

Health Management and Quality Consultant, MD, PhD, ROMANIA
E-mail: dsava22@gmail.com

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Abstract: The purpose of this paper is to raise awareness about the future vulnerabilities of hospitals. It is based on current literature on hospital organization and management, open sources, personal experience and estimations of the author. The hospital is defined and a classification is made based on structure and functionality. Vulnerabilities vary according to the profile of the hospital, and they can be internal (weaknesses) or external (threats). The internal vulnerabilities can be conceptual, structural and functional weaknesses. The external vulnerabilities can be general or specific threats. Every vulnerability is described in the context of various types of hospitals, and possible counter measures are suggested. Hospitals' weaknesses emerge from their lack of flexibility and competitiveness and from their structural and functioning flaws. Most frequently, the threats menacing hospitals derive from epidemiological change and lack of resources, an unbalance between the demand for and the supply of care. To overcome their vulnerabilities, they need to take specific actions and be supported by the Ministry of Health. The paper provides managers and policy-makers estimations regarding hospital vulnerabilities, suggesting also possible actions to reduce these vulnerabilities or their effects.

Keywords: health management, internal vulnerabilities, external vulnerabilities, public-private hospitals

1. Introduction

In order to understand what the future vulnerabilities of hospitals are, in the years to come, we need to clarify the definition and functions of the hospital.

2. Hospital Definition

There are many hospital definitions. Most of them pertain to their structure and function "an institution where sick or injured are given medical or surgical care" (Merriam – Webster English Dictionary), but what is the real difference between hospital and other healthcare providers serving ill people, is that hospitals render care for inpatients. The seriousness of the patient's disease requires complex care and continuous monitoring of health status under treatment, and this can only be delivered by hospital if the patient is admitted in, and stays for at least 24 hours under surveillance of medical personnel. The inpatient's serious status, the complex care, and continuous monitoring are the defining characteristics of hospital services. This differentiates the hospital from other health care providers (outpatient clinics, birthing homes, nursing homes, etc.) with which the hospital might share some characteristics, but not all.

3. Classification Of Hospitals

Hospitals can be classified according to their structure: type of ownership (public / private), age (old / new), location (urban / rural), position (standalone / part of a network), construction (mono-block / multi-pavilion), size - based on the number of beds they have - (small / big), or according to their function: purpose of activity (ordinary / teaching / research), types of services provided (general multispecialty / specialized single specialty), duration of care (short term care/ long term care), output measured as the average severity of cases (high case-mix / low case-mix).

4. Vulnerabilities

Any hospital can be described according to these 6 structural and 4 functional characteristics. Each hospital has its own profile, so they are not homogenous in structure and functionality. Therefore, there is no unique type of vulnerability for hospitals. The vulnerabilities vary according to the profile of the hospital. As we will see further, some vulnerabilities are common to all hospitals, deriving from the very concept of hospital organization, while others are specific to each hospital derived from its particular structure and functionality. Furthermore, vulnerabilities can be linked or derived from one another, intensifying their weakening effect.

Vulnerabilities can be internal to the hospital being related to the concept of hospital, its structure and functions, and are generally known as *weaknesses*, being inherent to the way the hospital was

designed and put to operate. These vulnerabilities derive from the past. But there are also vulnerabilities related to factors external to the hospital, generally known as *threats*. The latter are related to future circumstances.

5. Internal Vulnerabilities (Weaknesses)

5.1. Conceptual weaknesses

5.1.1 High fixed costs. Hospitals have high fixed costs as proportion in total costs, due to the high value of fixed capital (medical equipment) and salaries,(many of them having life – time permanent employment), and little variable costs (food, medical materials, and pharmaceuticals) (Roberts et al.). This type of vulnerability becomes very obvious when the occupancy rate of the hospital is decreasing. If the occupancy rate is not big enough to cover at least fixed costs, they are prone to go bankrupt. High fixed costs require a high occupancy rate. The most affected will be big, mono-block, public, low case-mix hospitals.

In order to deal with this vulnerability, hospitals should try either to transform fixed costs in variable costs or admit patients whose health conditions are not severe enough to be admitted. If the latter works very easy on short term, ideally, hospitals should be more flexible and adjust the fixed costs to match the activity / demand. That is because hospitals have better control over the costs, than over the demand for care. Fixed capital (medical equipment) costs cannot be reduced very easy and it is more likely this can be achieved if there is a modular hospital (with adjustable size) and flexibility of human resources costs. That means to give up as many as possible permanent jobs and replace them with temporary jobs or improve service delivery management so that workforce is better used.

5.1.2 Lack of competitiveness in terms of price and access. Hospitals are designed to deliver complex services, and it is obvious they can do and deliver simple services too. On the other hand, the same simple services can be provided cheaper by other outpatient providers. Therefore, in the realm of simple services, hospitals lack competitiveness in terms of service price (Richter and Deduch, 2017). Also outpatient facilities are smaller, more numerous and spread in the same hospital catchment area. Therefore hospitals lack competiveness also in terms of access. This type of vulnerability mostly affects the old, big, ordinary, low case-mix hospitals.

Hospitals (except teaching hospitals) should consider giving up delivering simple services and let them to be provided by outpatient facilities, which will always provide them cheaper and will be more accessible to the public. Hospitals should also be aware and up-to-dated with new emerging medical technologies and evaluate them against their own needs, their potential to simplify procedures, and the possibility to be adopted by outpatient competitors.

5.2 Structural weaknesses

5.2.1 Building decay. Hospital buildings get old and their structure is compromised because building materials lose their properties in time, leading to building decay. Buildings also become outdated because new types of care and new service delivery processes require different spaces and pathways. In addition, old buildings are increasingly difficult to clean, a mandatory hospital activity. The most affected will be old, mono-block, big, multispecialty hospitals.

There should be a thorough building management including maintenance and refurbishing. In this regard, a good tool is the concept of *Building Management System* or *Building Automation System*, which is a computer-based system combining building management with integrating data and controls of energy supply / consumption, heating , ventilation, air conditioning, safety, and security (Lorenzi N., 2017). Legislation should allow for calculating depreciation so that the true economic value is known and make possible the replacement of obsolete facilities. Building investment must be made considering epidemiological estimations and future workload.

5.2.2 Inadequate workforce. Some hospitals run with inadequate workforce, with fewer personnel than necessary to match the workload, or even worse, some employees might not have the adequate skills for the job, their professional education lagging behind technology progress and process improvements. Inadequate workforce includes also demotivated personnel (Manyisa and van Aswegen, 2017).The most vulnerable are standalone, high case-mix, public hospitals.

There should be a continuous assessment of the necessary skills according to estimated patients' needs of care. *Workload Indicators of Staffing Need* is a good tool to be used, in this regard (Ozcan and Hornby, 1999). Proper human resources policy requires projecting the necessary workload and number of employees, a good selection process and continuous education.

5.2.3 Outdated technology. The technology is changing fast and it is difficult and expensive to keep up with this development; hospitals might lag behind very easy, having to rely on outdated technology. The effect is increased inefficiency mainly due to waste of doctors and nurses time and lengthening hospital stay as shown in a study by Ponemon Institute (2013). The most affected will be small, rural, low case-mix hospitals.

Hospitals should continuously analyze their activity in search for possible improvements, together with keeping up-to-date to technology development and seeking for opportunities to adopt new technologies, but only if they need to.

5.3 Functional weaknesses

5.3.1 Nosocomial infections are infections occurred in the hospital due to contaminated environment, contact with staff and other persons, own bacteria, hospital waste. The World Health Organization estimates the rate of nosocomial infections at 15% of all hospital patients (Khan et al, 2017). There is a high risk of more nosocomial infections as more as newer antibiotics are used and germs develop resistance. All hospitals are vulnerable to this, but the worst affected might be old, single specialty, teaching hospitals.

Preventing nosocomial infections requires specific policies regarding cleaning, disinfection, sterilization, and management of antibiotics according to WHO (2018). Personnel should be trained to work according to procedures, pathways should be designed, including patients' visits, so that cleanliness is kept. Quarantine methods should be prepared and personnel trained to observe them. The current approach towards nosocomial infections needs to be reviewed. There should be a thorough and honest analysis of the way germs gather resistance in hospital. This includes a scrutiny of the current procedures with the aim of designing an antibiotic therapy which will reduce the development of antibiotic resistant germs. On the other hand, it is necessary a review of the whole antibiotics usage process from production to controlled and un-controlled use of antibiotics over – the – counter and outside the health system for veterinary purposes.

5.3.2 Human errors. Healthcare services are labor intensive and human errors are always possible, in any hospital, with serious consequences. Most affected might be the high case-mix hospitals.

In general, human errors can be avoided working with procedures, educating personnel, and redesigning processes for mitigating errors. New medical personnel will benefit from orientation and supervised training. All personnel must undergo continuous education programs and should be insured for malpractice and personal liabilities. Every employee must have a work log for the purpose of evaluation and personal development. An adequate reporting system should be in place and there must be a *Sentinel Event* detection and management system. There are various ways to detect and prevent human errors. *Failure Mode and Effect Analysis* is one of them (Smith). Other error reducing methods were elaborated by Leape (1994), and Berwick (1996).

5.3.3 Low quality care. If services are rendered using bad resources and inadequate procedures this leads to bad outcomes and consequently unsatisfied patients. It is the case of low quality care. Old ordinary hospitals are most vulnerable.

The best way to avoid this and achieve quality of care is by sharing information about quality improvement techniques and implementing hospital accreditation. A constant research of opinions of personnel and especially of patients should be performed. There should be implemented a routine

data collection system, all activities being documented. This data is analyzed for the purpose of improvement and internal studies regarding quality of care. The medical personnel should work according to clinical guidelines (Griffith, 1999) and participate in peer reviews of activities. It is imperative that all employees should undergo training in quality of care, as quality is everybody's business.

6. External Vulnerabilities (Threats)

The future might bring many changes either in the health system - and hospitals are part of it – or in other domains, but affecting the health system and hence hospitals indirectly. In either way hospitals will be affected, but the impact might be different on private and on public hospitals. Some of these future external changes are a direct threat to hospitals, some might constitute initially an opportunity and may transform later into a threat. Some threats may expose inherent weaknesses.

6.1. General future changes

6.1.1 Epidemiological transition. There is a trend of increasing life expectancy all over the world, mainly due to better sanitation, better prevention of disease, improved access to care, more accurate diagnostics and better therapies. Increased life expectancy is associated with population aging. There are more and more old people, and diseases of old age are predominantly chronic diseases (Phillips, 1994). The older the people suffering from chronic diseases, the more complex their pathology becomes, and hence more difficult to be treated. In fact, the success of medical activities translates into more patients. So, hospitals will have to deal more and more with old patients with complex pathology. On the other hand, the hospital is organized to function efficiently by meeting the needs of patients suffering of a known scope of diseases and an estimated level of the demand for care. Sudden outbreaks or surge of certain diseases as well as epidemiological transition may affect hospitals by creating an unbalance between the demand for care and resources available. Small, rural, ordinary, low case – mix, public hospitals will be most affected.

An epidemiological analysis should be carried out and it should comprise looking at morbidity trends for the purpose of estimating the burden-of-disease, assessment of access to healthcare facilities and their capacity to deliver care, and an analysis of hygiene infrastructure, comprising safe water, safe housing, safe food and sewage. This is a complex job going beyond any hospital capabilities and it is better to be done by the Ministry of Health or a specialized agency / national institute. Because hospitals will have to deal with more complex pathology patients, it is required enhancing the adequate human resources and prepare for increased expenditures.

6.1.2 Economic change. World economies are increasingly interconnected and that means they are prone to be affected by changes in other countries. Three major economic domains might be affected: trade, currency and employment. These three are interconnected, but the most serious case is that of a weakening currency, a decrease of the exchange rate (Picardo, 2015); in this case hospitals might expect an increase in costs of imported goods (licenses, medical technology and pharmaceuticals), a decrease of their budgets, and more poor population which will increase the demand for care in public hospitals and decrease the demand for care in private hospitals. Big, urban, multispecialty, high case - mix, teaching and research hospitals will be most affected.

Hospitals should be prepared for times of economic hardship and introduce elements of managed care (drug formularies, controlled diagnostic tests, and controlled prescriptions). Again, they will need support of the Ministry of Health which should foster investment in domestic medical technology and pharmaceutical industry, in order to sustain a good functioning of the system with diminished imports. In case of increased demand for care, public hospitals need to have an available and flexible workforce who can cope with increased activity. This comprises a database with available, skilled and licensed doctors, nurses and medical technicians. This kind of personnel, currently out of the system, either on leave, or retired, should be available on call, or be willing to participate on a part-time basis in the increased activity of the hospital. Sometimes this kind of personnel might come from the private sector, in case the latter is not taking advantage of the opportunity to render services to foreign patients at a lower price, thus increasing its activity.

6.1.3 Political change. The changing of political context might lead to changes in government priorities, and regulation changes (Lenard, 2018), a possible menacing outcome being a reduced budget available for health system – including hospitals. Small, rural, short – term, low case – mix, public hospitals are most vulnerable to this.

Changes of priorities due to political changes cannot be prevented by hospitals, but faced with adverse policies they can increase their negotiating power by creating associations. Hospitals are less vulnerable to political changes if they are a monopolistic provider of services in certain area and if they have a good public image, achievable through public relations techniques. However, the above should be matched by good performance and provision of quality care.

6.1.4 Climate change. Climate change is an uncontrollable factor of environment. There is a tendency to warming up and we can expect disruptions in agricultural output, forced changes in dietary habits, economic problems, and water scarcity. As environmental changes put pressure on the whole ecosystems to adapt, the first effect would be increased plant and animal mortality, as

ecological niches are disturbed. This in turn will disrupt the balance between plants and plant-eaters and the balance pray / predators, disturbing natural food chains and the biosphere as a whole. Surges in insect numbers or changes in migratory bird passages might happen, and in turn they can lead to the emergence of new infectious diseases for which the vectors are these insects or the migratory birds. Aside from the above, climate change can trigger directly epidemiological changes by increasing heat – related illnesses, aggravating chronic diseases, inducing malnutrition and stress-related mental disorders, according to Health Care Without Harm (2018). Standalone, ordinary, multispecialty public hospitals are most vulnerable

Hospitals should have contingency plans especially for outbreaks of infectious diseases and for functioning with depleted resources. The Ministry of Health has to monitor trends for climate change in the country and estimate possible impact on the health system.

6.1.5 Natural disasters such as earthquakes, floods, landslides, wildfires, tornadoes, and big storms are a threat both for the physical structure of the hospital and also because it increases demand for care, especially of patients with injuries, complex cases, who can overwhelm hospitals. Old, multispecialty, public hospitals are most vulnerable.

In order to cope with natural disasters, every hospital must have a preparedness / reaction plan, based on historical data about natural disasters in the area as well as newly emerged disasters in the region. Hospitals ought to have built-in back-up systems for almost everything. Buildings should be stronger than generally required; there should be alternative sources of water, electricity, gas and heating. Additional human resources and medical supplies should be available to cope with increased activity. Considering the potential increase in specific disaster induced pathology, core hospital services (operating theatres, anesthesia, intensive care) may have double back-up systems. These include also communication means. The databases and information systems should have back-ups in remote areas, so that the natural disaster affecting the hospital does not affect them too. All hospital systems and personnel should participate in periodic drills designed to maintain preparedness (Doiel, 2017).

6.1.6 Migration. This is one of the most present threats of our times. Hospitals might be put in the situation of dealing with huge numbers of foreign patients with their own distinct pathology, or migrant specific pathology like contagious diseases, trauma, nutrition problems, stress induced diseases, psychological problems (Hudelson et al, 2014). Multispecialty, public hospitals are the most vulnerable.

Hospitals have to be prepared to have the necessary resources available at hand, in case of receiving migrant patients. They need to have contingency plans to cope with the pathology brought by

migrants, these plans pertaining to human resources and necessary facilities, equipment and consumables. The latter can be provided by a public agency in charge with natural disaster response (equipment and medication), but for delivering services to foreign patients, hospitals need to have prepared an emergency unit and to have information available pertaining to the culture and dietary habits of migrants. Hospitals also need to have prepared a communication interface comprising psychologists, public relations specialists and translators.

6.1.7 Social change in attitudes towards health and health risk factors. Normally, the health system has a good public image. However, the internet is full of information about health which is not always correct, and in some cases people might develop adverse attitudes towards medical services (vaccinations) which will have epidemiological repercussions as well as erratic patient behavior. Hospitals might expect patients who have total distrust in the health system. As the internet, social networks and cable TV develops, traditional conservative behavior is replaced by consumerism, which might include change in dietary patterns towards more processed food and beverages, increased consumption in alcohol, changes in sexual behavior. These might lead to other types of epidemiologic change towards an increased incidence of metabolic and chronic diseases, liver cirrhosis according to Australian Victoria Health Promotion Foundation (2015) increased sexually transmitted diseases, unwanted pregnancies, psychiatric problems. Small rural, public hospitals are the most vulnerable.

Hospitals should try to forecast epidemiological changes induced by social changes by analyzing morbidity trends and need to have trained professionals who should inform and educate the patient. The public image of the hospital is very important as well as enhancing services rendered with psychological care and advice. These unwanted social changes can also be mitigated by public health interventions of the Ministry of Health.

6.1.8 Increased pressure for profitability in food industry might result in a drive for cost reduction by using more GMOs, fertilizers, weed-killers) and food additives beyond food safety standards being correlated according to Institute for Responsible Technology (2018) with chronic degenerative diseases of the nervous system, and leading to food poisoning (dioxin, metals) (Tlustos et al, 2011), emergence of degenerative diseases (“mad cow disease”) (WHO, 2002), or infectious diseases (“bird flu”) and cancer (DDT) (Loomis et al, 2015). All public hospitals might be affected by this.

Therefore in estimating future burden of disease, practices in agriculture and food industry, should be taken into account, and hospitals should be aware of these future epidemiological changes. As it regards food borne diseases and intoxication, these can be very well addressed by hospitals through

preparing in advance for such events. With the help of the Ministry of Health, hospitals should have ready available at the front level of care (admission room) adequate resources and guidelines for such outbreaks or poisoning. A national reaction system to these types of diseases should be put in place too.

6.2. Healthcare care specific future changes

As we will see further the healthcare specific future changes might be direct threats or become threats after misunderstood opportunities were neglected or constituted the basis for wrong decisions.

6.2.1 Technological change. In the future health sector there will be increased use of new devices, advanced materials, nano-technology, artificial intelligence, wearable sensors, and robotics. Adopting new diagnostic and therapeutic technologies has several effects: improved access to specialized care, less invasive procedures, reduction in hospital stay, increase in investment costs, increasing educational costs, and fluctuations in numbers of personnel. Technological change can lead to sudden increase in demand for care in case of large scale spread of personal diagnostic devices. Small rural, public hospitals will be most affected.

Technological change might require investment decisions. These should be made after thorough analysis, only if there is a need to do it. This requires prior data analysis, and forecasting the epidemiological needs. Investment should meet a real need and not be made just to imitate or "keep up with progress". The technology should really improve patient care (Thimbleby, 2013) and must be cost – effective. Hospitals should be designed and developed according to the needs of the population in the area. Cost benefit analysis and cost-effectiveness analysis are good tools in this respect.

6.2.2 Changes in market dynamics happen due to health system changes, technological change, and epidemiological change (Koch, 2016). These changes result in decreased demand for some services and increased demand for others. Hospitals are not lonely organizations. They are part of entire national health systems in charge with delivering a multitude of health services. For some of those services, the hospital is the sole provider, being a monopoly in the area it serves. This is the case of complex services like big emergencies, poly-trauma patients or highly specialized surgery, requiring many personnel and technology, as well as permanent care. But there are also hospital rendered services which can be provided by others like GPs, specialized outpatient clinics, birthing homes, nursing homes, home care facilities, rehab facilities. In this case the hospital is just one among many suppliers, the market is competitive. As there is a constant epidemiological and technological change – especially the latter – which might have as effect a decreased demand for hospital care and increased

demand for outpatient care and because the outpatient sector is less costly, more hospital activities will be transferred there, so hospitals will get empty. It exposes a conceptual weakness of the hospital towards other competitor healthcare providers, which provide care at lower costs and to which patients have better access. Hospitals are also under threat from competition of other hospitals. Low case- mix, public hospitals are most vulnerable.

In order to retain their competitive edge, hospitals should use specific analytics, integrating clinical data with market information (Gamble, 2012). An impact evaluation of these changes should be made. If these changes make the outpatient providers more competitive than hospitals, then the latter should give up investing on delivering that kind of care. They should focus on investments limited to services delivered on a monopolistic market, because in this case they enjoy the position of price - setter and can appropriate consumer surplus, being able to increase profits dramatically. This is why, in order to increase profits, hospitals must focus on services which don't have competition from other providers. In order to do this, hospitals should do an impact evaluation and forecast future services.

6.2.3 Digitalization of hospital activities. Documents, tests results and data will be less and less recorded on paper or film but in a digital form, resulting in the so called "paperless hospital". This is an opportunity for improving efficiency, reducing errors, enhancing connectivity with other medical devices, speeding up processes and providing more hospital data for research (Dumortier, 2017); but requires costly infrastructure, software, data processing, change of operational patterns and special research education for personnel. Security of data might become a problem (Overby, 2018). Small, single specialty, rural, public hospitals are most vulnerable.

Digitalizing the hospital without improving efficiency and quality of care or extending the scope of activities will only increase costs. A cost effectiveness analysis should be made, prior to adopting it, or a step-by-step approach should be envisaged. The issue of data security can be solved with additional costs.

6.2.4 Ultra-specialization of personnel. The emergence of micro-specialties leads to ultra-specialization. Doctors loose broader picture and the approach to the patient as a whole. They become more competent on very narrow domains. This becomes a problem in dealing with the increasingly more multiple pathology patients, although it might lead to increased efficiency, especially in private settings. This is an opportunity for private hospitals but a threat to big hospitals because of high costs and increased adverse events associated with intra-hospital referrals (Gimenez et al, 2017). Big, multi-pavilion, teaching, public hospitals are most vulnerable.

Big public hospitals should avoid this kind of ultra-specialization because it raises their costs with intra-hospital referrals, and produces a fragmentation of care and of teaching process.

6.2.5 Procurement flaws. As medical technologies develop and new pharmaceuticals are invented, hospitals are under constant pressure by manufacturers to buy their new products. On the other hand, hospitals operate under the pressure of cost containment policies (Lingg et al, 2016). There is also an asymmetric information situation in favor of the supplier of the new technology or new drug; therefore, the negotiating power of hospitals diminishes, leading to adopting new technologies and new drugs without proper health technology assessment. This might lead to increased costs without increased benefits. Standalone public hospitals are most affected.

There should be a health technology assessment and cost-effectiveness analysis prior to any technological investment or pharmaceutical purchase, so that cost increase should be offset by good clinical outcomes. In order to cope with this situation, hospitals might need to hire skilled people to perform economic analysis including a thorough assessment of the utility of the new technology for the hospital. It is possible the private and networked hospitals can do better at this, but for public hospitals they might need to rely on a public health technology assessment agency or the Ministry of Health to do this assessment. Nevertheless, hospitals need to train their employees in health technology assessment, clinical research, statistics and epidemiological research techniques, so that they can tell apart a good study from a bad one and be better informed, before taking procurement decisions. When purchasing pharmaceuticals or new technology, hospitals might get better prices if they associate for negotiation.

6.2.6 Reduced independent medical judgment. As new technologies are adopted, medical science develops and specialized care is fragmenting, there will be more and more clinical guidelines and therapeutic protocols; the advantages are reduced liability in case of malpractice, reduced variation of practice and hence increased efficiency and better quality. The reverse is that it hampers independent medical judgment (Singer, 2013) to the extent doctors end up in practicing “standard schemes” and becoming ”medical robots”, thus leaving behind professional experience and relying only on official clinical practice guidelines. There is also the danger that specialized software or specially trained technicians would replace doctors especially in certain diagnostic activities and machine operated therapies. Ordinary, single-specialty, long -term care hospitals are most affected.

Hospitals should permanently do continuous medical education for all personnel. They should also encourage peer review and qualitative reports on day-to-day activity.

6.2.7 Reduced interaction with patient. Adopting new sophisticated technologies may reduce physicians' time with a patient allowing the doctor to see more patients in the same time, but also reduces the interaction between doctor and patient, thus frustrating the patient, and lowering the quality of care (Lipton, 2014). Research, high case-mix, private hospitals are most vulnerable.

The more sophisticated is the technology, the more patient has to be informed about the disease (Cocchi, 2017), personal conduct, diet, and above all be shown empathy by the caring doctors and nurses. Introducing the concept of "realistic medicine" (Calderwood, 2017) which involves the patient in decision-making about the management of the disease might be of real help.

6.2.8 Increased patient awareness. The spread of medical knowledge and its availability on the internet is making people seek professional medical advice, increasing demand for health care but also makes some patients more aware of diseases and treatments possibly creating unrealistic expectations and anxiety, to the extent of emergence of a new disease: "cyberchondria" (Clements and Williams, 2011). Increased awareness also make them more aware of medical mistakes, hence the possible increase of justified or not, court cases for damage induced by medical errors, with big financial consequences. Single specialty, high case-mix hospitals are most vulnerable.

The hospital personnel have to keep up-to-date with medical information and to be trained to understand the psychology of patients who informed themselves on the internet. On the other hand, the hospital as an institution must be insured for liabilities and medical personnel has to have malpractice insurance.

6.2.9 Pressure to increase efficiency. There will be an increased pressure to boost efficiency, both in public and private hospitals. This comes from the fact that given the resources, many hospitals suffer in various degrees of technical inefficiency. Many hospitals especially public, serving a certain area, have a bigger capacity to render services than necessary; they run on various degrees of emptiness, or are filled with patients who can be treated in outpatient facilities. It is the case of low occupancy rate, an evidence of technical inefficiency. Big, network hospitals are most affected.

Increasing efficiency should be done wisely according to the local situation. There is no universal cure for it. The activity of the hospital is very complex. It consists of its core medical activities (interaction between medical personnel and patients) and auxiliary activities. This can be medical by nature, like sterilization, pharmacy, lab, imaging or forensic services, or general, like cooking and serving meals, linen washing, cleaning, and maintenance of medical equipment and of the building. If there are firms which can provide these auxiliary services at prices lower than the hospital costs, then, these services can be purchased from these firms through outsourcing (Case et al. 2008). The

reverse is also possible. When a hospital has outsourced many of its services might find out that it is more expensive to purchase these services from outside and be more efficient by providing them with its own personnel on its own premises. So the hospital might give up outsourcing and turn to insourcing or integration (Hardwick et al, 1999). The key to these processes is always to do a cost-effectiveness analysis to find the least costly alternative. Another way of boosting efficiency, especially in the private sector, is trying to achieve the concept of "economy of scale" (Hardwick et al, 1999). That is improving efficiency by delivering the same product in bigger numbers, with the same resources. Thus cost per unit of product decreases. In order to make intensive use of capital, and take advantage of their increased specialization of labor, private hospitals can focus on a single service, by a unique method, delivered many times in short timeframes, round-the-clock. Few examples of these services are: lens replacement, joint surgery, prostate adenoma surgery and imaging services. Another way of improving efficiency is the "economy of scope". That is improving efficiency by producing as a large scope of different services as possible with given resources (Hardwick et al, 1999). Public hospitals are in the best position to do it. They should increase their production aiming to achieve their own production possibility frontier (Case et al, 2008).

7. Conclusions And General Considerations

Hospitals weaknesses emerge from their lack of flexibility and competitiveness as well as from their structural and functioning flaws. The threats menacing hospitals derive from epidemiological change and lack of resources creating an unbalance between the demand and the supply of care. These threats can also empower more accessible and more efficient competitors. Public hospitals are in general more vulnerable because they can't choose their patients and thus are not able to control the demand for care, as private hospitals do. Public hospitals can't do "skimming" of patients, and they have to be always ready to admit any patient, sometimes even referred from private hospitals.

In the future hospitals will have to pay attention to the following:

7.1 Wealth of data. In order to retain a competitive edge and survive they need to use data to enhance diagnostic precision and customize better the treatments as well as to be in the forefront of medical research. Not all can do fundamental research, but all of them can do qualitative studies regarding quality of care, and quantitative epidemiological studies. This data should be used for continuously improve the quality of care and creating epidemiological forecasts. The importance of this activity is forging the emergence of a new medical specialty, clinical informatics, according to Medical Billing Services (2018).

7.2 The supporting role of the Ministry of Health. There are many threats to the hospitals from external environment, there are also activities like HTA assessment, or negotiating, or impact assessment which can be too difficult to be carried out by hospitals, especially the public ones. Therefore these hospitals should be supported by the Ministry of Health who should:

- do itself or establish a national agency /institute who should do demographic estimations comprising population dynamics, family and social values, migration, employment, epidemiological studies comprising morbidity, mortality and trends, analyze epidemiological transition and burden – of – disease, and economic analysis comprising infrastructure, resources, skills, markets, investment, businesses, jobs, poverty, food and nutrition, and health market analysis for the purpose of estimating the future need for health services;
- analyze the performance of the health system providing a basis for policy making;
- set up a health technology assessment agency;
- control the pharmaceutical market, and foster domestic production of medical equipment, medical devices and pharmaceuticals;
- assist hospitals in their development and investment decisions, taking into consideration the competition in the area and patients' access to care;
- set up a quality assurance agency in charge with disseminating best practices, be part of accreditation of hospitals and participate in designing guidelines and clinical protocols;
- foster education in health economics (especially cost – benefit and cost – effectiveness analysis) for hospital managers;
- elaborate regulation allowing hospital flexibility and independent managerial decisions.

7.3 The simplicity / complexity dilemma. The hospital is a complex system, which in order to survive must be flexible and be able to adapt to various external menacing changes. The hospital stands between two opposing tendencies or forces. In order to become efficient (and if private, profitable) it has to simplify and reduce complexity. But in order to survive to changes in the external world, it needs to increase complexity and have built-in redundancies and buffer-systems to absorb shocks. Redundant systems are slower, costly, and less efficient, but resist better to external threats in the foreseeable future. These back-up systems should comprise all resources the hospital needs for performing its functions.

7.4 Future forecasts. Hospitals exist to serve patients. Policymakers have to be aware that if patients are better served by other types of medical providers, the rationale for hospital existence disappears. Due to technological progress, and to better patient access, more and more services will be delivered in the outpatient facilities. Hospitals can't prevent or oppose these trends, but can mitigate the negative impact upon them by becoming more flexible. Probably, the public hospitals will remain only with big emergencies, multiple pathology patients, highly sophisticated services, teaching, research, in one word making the most of their resources and acting like economies of scope, as the private hospitals will be smaller and will deal with ultra-specialized "cold" surgery, acting as economies of scale. On the other hand, due to financial constraints (as their only source of funding is public money) and increased adoption of new technologies, public hospitals will increasingly work based on guidelines and protocols and their employees will become more and more "medical proletarians", a process which will be far less obvious in private hospitals (based on a direct hospital – patient financial relationship). To fulfill their public duties, all hospitals should be able to care for emergencies (at least stabilize the patient and provide for transportation to an adequate facility for continuation of care).

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