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# Reforming Healthcare Practice in View of the Economic Crisis in Lebanon: The Case of Cardiovascular Care

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## Abstract

Since the fall of 2019, Lebanon has been facing an economic crisis that has imposed many challenges on its healthcare system in its entirety. In this review, we propose a methodology to inform healthcare policy and apply it on cardiovascular disease (CVD) healthcare with emphasis on ischemic heart disease (IHD). The main goal of this methodology is reducing unnecessary expenditure while maintaining quality and access. CVD, and particularly IHD, is the most common reason for hospitalizations in Lebanon. Lebanon also has a high density of catheterization labs, higher than countries with higher prevalence of disease. Additionally, we found coronary to be more expensive in comparison to other countries. To reduce healthcare costs without compromising quality and access we propose solutions targeting healthcare financing, payment for services, healthcare organizations, behaviors of providers, payers, and patients, and above all government regulation.

## INTRODUCTION

Since the fall of 2019, Lebanon has been facing an economic crisis secondary to decades of post-civil war consensual governance, and a post war elite commanding the main economic resources. The crisis has put a strain at all levels of supply chains due to increasing exchange rates of Lebanese pounds against the United States dollar (USD), and

limitations on transfers outside the country because of the de facto illegal capital control.<sup>1</sup> The country's economy is already in a deep recession, with increasing unemployment rates, and a massive loss of purchasing power.<sup>2</sup> As other economic sectors, the healthcare system in Lebanon is challenged, and the difficulties have affected physicians, hospitals, pharmacists, and health financing agencies of both the private and public sector.

Lebanon's health expenditure has been increasing to reach 719 USD per capita per year in 2017.<sup>3</sup> Among the MENA countries, Lebanon does not have the highest expenditure per capita, but has the highest current health expenditure (CHE) as a percentage of gross domestic product (GDP) (8.20%).<sup>3</sup> This expenditure is distributed among employment funds, private insurance companies, the ministry of public health (MOPH), the military, NGOs, and out-of-pocket (OOP) expenditure (23.4%, 19.1%, 21.4%, 3.1%, 33.1% of CHE respectively in 2017) with the biggest contributors being employment funds and OOP expenditure.<sup>4</sup> Obviously, these will change with the current soaring unemployment rates

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and poverty rates. Thus, adaptation and reform are inevitable. When approaching healthcare reform, Roberts M. et al. advocate for looking at what can be done through 5 knobs: financing, payment, regulation, organization and behavior.<sup>5</sup> How and who finances healthcare and what the payment schemes are greatly determine the regulations set within organizations and drives behaviors of the healthcare consumer and healthcare providers.

The MOPH is financed by taxes from the central government's budget. Employment funds are fueled by mandatory contributions of employers and employees. Payments for healthcare services by the MOPH and employment funds to hospitals and providers are based on fees for service system (payment per service provided) with a co-pay by the patient in the range of 10% to 50% depending on type of care (inpatient or outpatient), type of employment fund, and relationship to the primary enrollee.<sup>6</sup> The MOPH does not cover outpatient coverage; but it has established a wide primary healthcare center network (discussed below). Private insurance companies adopt a variety of payment systems ranging from strict fees-for-service to fees-for-service combined with capitation (payment per patient) schemes for general practitioners. Some private insurers include a co-pay. All the financing agents get access to the patients' files to grant pre-approvals for admissions, except for emergency purposes where patients are admitted directly. Moreover, all financing agencies monitor on a daily basis the course of treatment, require pre-approvals for tests and procedures, and some of them (private insurers) will question the need for in-hospital stay.

In this review we use the approach of Roberts et al. to health reform by collecting the relevant health system metrics from readily available information sources such as the Global Burden of Disease Collaborative Network and Ministry of Public Health Statistical Bulletins, and then applying the author's "five health system control knobs" framework to suggest options that policy makers could adopt to affect these metrics.<sup>4,7</sup> The guiding principles for these chosen options being the promotion of value-based healthcare and feasibility during economic crises. We will apply this approach to cardiovascular disease (CVD) healthcare in Lebanon with a focus

on ischemic heart disease (IHD).<sup>8</sup>

## Cardiovascular Disease - Related Metrics in Lebanon

The following indicators related to disease burden and its financial impact on health economy were selected. For CVD and IHD in Lebanon, these indicators were extracted from the Global Burden of Disease Collaborative Network and Ministry of Public Health Statistical Bulletins<sup>4,7</sup>:

- Prevalence
- Deaths
- Hospitalizations

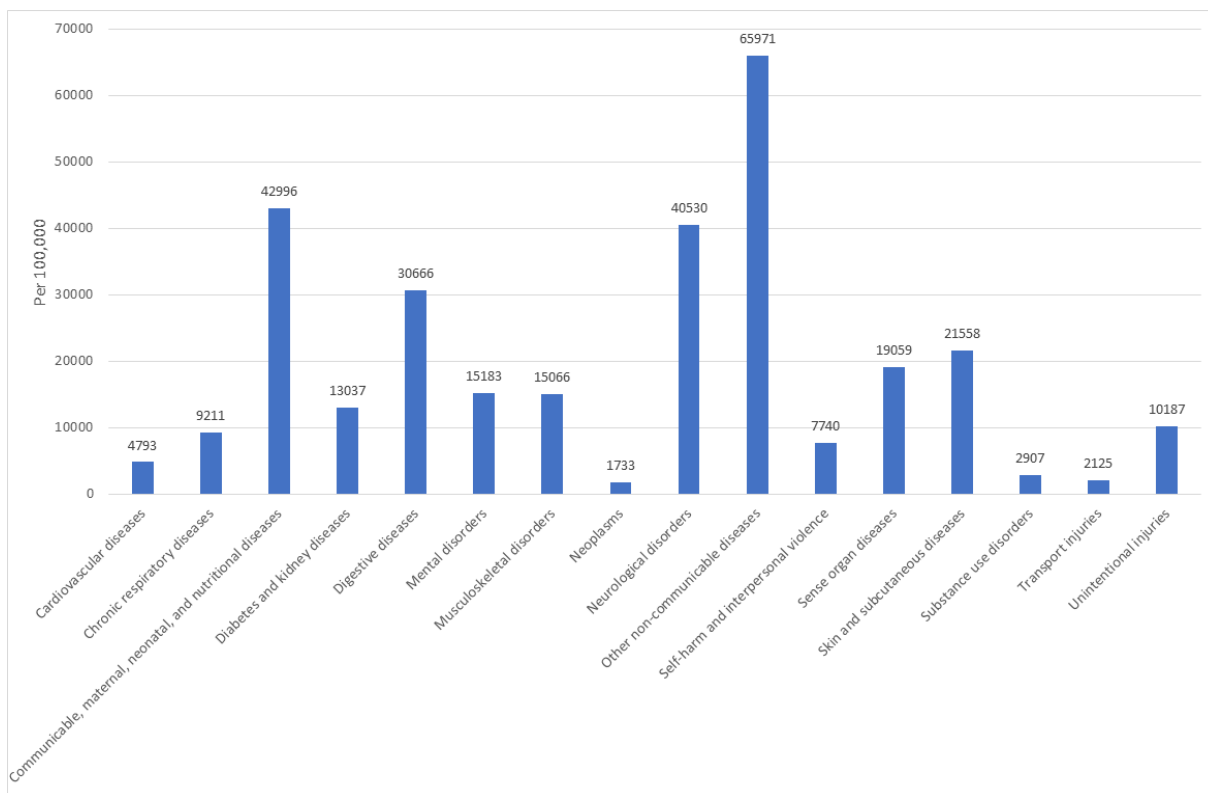
In this section we will also present metrics related IHD healthcare provision in Lebanon including cardiac catheterization and the coronary stent market.

Although CVD prevalence (4,793 per 100,000) is not relatively as high as other disease categories, it is the leading cause of death (165.58 deaths per 100,000 of deaths of all cause) (Figure 1 and Figure 2).

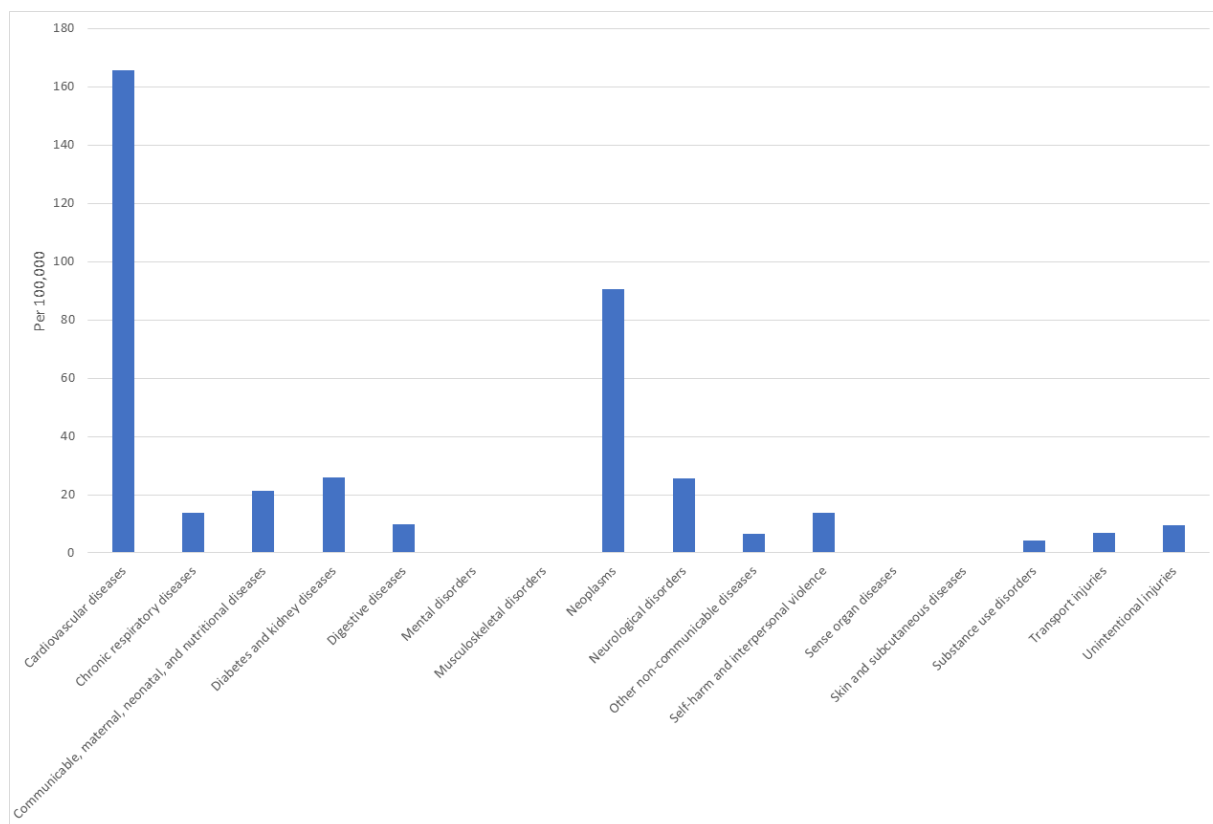
Furthermore, CVD is the most common cause for hospitalizations subsidized by the MOPH, which have been increasing for all causes, and at a higher rate for CVD (Figure 3). By further stratifying the causes of CVD-subsidized hospitalizations by MOPH, we noted that IHD is the leading cause driving these hospitalizations (Figure 4).<sup>4</sup> Hence, IHD became the focus of the analyses presented in our paper. Figure 5 shows the prevalence of IHD in Lebanon compared to select countries worldwide.

## IHD healthcare provision in Lebanon

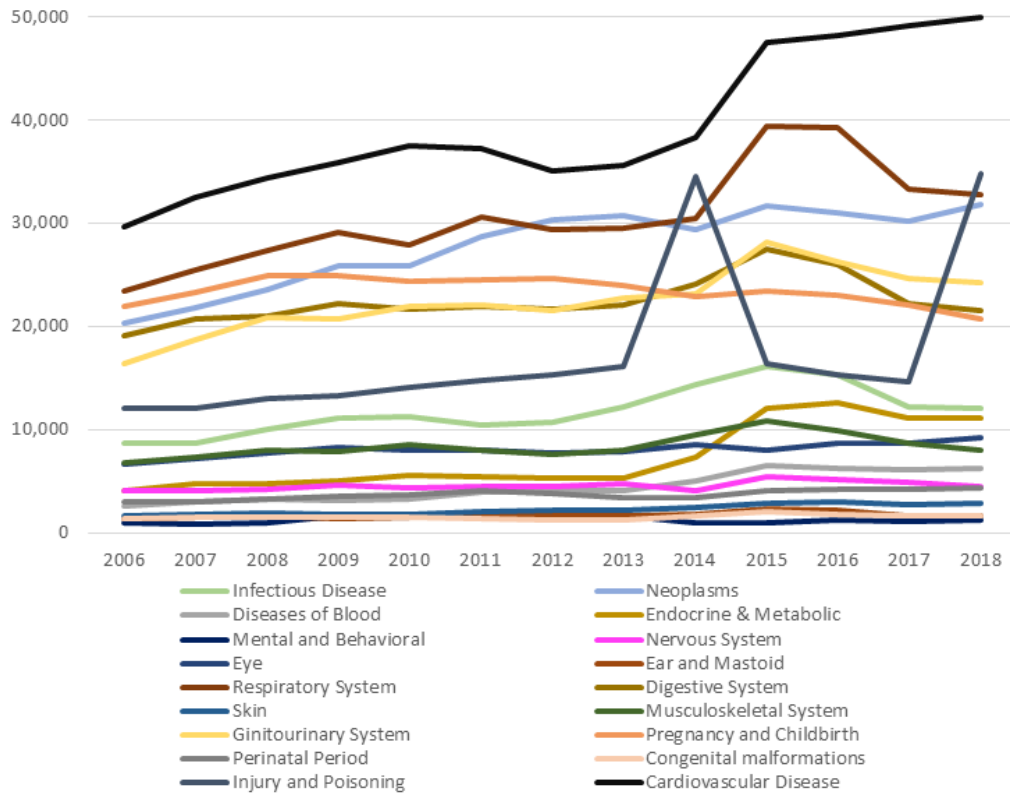
For outpatient treatment and follow up, patients rely on outpatient private clinics that are available within hospitals or out-of-hospital ambulatory facilities. Chronic IHD drugs can be paid out-of-pocket or reimbursed by employment funds. For patients who cannot afford private outpatient care, the MOPH provides in-kind support to a National Network of Primary Healthcare (PHC) centers that provide reduced-cost consultations and free chronic diseases medications.<sup>9</sup> In these PHC centers, CVD patients constitute 47% of all patients benefiting



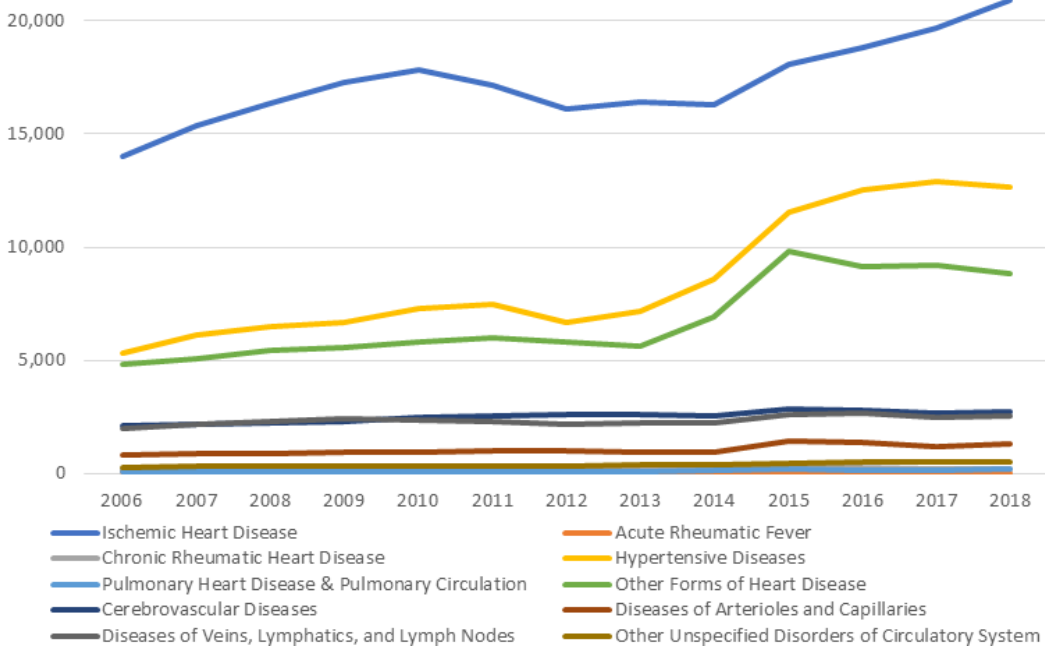
**Figure 1** Prevalence of the different disease categories in 2017 in Lebanon as per the Global burden of Disease Study.<sup>7</sup>



**Figure 2** Death rates for the different disease categories in 2017 in Lebanon as per the Global Burden of Disease Study.<sup>7</sup>



**Figure 3** Hospitalizations subsidized by the Ministry of Public Health (MOPH) for the different disease categories across the years. Compiled from yearly Statistical Bulletins issued by the MOPH and plotted against year on the x-axis.<sup>4</sup>

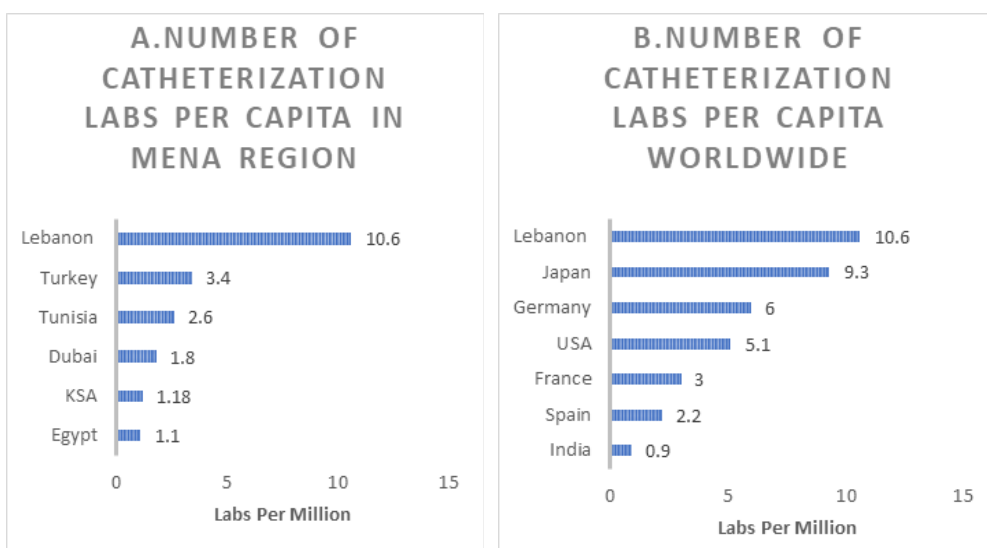


**Figure 4** Hospitalizations subsidized by the Ministry of Public Health (MOPH) for the different categories of cardiovascular disease (CVD) across the years. Compiled from yearly Statistical Bulletins issued by the MOPH and plotted against year on x-axis.<sup>4</sup>

from chronic drug distribution.<sup>4</sup>

Angiographies and percutaneous coronary interventions are covered by public and private financing agencies with no cap to the number of interventions per center. The number of catheterization labs per capita in Lebanon has been increasing from 7.7 labs per million in 2004 to 10.6 labs per million in 2016.<sup>10,11</sup> Figure 6A and Figure 6B

United States (3,192 catheterizations per million per year in 2019).<sup>11,12,20</sup> Sibai et al compared angiography entries from the Lebanese Interventional Coronary Registry with the ACC/AHA 1999 guidelines for coronary angiography and calculated an overall rate of appropriateness of procedures of 54.7%.<sup>21</sup> Stents in Lebanon are considered implantable medical devices; their importation follows the



**Figure 6** Comparison of the number of catheterization labs per capita across select countries in the Middle East North Africa (MENA) region (A) and select countries worldwide (B).<sup>10,12-19</sup> The shown densities were extracted from published data when reported as densities. In sources reporting absolute numbers, these values were divided by population data for the respective year the value was reported from the World Bank Open Data to calculate density per million.<sup>3</sup>

show how Lebanon’s density of catheterization labs per capita compares to other countries in the Middle East and North Africa (MENA) region, and globally. When compared to other countries, Lebanon has the highest density of catheterization labs although it does not have the leading prevalence of IHD (Figure 5). Unfortunately, there are no recent numbers on utilization rates of catheterization labs in Lebanon. In 2004, that rate was 5,300 angiographies per year per million, which is higher than the average number of angiograms across European countries (4,122 angiographies per year per million in 2018) or the

regulations and quality control standards set by the MOPH for the importation of medical devices. To register a device, an importer must provide a quality certificate for the device issued by either the EU or the following countries: USA, Canada, Switzerland, Australia, or Japan. An alternative would be obtaining a certificate from the Lebanese institute of industry research. The importer must also fill a device identification card, provide the labels on packaging along with the device manual, and provide invoices from the mother company. The registration process also involves the Lebanese

**Table 1** Costs paid by patient or covering agency for coronary angiography and for Drug Eluting Stent (DES) placement.

Category	Coronary Angiography (USD)	Coronary Angiography + DES Placement (USD)
Room and Service	59	175
Device Use	162	323
Medical Supplies	84	2,052
Medical Professional Fees	223	382
Total	527	2,939



**Table 2** Costs of coronary stents in Lebanon, Turkey, and India.<sup>23-25</sup>

Stent Type	Country	Cost (USD)
Bare Metal Stent	Lebanon	495
	Turkey	369
	India (Before 2017)	678
	India (Since 2017)	108
Drug Eluting Stent	Lebanon	1,584
	Turkey	613
	India (Before 2017)	1,821
	India (Since 2017)	444

Order of Physicians. Once a device is registered it can be imported into the country. Physicians, hospitals, and suppliers are then required to report any side-effect or malfunction as part of a post marketing surveillance strategy.<sup>22</sup> Procurement departments in hospitals, in collaboration with the interventional cardiologists, determine which stents to purchase and provide to patients. As in many other countries, patients do not have a say in choosing the stent inserted into their coronaries.

Table 1 shows the cost charged to the patient and/or covering agency for a coronary angiography procedure and for insertion of a drug-eluting stent. The drug-eluting stent would cost \$1,584 which accounts for nearly half the total cost. Table 2 compares stent prices in Lebanon with India and Turkey and shows the higher cost of stents in Lebanon.<sup>23-25</sup> In 2017, India implemented a pricing policy which is discussed below. Lebanon's total procedural costs are also higher than other countries where they were reported to be \$2,363 for cardiac catheterization in Saudi Arabia<sup>26</sup>, and \$2,330 for MI interventions in Tunisia.<sup>27</sup>

### Proposed reform steps: Using the five healthcare control knobs to impact CVD-IHD

As listed above, employment funds, private insurance companies, the MOPH, NGOs, and OOP cover healthcare services. With the recession and soar in unemployment, we predict a rise in the burden on MOPH. Thus, it is incumbent on MOPH and the Lebanese government to lead the efforts to reduce the cost of healthcare in general and care for IHD in particular.

We will adapt the five knobs to reforming IHD care. Depending on the needs of the system, Roberts et al. suggest addressing multiple knobs instead of prioritizing one over the other.<sup>5</sup> Ensuring adequate financing is not enough alone if inefficient organizations and behaviors leads to losses of the resources acquired by efficient financing. Within each of the knobs, problem diagnostics and the structure of the system in place should guide the measures addressed.

### Payment

Currently, health service providers-hospitals and physicians are payed on fee-for-service basis for angiographies and angioplasties. It is established that financial incentives are major drivers of hospitals and physicians' behaviors. Fee-for-service payments incentivize providers to provide non-essential services (sometimes redundant) and place all risks on the service buyer. This can possibly explain the findings of Sibai et al. reported above. The healthcare payment learning and action network (HCPLAN) provides a good review of payment systems in the USA.<sup>28</sup> Different payment schemes have different pros and cons. Revisiting the payment scheme for procedures where prosthetics and devices are involved, and for the most complex 5% of cases which account for 50% of the bills, should be a top priority.<sup>29</sup> A per-admission payment system would address other items in the admission other than the stent price. However, this will not limit the number of admissions, nor limit the number of unindicated procedures. Thus, a better aim would be to reach Category 3 from the HCPLAN overview where you maintain a fees-for-service

structure but couple it with provisions based on 'appropriate care'. A review of the payment method by the MOPH to hospitals was performed in 2014. This review linked payments to a utilization review, standardized admission criteria, and a hospital case-mix. Preliminary results showed some promise in terms of increasing complex case admission rate and decreasing admissions of inappropriate cases.<sup>30</sup> In the case of coronary interventions, payments will be based on whether the procedure are: (1) provided following the right indication (positive stress imaging test result or positive troponin), (2) provided within the right time (time to balloon in the case of ST elevation myocardial infarction for example), (3) another alternative would not have been clinically better (coronary bypass for multi-vessel disease), and (4) readmission within 30 days. Such recommendations are in line with suggestions from other health policy researchers in Lebanon.<sup>31</sup> While increasing co-pay has been found to reduce overall cost and altered patients' behavior, this does not seem applicable in the current setting of high unemployment witnessed in the country.

Preventing kickbacks to physicians and institutions in return for using a more expensive alternative is also important here. While the law (article 20 of law 288 regarding medical ethics) prohibits bribes to physicians in return for choosing one drug or medical device over the other, policies aiming at detecting misconduct should be implemented.<sup>32</sup> Revision of the law to include non-monetary incentives can also be recommended.

## Organizations

Changes imposed by paying agents at the level of organizations which provide care, hospitals in our case, essentially answer: which hospital does what? How payers incentivize hospitals based on their performance? How managerial changes occur to address the latter questions and improve overall performance? Figure 5 clearly shows there is room for improvement in terms of slowing the mushrooming of cardiac catheterization laboratories in the country. While increasing the number of labs may provide room for competition, this has not translated into a reduction of costs. Thus, should the payers start limiting which hospitals perform

what procedures based on a clear mechanism that ensures competitiveness along Category 3 from the HCPLAN overview described above, we will force organizational changes to match needs and achieve desired goals. Regulatory policies should also be in place to decrease redundancies in services between centers based on clear criteria that reflect the studies needs of the population. In addition, incentivizing collaboration among hospitals to consolidate and specialize within networks can have numerous benefits. This will permit redistribution of services among hospitals within the network further permitting centers of excellence in care to develop. Forcing these networks to be linked to at least one of the major teaching university hospitals, that are all located in Beirut, could help reduce disparities in care noted in hospitals outside Beirut. Teaching hospitals can provide administrative, continuing medical education support, quality control, and branding for other members of the network. In return, teaching hospitals can agree on fees for leading the network, receive transfers of patients for specific procedures to their centers of excellence, or get a leading role in the networks' procurement department for better negotiating power when purchasing stents, specifically, and other items. The latter we believe may be the most important incentive to decrease the overall network's procurement bill. This procurement collaboration can also lead to competitive pricing as well as restricting kickbacks to physicians and institutions for using the more expensive stents in the market for example. Allowing these newly formed hospital networks to purchase or import directly without the resort to importers and distributors can also curtail kickbacks for the use of the more expensive alternative and decrease corruption in the decision of what gets imported.

Additionally, healthcare restructuring that allows payer and hospital networks to purchase or import devices directly can curtail kickbacks and corruption across physicians, hospitals, and more importantly governmental authorities or third party payers administrators who are currently all positioned to approve or restrict any import, which then provokes an unwarranted higher cost to the consumer and public.



## Regulatory

The above financing proposal and changes in payment schemes, organizations leading to behavioral changes would certainly require legislative and regulatory proposals after studying their implementation feasibility. Here, a well-studied regulatory intervention comes from Pandey et al. who studied the factors that drive stent pricing in India. They reported that manufacturing costs, material cost, and maintenance costs were not main drivers of stent pricing, rather profit margins of hospitals, manufacturers, distributors, and importing companies were the important drivers. They also reported the lack of government regulations as the factor that all other factors are dependent on, and the factor which causes exceeding profits at each level.<sup>33</sup> In 2016 coronary stents were placed on the Indian National List of Essential Medications (NLEM) making them eligible for subsidy and pricing regulation. In 2017 the government then set a price ceiling to coronary stents after taking into account manufacturing and distribution costs, leading to a dramatic decrease in stent prices reaching up to 85% in certain cases.<sup>25</sup> A similar scheme can be replicated in Lebanon aiming for this target and all the above interventions/suggestions. Consideration should be given to corruption in the Lebanese health sector evidenced by inflation of prices despite the surplus of healthcare services offered, predominance of oligopolies, lack of government oversight, and the lack of laws permitting transparency and accountability.<sup>34</sup> More pertinent now, since the government is subsidizing all medication and supplies, then it is only normal to set standards to identify criteria for subsidy. This will lead to significantly reducing prices overall. For example, there are currently more than 20 different brand names selling the molecule atorvastatin. Setting a tender with a limit of 2 brand names that qualify subsidizing can drive the prices much lower. The same can be done for subsidizing medical implants. Instead of subsidizing all stents imported for example, subsidizing those from a limited number of manufacturers that have the cheapest prices with demonstrated quality can have a significant price lowering effect.

## Behaviors

Healthcare service transactions involve three parties: the patient, the provider and the payer. Thus, changes in behavior should be sought from all these three key players. Patients must be empowered and informed to differentiate between appropriate and inappropriate healthcare services offered to them. Providers must adopt responsible behaviors in providing care needed adequately. In addition, the payers, including private insurance companies, must push for reforms that not only reduce cost but also maintain quality of care. The three players are subject to morally hazardous behaviors. The classical example is of patients with private insurance who request unwarranted “cardiac screening” tests. The providers in turn benefit from these tests, with some under the label of “executive package” offering computed tomography coronary angiography and exercise stress echocardiography for asymptomatic executives on the same day.<sup>35</sup> Similarly, insurance companies do discourage such practices with the potential to increase future premium. This explains in part the continuous increase in healthcare insurance policy prices that nearly triples from 2,196 USD in 1999 to 6,690 USD in 2017.<sup>36</sup>

Among the behaviors that need to be improved are those showing stronger commitment to prevention. That the three most common causes of hospitalizations subsidized by MOPH shown in Figure 3 (CVD, respiratory system disorders, and neoplasms) have in common smoking as a major risk factor, which spells out a target. In particular smoking is a major risk factor for IHD. Lebanon has the 27<sup>th</sup> highest smoking prevalence worldwide according to the WHO global health observatory.<sup>37</sup> A study done in Lebanon demonstrated increased odds of hospitalization in smokers. Hospitalization also increased in a dose dependant fashion with the number of pack years.<sup>38</sup> Costs of smoking related diseases in Lebanon in 2008 were estimated to be 146.7 million USD, with CVD accounting for 71% of these costs.<sup>39</sup> Policy and bills addressing smoking reduction and protection from second hand smoking have been passed, their enforcement however has been limited and sometimes temporary with limited overall success. Taxes have not been significantly

increased on tobacco products. Increasing taxation on tobacco products and using these taxes along with those on alcohol products to fund healthcare can help reduce consumption and provide a new source of needed funding. Similarly, hypertension is another risk factor that can be better controlled by policy implementation. In a recent study done in Beirut, it was found that 65.4% of the study population were aware that they were hypertensive and 61% had adequate control of their diagnosed hypertension.<sup>40</sup> This highlights the need for awareness education and screening efforts. Historically, efforts to reduce salt intake in the Lebanese were launched starting from researching the amount of salt intake among Lebanese consumers and sources of salt in the Lebanese diet.<sup>41</sup> These efforts did not translate into policies limiting salt content of food items or proper salt labeling as is done in other countries. The group that led this effort (Lebanese Action on Salt and Health) highlighted that the primary cause of failure to achieve this target was that food labeling and food content standardization falls under the ministry of industry not ministry of public health. Thus, level of collaborative efforts between these two ministries varied with changes in governments and ministers' commitment to the cause.<sup>42</sup> A similar population based intervention that is stalling is related to the reducing out-of-hospital cardiac arrest where legislation to pass a Good Samaritan law equivalent is slow and till now there is no central office at the ministry of public health that governs and coordinates the deployment of public automated external defibrillators or coordinates the work of various emergency response teams.<sup>43</sup> These examples are worth full investigation as to what should have been done to avoid another failure in any other population based intervention. This is essential to build public trust. A thorough evaluation of how to maintain/build the trust of the Lebanese in public healthcare systems is a must.<sup>44</sup> Failure to do so may negatively impact patients' adherence to recommendations and support to decisions in other areas. For example, how can patients be confident the "less-expensive" stent deployed in their hearts is not of lesser quality. After all, no matter how much details healthcare providers deliver, information asymmetry will always remain a challenge between

providers and patients.

Similar to commitments to primary prevention, behaviors reducing readmissions and promoting secondary preventions are needed. Readmissions carry big burdens on patients regarding morbidity and cost. Stent thrombosis is a complication following stent placement that incurs significant costs.<sup>45</sup> In addition to the choice of antiplatelet and the use of drug eluting stents, patient compliance with antiplatelets is an important factor in preventing stent thrombosis.<sup>46</sup> Adequate physician follow up can help with patient compliance; however, many patients cannot afford follow up with private clinics. Improving care at an already established primary care center network by the MOPH can ensure adequate follow up for these patients, along with the provision of needed drugs free of charge. Ensuring medication availability is also important in this regard, and is of concern especially after some essential cardiac medications were absent from the market in Lebanon recently. Here, replicating pre-existing programs such as Get with the Guidelines by the ACC and integrating them in the healthcare system with proper incentives and penalties for proper or lack of proper behaviors by providers can help.<sup>47</sup>

## Financing

The government sets the budget for the MOPH, while mandatory contributions finance the employment funds. Both systems require a co-payment by patients. In our opinion, an additional contributor to financing healthcare could be the city of residence or city of employment. The municipalities in these cities benefit (directly or indirectly) from the taxes on individuals but they do not contribute to their healthcare. Since municipal tax does not cover healthcare, new legislation will need to be passed to allow municipal tax contribution. Typically, an individual is more likely to work in a more developed area where employment rates are higher. While some may prefer to live near their work, others may choose to live in other areas due to affordability and proximity to their families. Having both contribute at a different percentage in an equitable manner would be a proposed way forward. We highlight here that determining the equitable

manner will be challenging so as not to further aggravate already existing geographical disparities. Some perceived barriers would be the size of certain municipalities and their corresponding budgets, and a solution may be to make the contributor the union of municipalities of the region instead of a single municipality. Other barriers can be the low availability of municipal staff needed to support such services along with the lack of a mechanism that ensures a non-discriminatory distribution of these healthcare funds. While reducing the contribution of the MOPH would be a direct benefit, other benefits to including other payers with MOPH are present. One benefit will be more oversight on bills which will enable more scrutiny as a role for municipalities in governance. This is a gap in the system that needs to be addressed in light of a press release by the minister of public health accusing some hospitals of inflating bills, as well as resolving delays in healthcare reimbursements.<sup>48,49</sup> Delegating a part of financing to municipalities also works along the general line of moving towards decentralization and can form the beginning of reshaping the model of care being provided.

## CONCLUSION

Without doubt the current economic and monetary crisis over and above the COVID-19 pandemic have placed the Lebanese healthcare system under huge strain. CVD account for a significant part of hospitalizations and cost entailed by the system. Only by reform steps at the level of financing cardiovascular healthcare, the payment schemes followed, and the regulations set will organizations change and with it the behaviors of the cardiovascular healthcare consumers, providers and payers. The importance of such reforms cannot be highlighted enough specially with the recent waves of emigration of skilled medical professionals because of the economic blow along with the longstanding delay in healthcare reimbursements. The exodus of physicians, including cardiologists, will impact further the quality and availability of care provided for cardiovascular patients.

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