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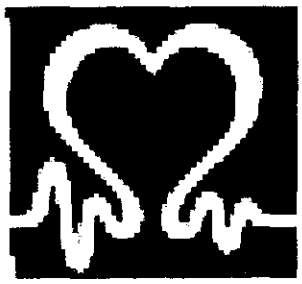
CORONARY SURGERY PRACTICE IN LEBANON



Preliminary evidence from the Ministry of Public Health records

Republic of Lebanon
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Executive summary by the Editor

This short utilization review of the MOPH's coronary patients, spanning few months, is the most recent attempt, to our knowledge, to explore the practice of hospitalizations on the account of the Ministry of Public Health.

Coronary surgeries, both CABG and PTCA, are fast growing operations in Lebanon. They take already a large share of MOPH and other payers' resources. The growth will continue as the Lebanese population is changing lifestyle, surviving longer and the proportion of seniors is increasing.

Utilization reviews of this kind would not and shall not be content only with few summary descriptive tables about age, gender and origin of the patients. They shall be taken as occasion to assess the practices with aim of improving cost-effectiveness, quality, fairness and, above all, outcome of expenditures of public finances.

Worldwide, especially for expensive and high technology medical practices, health authorities are stepping up surveillance. On the issue of coronary surgeries, benchmarking and guidelines are becoming a routine approach both as internal and international efforts to improve outcome.

The study, as was anticipated, met several important data constrains: difficult access to providers' or payers' data, incompleteness of records. It is not surprising, as utilization reviews are not routine practices.

Though short and limited, this study on MOPH patients will open the door to further improvements in utilization reviews. For that reasons the establishment of an effective information system and records' treatment are essential.

Major points outlined in the study regard the need in Lebanon for:

1. A more systematic use of diagnostic and prognostic tools, based on the best international practice.

Payers shall demand doctors to apply guidelines for clinical and instrumental examination procedures and provide full evidence of them before proposing a coronary surgery. Angiography shall not be the first and only test for surgery decisions.

2. Setting up a system of hospitals' confidential auditing. Payers (on behalf of the patients) would require contracted hospitals, as part of an accreditation and contracting process, to provide evidence of such practice.

3. Establishing a National Register for coronary surgeries and in general coronary diseases.

4. Establishing a plan for controlling underlying risk factors and disease. The MOPH is the main party concerned by such national undertaking.

5. Improving access to quality treatment, by contracting and authorizing hospitals on geographical basis and after considerations about their volume and case mix. A limited number of hospitals may have to be contracted. Alternatively, a stratification of hospitals contracts on the basis of capacity to handle specific case mix shall be used.

6. Improving follow-up to control risk factors after the surgery. Surgery without decreasing the risk factors is non-sense: relapses, re-admission and disease progression will continue to take place. Costs will increase and health results will be poor. Follow-up is essential to define the very quality of the surgery.

7. Improving women access by promoting public's and professionals' awareness, information and education. Women shall fully benefit from the advantages of new technologies in coronary diagnostic and intervention.

8. Improving the in-house information system (MOPH and other payers alike) in order to establish the much needed practice of systematic utilization review. Computers are not panacea to lack of procedures on collecting, storing and retrieving records. Discharge summaries are still the weakest point in the chain of reporting.

In summary, the study shall be taken as an opportunity for payers, providers and consumers to understand the practice of coronary surgery (an essential, expensive and sophisticated surgery).

We hope that the recommendations will be taken in due consideration by all concerned parties on the ground of their potential to improve the patients' health and financial performance. In that sense, a major role shall be played by the providers, scientific societies, professionals and finally the same patients.

Meanwhile, the Health Policy and Research Unit, a joint effort between the MOPH and the Italian Cooperation, will continue to improve data collection on the subject of coronary surgeries through the establishment of a prospective survey.

Thanks shall be expressed to all those who have so far shown interest and commitment to the study and its results, in the MOPH and among other payers, providers and professionals.

Beirut 1-8-2002

CORONARY BYPASS AND PTCA

The needs for coronary surgery

1. Heart disease and stroke—the principal components of Cardiovascular Disease (CVD) —are the first and third leading causes of death in the United States, accounting for more than 40% of all deaths. About 950,000 Americans die of cardiovascular disease each year, which amounts to one death every 33 seconds.

Although cardiovascular disease is often thought to primarily affect men and older people, it is a killer of women and also people in the prime of life. More than half of all cardiovascular disease deaths each year occur among women.

Similar figures are available from EU. There are, yearly, 1.5 millions deaths for CVD.

2. A more specific data on heart problems in EU indicates that half of them (about 750,000) are due to Coronary Heart Disease (CHD).

One in six men and one in seven women die from CHD, meaning the magnitude and severity of the disease is almost identical in the two genders, though women may die at an older age. Angina and heart attack, usually at the basis of cardiac surgery, are spread in equal size among women and men. This may be because in EU countries risk factors tend also to be equal.

Any data which does not show that distribution of angina, heart attack and CHD deaths are similarly important for the two genders, shall be taken, therefore, with caution. The possibility is that causal factors (lifestyle, diabetes) are strongly skewed towards male gender.

3. Different treatments are recommended for patients with coronary artery disease.

For some people, changes in lifestyle, such as dietary changes, not smoking and regular exercise, can result in great improvements in health. In other cases, medication prescribed for high blood pressure or other conditions (statine for hyperlipidemia) can make a significant difference.

Surgery may be recommended for patients who continue to have frequent or disabling angina despite the use of medications, or people who are found to have severe blockages in their coronary arteries.

The two most common interventional procedures performed on patients with coronary artery disease are coronary artery bypass graft (CABG) surgery and percutaneous transluminal coronary angioplasty (PTCA).

4. Coronary artery bypass graft surgery is a procedure in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart, bypassing the arterial blockage. Typically, a section of one of the large (saphoenous) veins in the leg, the radial artery in the arm or the mammary artery in the chest is used to construct the bypass.

One or more bypasses may be performed during a single operation, since providing several routes for the blood supply to travel is believed to improve long-term success for the procedure. Triple and quadruple bypasses are often done for this reason, not necessarily because the patient's condition is more severe.

CABG surgery is one of the most common, successful major operations currently performed in the United States. As is true of all major surgeries, risks must be considered. The patient is totally anesthetized, and there is generally a substantial recovery period in the hospital followed by several weeks recuperation at home.

Even in successful cases, there is a risk of relapse causing the need for another operation. Those who have CABG surgery are not cured of coronary artery disease; the disease can still occur in the grafted blood vessels or other coronary arteries. In order to minimize new blockage, patients should continue to reduce their risk factors for heart disease.

5. Coronary angioplasty **or** balloon angioplasty begins with a procedure similar to that of angiography. However, the catheter positioned in the narrowed coronary artery has a tiny balloon at its tip. The balloon is inflated and deflated to stretch or break open the narrowing and improve the passage for blood flow. The balloon-tipped catheter is then removed.

Bypass surgery relieves symptoms of heart disease but does not cure it. Usually you will need to make a number of changes in your lifestyle after the operation. If your normal lifestyle includes smoking, a high-fat diet, or no exercise, changes are advised.

6. The epidemiology of CHD is a two-face story. Started with the epidemic of coronary diseases associated with increase in risk behaviors and ageing of the population, we now witness, in industrialized countries, a decrease associated with better treatment of underlying diseases and better awareness of risk factors.

The diagnosis and treatment of diseases have received a boost from new drugs and surgery procedures. Hypertension, diabetes and hyperlipidemia are better controlled

by drugs. Diagnostic procedures have been expanded. Treatment as CABG and PTCA are quite effective, in expert hands, to increase survival.

7. The health care industry is the largest service industry worldwide, relying heavily on human skills and countless number of procedures.

The growing expectation for more effective, fast and comfortable devices and products has expanded the health care market and increased profits. Rapid improvement of health outcome, high standards of professional skills, less labor-intensive procedures, shortening or even elimination of hospital stay, greater patients' comfort and satisfaction are becoming the essential benefits expected by medical technology development, all around the globe.

Cardiac bypass surgery, coronary angiography and percutaneous transluminal angioplasty are only few examples of a constant stream of new technologies handled by the health industry.

Stress has always been put on availability. However, huge supply has not always been followed by equal access, proper utilization and evidence of clinical effectiveness at individual or population level.

Arguments have run very contentious on whether high investments in medical technology have been and are always justified, whether benefits are tangible and proved, whether costs can be born and whether funds and resources have been allocated on the best available alternative procedures.

Health insurance and health plans are interested in knowing whether alternatives are available or whether cost effectiveness is proved to decide on coverage and reimbursement.

Coronary disease and coronary surgery in Lebanon

1. Heart surgery (coronaries and valves, under different surgical techniques, but not transplant) is one of the 10 high-tech procedures that are reported, all together, to consume 50 percent of the budget of the Ministry of Public Health in Lebanon. (Personal communication by Dr. R. Khalifeh: Italo-Lebanese Health Technology Conference-Beirut-2000).

Similar figures are likely to be reported by other Lebanese insurance coverage (private and public ones). On the whole, citizens in Lebanon can rely on one or another form of financial coverage, though they may end up footing some co-payments or under the counter bills.

2. In 2001 the MOPH, which covers about 50-60% of the population (though in reality the figure is theoretical), has received requests, through the Heart Commission, for 1284 CABG and 855 PTCA financial coverage. (Dr. R. Khalifeh-2002). The number of CABG requests has remained almost unchanged since 1996. (**Table 1 and 2**)

However, the number of cases has risen fast from 1999, after a sharp drop from 1997 to 1999 (a growth of 17% a year). This trend is all more important as the MOPH has started since year 2000 reimbursing PTCA procedures, which have been almost doubling in just one year. For mere comparison the increase in 1998 (last data available) for UK has been 8.7% on the previous year (British CV Intervention Society- 2000)

For the total coronary surgery the increase from 1999 (the point of trend inversion) is about 123% or about 61% a year. The trend inversion is most likely due to change in MOPH policy towards reimbursing PTCA. The new coverage (since June 2000) has led providers and users to resume to coronary operations with new interest. Worried patients would take a step towards the surgery as they see it less traumatic and safer.

Table 1: Requests for Heart Commission's approvals

Year	CABG	PTCA
1996	1155	
1997	1384	
1998	1254	
1999	959	
2000	1126	413
2001	1284	855
Total	**7162**	**1268**

*From the Commission of Open-Heart → Approvals of proposals (Information from Dr. Riad Khalifeh, Directorate of Medical Care, Ministry of Public Health-2002)

1996	1044	
1997	1230	
1998	1147	
1999	1034	
2000	1046	424
2001	1252	958
Total	**6753**	**1382**

* From the MOPH request for coverage following the approval by the Commission (Information from Dr. Riad Khalifeh, Directorate of Medical Care, Ministry of Public Health-2002)

The two sets of data are comparable: some of patients, after the necessary Commission's approval, will not make the request for coverage. However, it is surprising and unexplained that in the case of PTCA, applications are higher than approvals. This should be a matter for further investigations (bypassing the Commission? Incomplete figures?).

The number of cases *actually* operated (available from bills and discharge summary), were not provided.

3. The MOPH budget for the fiscal year 2001-2002 for all hospitalizations expenses was set at LL 210,000,000,000. Of this, the budget (2001-2002) for heart surgeries was set at LL 20,000,000,000.

Here under (**Table 3**) are the expenses trends, since 1996, for heart surgeries (coronary and valves). Valve operations are said to represent a limited part of the expenses.

1996	16,460
1997	18,840
1998	16,158
1999	10,148
2000	13,933
2001	18,591

Expenses are not divided by coronary and non-coronary heart surgery.

From the above table it is understood that about 9% of the total hospitalization budget is devoted to heart surgery (mostly as coronary surgery). Hospitalizations budget is said to cover about 85% of the total MOPH budget.

Interesting enough, while the number of coronary surgeries has increased dramatically since 1997, the above table shows almost the same MOPH's expenditures than in 1997 (18.8 billions in 1997). This may be the result of tight control introduced by the flat rate scale.

Again, if the year 1999 is taken as reference, the expenditures on cardiac surgeries have grown by a hefty 42% a year. Much of the increase is accounted for by the reimbursement of PTCA.

4. According to Dr B. Asmar, 2001, 2425 CABG and 2765 PTCA were performed in year 2000 in Lebanon, for a population of around 4 million: a *combined* rate of about 13 per 10000.

Applying the flat rate cost to the number of nationwide cases will lead to an estimated national bill of about 30 billions LL for cardiac surgery (0.1-0.2 % of the GDP).

Stagnating economy and containment of yearly allocations to an already scarce MOPH budget will not keep the pace with the fast growing cardiac surgery expenditures (particularly coronary). Such expenditures will take an even larger share of the GDP and the MOPH budget.

5. While the population rate of coronary operations, suggested by Dr Asmar's figures, seems to be in line with most of the industrialized countries (an average for PTCA of 5.5 /10000 with a range from 0.5 /10000 of Portugal to 34/10000 of USA and for CABG of 5.5 /10000 again with a range of 1.5 /10000 of Spain to 20/10000 for USA: *data from Health Affairs May-June 2002*), it is worth noticing that the size of population above *65 years of age* *(the age where most of the cases fall) is in Lebanon half the median of the above countries (about 7% against 15 %).*

6. The coronary surgery is carried out in Lebanon in 20 centers. The numbers seems growing. This implies that most of these centers have a small volume activities. Concerns on the quality and outcome are raised on the ground that mortality may improve with the volume of cases treated by a center or by the number of procedures performed by any given surgeon.

7. The difficulty in assessing on national level the trend in the volume of operations, stresses the need for a national coronary or cardiac surgery register.

This would offer a window of knowledge on the growth trend of the utilization of such procedures and the size of response to cost containment measures, at least from the public payers.

Besides it would help in assessing appropriateness of indications, quality, and access.

Such register could, first, be tried with the MOPH data. Indeed, the MOPH shall have a basic set of data to monitor the above. In particular data on the actual utilization and disbursement of CABG and PTCA shall be set up. However, the MOPH shall make mandatory the provision of data for such Register from all Centers and all patients.

8. Data on the epidemiology of coronary diseases and underlying risk factors are scarce and poorly collected. Life expectancy, in transitional countries like Lebanon is rising sharply, and people are most likely to be increasingly exposed to coronary risk factors (tobacco, overweight, hypertension, diabetes) and for longer period. Risk factors are spreading fast among population in early ages and in fact they are involving segment of population previously untouched: smoking for instance are spreading among women faster than ever.

The tables below (**Table 4 and 5**) show the diffusion of risk factors in UK and what is collectable in Lebanon.

UK+	38%	3%	27%*
LEBANON++	26%	13%	26 %**

+ British Heart Foundation 2002 Statistics.
++ Dr. B. Asmar 2001
* British Heart Foundation 2002 Statistics.
** HS 1999. 16 and above: "1 or more cigarette *dans la journée"*

Male	33.7 %
Female	18.3%

* HS 1999. 16 and above: *daily*

It is evident that most of risk factors seem to be lower in Lebanon, with the noticeable exception of diabetes, a complex condition often associated with high level of blood tension, blood fat and obesity. As additional comparison, USA has reported in 2000 a population prevalence of diabetes of 7.3% *(JAMA 2001;286:1195-1200).*

Of all the risk factors, diabetes is certainly the most important as other health problems can be easily found in diabetic patients. The large prevalence is confirmed by other studies. Comparisons of such kind must be treated with care, as the Lebanese data are, by large, difficult to appreciate (nothing is known about cut-off points for the hypertension, definition of diabetes, source of data). Cholesterol and other fats levels in the populations are not available, as also obesity rates. Despite of it, they may still provide some useful consideration.

In the case of smoking, the 1999 Lebanese Household Survey shows a relatively low smokers' percentage. This may still be a matter of concern for the amount of tobacco smoked (23 cigarettes is the average) and possibly for the growing trend (in UK, as in many industrialized country, the trend has actually halved since the 80's). Other sources indicate much higher smokers' percentages (50%. Dr B. Asmar 2001). Much, also, depends on sample, questions and ages considered. There is no verifiable trend confirmation.

The medical cost of the high prevalence of risk factors in the population can be tremendous for individuals and the society. Primary prevention, then, should be the major objective. Few epidemiological data are reported in **Table 6,** as rough extrapolation of rates from UK; much of them are of difficult consideration.

Table 6: Coronary Heart Diseases (CHD): fatality rates

	1-Population *1000	2-CHD (~3%)	3-Fatality rate (~10%)
UK	58,000	1,770,000	170,000
LEBANON	4,000	*120,000**	*12,000**

* applying the rates from UK data

The number of coronary heart patients would be, erring on the lower side, about 120,000. Assuming a fatality rate of 10% (conservative estimate, too), there would be 12,000 deaths a year for the disease in Lebanon. Given the many uncertainties about risk factors and prevalence of underlying diseases the need for a major nationwide survey cannot be overemphasized.

9. Against the above background, disease specific surgical procedure rates in Lebanon, compared to UK, seems to be high. Obviously this depends on the actual number of cases classified as coronary disease in Lebanon, a figure totally unknown. The estimate produced here may well be an underestimate. Population operation rates (**Table** 7), also seems to be high compared specifically with UK, particularly if the population demography is taken in consideration.

Table 7: Coronary surgeries: UK vs. Lebanon

	1-CABG-	2- Disease specific CABG rate (# surgeries/CHD*)	3-PTCA	4- Disease specific PTCA rate (# surgeries/CHD*)	*5-Population operation rate for both procedures (# both surgeries/ Population)*
UK	**28,000 (1998)**	1.6	**25,000(1998)**	1.4	**9/10,000**
LEB	**2,452 (2000)+**	*2*	**2,765(2000)+**	*2.3*	**13/10,000**

\+ Dr. B. Asmar 2001

* estimated number of cases based on UK CHD rates

Why a study on heart surgery in Lebanon

The background outlined in the previous chapter has led to summarize the state of the art of the coronary surgery in Lebanon in the following points:

1. CABG and PTCA have been a major breakthrough in medical treatment of coronary diseases. They have contributed to the decrease of fatality rate for CHD and length of survival. Together with anti-cholesterol drugs and changes in lifestyle they are reported as reason for the major decline in trend of CHD and mortality in industrialized countries.

In a recent survey in the USA by the Stanford University, physicians have ranked PTCA and CABG, respectively 3rd and 6th among 30 major medical innovations. Statins come 4th (Health Affairs Sept-Oct 2001).

Their introduction, however, has sparked worries about abuse, excess and poor quality.

In transitional countries, the full effect on CHD by demographic and lifestyle changes, poor access and limited disease control measures may still have to be seen. This is a reason why the present growth rate of heart surgery (CABG and PTCA in particular) in Lebanon concerns patients and society as a whole.

2. Lebanese public and private payers have to be concerned, as cardiac surgery already constitutes a high proportion of their hospitalization bills. With other technologies pressing for reimbursement or coverage, such as bone marrow, kidney and other transplants, proper utilization of coronary surgeries may result essential to optimal allocation of scarce resources.

3. Considering the demography of the population, Lebanon may have, by comparison with industrialized countries, a high rate of surgical operations. This would be best viewed by a comparison based on age specific procedure rates or age-standardized population rates. However, this kind of data is not easily available in Lebanon.

Based however on the age distribution of cases and population, and extrapolating from the national number of cases, it was possible to assume an age specific rate as follows (**Table 8**):

Table 8: Age specific rate of coronary operations in Lebanon

Age	% of the pop+	# of citizens	Operations *	Rate
>50	17.8	712000	4173	59/10000

+Nat. Hous. Survey 1999
*Based on 80% of the 5217 B. Asmar 2001 cases. (CABG+PTCA)

This age specific rate is clearly in excess of any expectation, (in UK would be 19.3/10000) showing that the intervention is actually performed in excess. When dispersed in the entire population, the resulting crude rate will appear in line with UK and the averages of OECD countries.

Comparisons with industrialized countries are more appropriate than comparisons with similar countries or country in the region, on the ground that the latter may show low procedure rates because of limited availability of the techniques.

The situation suggested a need for investigation on the reasons for such supposed "excess". Main concern expressed by several quarters was related to the possibility of over-indications across the nation: subjects with little or very limited clinical and pathology evidence of coronary disease being operated.

For that purpose the MOPH in Lebanon has appointed, as earlier as 1995, a specialized Commission to oversee authorizations for cardiac surgery. At this date few, if any, applicants have been rejected.

The argument that Lebanese physicians identify more coronary pathologies because of the widespread use of the angiography, as first diagnostic mean, even in non-symptomatic or low risk patients, is somehow possible. Data on angiography rates in the country do not exist, to make useful comparisons.

4. Equally important was the concern about quality of care. Poor quality in coronary surgery has been a matter of attention all over the world. Patients living in country with weak surveillance and control are more at risk of undergoing sub-standard procedures and care. The same organizations of cardiologists, doctors, cardio-surgeons were voicing such a concern in Lebanon.

5. Additional questions raised would involve possible indications of unequal access of patients to the available technologies and the incentive effects of flat rates introduced by the MOPH for CABG and PTCA.

6. The questions which, therefore, were put forwards at the very inception were several and summarized as follows:

1. ***Was there any excessive recourse to coronary surgery (CABG and PTCA), reflecting a lower threshold for cardiac surgery indications?***

2. ***Was there any bias towards a type of operation (CABG-PTCA), in contrast with "guidelines" and benchmarking?***

3. ***In particular, was there any evidence of difficult access to care or discriminations?***

4. ***Was there any clue for poor quality of coronary surgeries?***

5. ***Was there any abuse of the MOPH flat rate system?***

Answering the many questions

1. While it was theoretically easy to answer the above questions through a national survey, practical difficulties have actually ranged from scarce research resources, poor data, lack of interest by providers, and limited expertise.

2. The absence of a national register of cardio-surgery has limited the reference to population rates to what was collected by different authors and methods and would result probably in underestimations.

3. The retrospective questionnaire (**Annex**), prepared with the most important items to be known in accordance and with the cooperation of the cardiac society, cardiology committee and other leading professionals, could not be administered nationally for the reasons reported in point one above.

4. It was, therefore, decided to proceed *stepwise,* starting from the MOPH data (supposedly covering 50% of the population, but probably much less in terms of coronary surgeries) and moving in the future to other major payers. The number of patients paying out of pocket the surgeries is, however, deemed to be few.

However, the best choice will be obviously to involve the actual providers (the 20 centers), the only ones that could provide support to answering the questions. Winning their cooperation is therefore vital.

5. The major source of MOPH data was the forms filled in to request the financial coverage (req. in forms or visa). They are forms which precede the actual hospitalization. However, whenever discharge summaries and bills information were traceable, they were also entered as new records or as complementary information. The period under study spanned from July till November (included) 2001.

6. It was quite obvious, since the inception, that the collection of the required information from the MOPH forms would have been equally difficult.

The most serious drawback would come from the incompleteness of the items reported on the forms. The poor status of the discharge summaries would especially be evident for the patients' identification and the coding of the disease.

A unique patient code for all the different forms or different files was not available, and links between different records and forms almost impossible to obtain, whether on hard copies or computerized entries. A bill was not always possible to link to a req.in forms or discharge summaries or vice-versa.

The Visa Center, where, req. forms were processed, was the only place where it was assumed to be possible to find computerized links between different hospitalizations and produce some summary statistics.

In theory, bills and DS should come together, but then they were somewhere misplaced, separated and impossible to be traced back. In fact, bills for cardiac surgery were simple logs of settlement requests by hospitals, for a given period (usually a month), reporting the name of the patients and few other data. Bills' logs, DS and Visas will be kept at the Central Inspection (with no archiving rules) for a maximum of one year.

7. Despite the above, it was decided to adopt the retrospective questionnaire (**Annex 1**) and assess the data from the MOPH, on the bottom line that poor information would be better than no information, a meagre position which at least has the merit of indicating ways to improve the organization of the MOPH information system.

At the same time, a system of prospective data was put in place, based on the information provided by the patients and treating physicians, when requesting the Cardiac Commission's approval. The new database would include additional items (see **Annex 2**).

Even so, questions such as outcome, quality of surgery, survival, complications and other personal data such as smoking habits would need information by the providers and (sampled) direct survey of patients.

8. These survey difficulties are not specific for cardiac surgery. Any utilization review in Lebanon would face serious obstacles, as so much information depends on the providers' willingness to make data available, even on payers' request. Providers have no incentive to do so. Confidentiality and additional administrative costs may also prevent any data transfer. Obligations are not enforced.

As for the MOPH records, when existing and traceable, they may have far less information of what indicated or needed.

As a result one of the most important outcome of the study shall be recommendations for utilization review at national and MOPH data level.

9. The records from the MOPH would include patients from any part of the country and from all religious and socioeconomic backgrounds.

The data was entered on SPSS, followed by data cleaning to have more reliable results.

10. To summarize, the records' limitations of this preliminary study will include one or more of the following:

a. Problems in tracing, for the period under consideration, the patients' records, especially the bill and the discharge summary. Most of the information relate to the Req. forms, which precede hospitalizations.

b. Missing information: the data was not specified in many fields, such as length of stay, the symptoms, the underlying diseases, the previous cardiac surgery, the ejection fraction, the tests performed (stress test, EKG).

There was not enough information on the pathology (location and severity of the occlusion), and the part of the bill paid by the patient.

d. Some items were not available at all, such as the smoking and exercise patterns, the weight and height, the occupation, the marital status.

e. Errors in data entered in the records.

f. Poor underlying disease coding.

g. Difficult tracing of repeated hospitalizations for surgical and medical treatment. No data on complications during the hospitalizations.

11. MedNet data were also examined to assess possible additional clues useful for answering relevant questions.

Provisional results

1. The number of coronary surgeries enlisted from the MOPH req. in forms, bills and discharge summaries were as follows:

[illegible]

[illegible]	[illegible]	[illegible]
CABG	***466***	***57.8%***
PTCA without stent	***8***	***1%***
PTCA with 1 stent	***287***	***35.6%***
PTCA with 2 stents	***45***	***5.6%***
Total	***806***	***100%***

2. The age distribution of the MOPH patients' requests is shown below.

[illegible]

[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		
26 → 50	*52*	*13%*	*2*	*50%*	*59*	*23.5%*	*10*	*26.3%*	*123*
51 → 75	*323*	*81%*	*2*	*50%*	*173*	*68.9%*	*25*	*65.8%*	*523*
76 → 95	*24*	*6%*	*0*	*0%*	*19*	*7.6%*	*3*	*7.9%*	*46*
Total	*399*	*100%*	*4*	*100%*	*251*	*100%*	*38*	*100%*	*692*

(114 missing ages)

Source: MOPH Req. In forms

About 82% of all patients are of age 50 and above, in line with international experience. These findings confirm what is seen in the medical literature indicating that most individuals under 50 years of age do not need a cardiac procedure and those over 76 years of age are too risky for these procedures.

3. The answer to the very first question of appropriateness of the coronary surgical indications could not be achieved at national level. The retrospective questionnaire was in fact requiring clinical and diagnostic data that other public and private insurance and the same 20 operating centers for coronary surgery, would not immediately provide.

Such information, at least in part, were reported in the MOPH coverage request forms as support evidence of the need for surgery provided by the Cardiac Commission.

The MOPH, through its Heart Surgery Committee, authorizes the coverage of the surgery and hospitalization on the basis, essentially, of the angiography evidence provided on recorded tape by the proponent physician. If approved, the patient shall obtain a final approval for coverage from the Visa Center. Physicians would usually add to the prescription very scanty clinical information or no information at all on the history, progress, diagnostic and clinical tests, underlying diseases of the patients. Discharge summaries would have been useful in tracing (if available and linked to hospital records) more about the cases on the account of the MOPH.

The authorizations, therefore, are based essentially on angiography. Comparing this only evidence with known guidelines would, in the case of the MOPH records, indicate the appropriateness of decisions on whether or not perform the surgery.

The survey has used as reference the Guidelines from the American College of Cardiology / American Heart Association Task Force on Practice Guidelines (1999) the most known and followed in USA. (http://www.acc.org/clinical/guidelines/).

These Guidelines are deemed, if anything, to be biased on the side of low surgical threshold and give wider indications for coronary operations.

The Guidelines apply rather better for CABG than for PTCA, as the decision for the former is solidly based on pathology evidence of the type and extent of coronary obstructions, while PTCA may leave more room for clinical evidence.

3.1 There was, therefore, no suggestion, from the data available, of incorrect or overstretching of indications. Compared with the above Guidelines' decision-tree, the requests for coverage (and therefore the approval of the Committee) were correctly based on angiography results. We obviously assume that angiography tapes provided to the Committee are not "gamed".

Though there were, apparently, misallocations between CABG and PTCA (see below), strict pathology evidence was compelling for CABG, though to less extent for PTCA.

However, if one takes the approach of the New Zealand National Advisory Committee on Health (and those professionals who worked on the issue), a score of 25 and more (their threshold for operation) cannot be given on pathology basis on any single or multiple obstructions (even three vessel disease), except in the case of left main obstruction and of a three vessel including the proximal left anterior descending artery (more or equal to 90% obstruction). What they say is that the 25 score could be reached only after clinical and other tests are scored and added. *(D. C. Hadorn and A. C. Holmes- BMJ 1997;314:135).*

It is worth stressing that the Lebanese Committee's decisions would rarely be based on the assessment of other clinical and tests elements, primarily because of the

insufficient elements provided by the treating doctors. By the NZ standard a large number of the Lebanese patients, in absence of other clinical data, would not have been allowed operation. However, if one considers only those cases for which clinical data are provided, the final decision appears correct.

3.2 Angiography seems to be the first and only diagnostic mean, in many MOPH cases. The same is said to happen for many patients nationwide. Doctors rely on the pathology evidence for decisions about the surgery. This is not, in itself, a matter of controversy if it is done on patients at higher risk (age, sex, underlying diseases) and other clinical evidence of coronary troubles (like angina, myocardial infarct).

The expanded use of angiography as first and basic diagnostic tool may yield a larger number of "clinical silent" pathologies, at earlier stage of coronary obstructions. They would be otherwise missed or seen later. Moreover, the angiography can be used as only indication for surgery, inflating the number of those with no clinical signs. The prognostic value of angiography in these low risk patients is doubtful.

Countries with less reliance on angiography as first diagnostic and prognostic tool may have lower disease population rates and rate of operations. Indeed, the rate of CABG and PTCA in many countries is correlated to the rate of angiographies performed.

If patients were screened clinically and a decision flow were used, less invasive diagnostic technique (e.g. stress test) would find a more important role in selecting patients for surgery, medical treatment or change in lifestyle. This would prevent non-symptomatic cases to undergo surgery.

The rate of coronary angiograms is not known in Lebanon (the range in Europe in 1995 goes from 2/10000 to 47/10000 in Iceland, most around 15/10000). Equally unknown is the rate of other non-invasive tests (which shall not be used as general population screening). Anecdotic evidence from records of one major hospital suggests that the rate of angiography was 1.5 against coronary surgery. If an extrapolation of this factor is done to the number of 2001 coronary operations (Asmar), it is possible that Lebanon specialists are over-utilizing such technique. (An estimated rate of 20/10000).

3.3 An indirect evidence which may, in fact, exclude the hypothesis of over-indication (pathology un-warranting a surgery) or expanded angiography tests (earlier test), was the age distribution of the MOPH patients. (**Table** above).

Most of the operations are performed in seniors. If there was a low threshold on indications or too high number of earlier cases, we most likely shall see more of younger patients operated.

3.4 If, therefore, we can assume that, nationwide, the indications for one or another of coronary surgery are quite appropriate or the positive angiographic cases are coming from at risk or symptomatic, as the data of the MOPH seem to indirectly suggest, is the high age specific rate of operations indicating an epidemic of coronary diseases in Lebanon?

3.5 There might be, however, another possibility: the MOPH could have stricter requirements for accepting a patient/doctor request. In a word the MOPH may be more virtuous than other payers' behavior. In this sense they may not be representative of the overall indication habits in the country.

Rather than the disease prevalence, the national "excessive trend" may be due to less than optimal application of guidelines and diagnostic tools among other payers (NSSF, mutual funds, private insurance), especially when PTCA is concerned. Again, at the moment, patients' pathology and clinical data from other payers and hospitals are not available.

3.6 The safest assumption at this point is that Lebanon may face an epidemic of underlying diseases such as diabetes. The prevalence of such risk factors is reported to be noticeable.

The main lesson, therefore, could lead to the statement that if not enough is done to control risk factors and diseases, which on the long run cause much of the coronary complications, recourse to coronary surgery is bound to increase.

This is not an easy conclusion without complete data from all providers and/or payers and epidemiological data.

4. On the question of conclusive evidence of preferences for biases towards one or another surgery, there are two points to be assessed: if ratio departs from what is usually seen and if ratio is in disagreement with Guidelines-based indications.

4.1 Out of 806 cardiac surgeries records collected in 5 months from the MOPH, 466 (57.8%) were CABG and the rest PTCA. About 84% of PTCA were with one stent.

Generally speaking international data show a 1/1 ratio between the two procedures. *(e.g. USA 2002 Statistics –American Heart Association).* PTCA is slightly overtaking CABG in recent years.

Substantial departure from these figures in MOPH or other payers would suggest a preference in either direction.

In the case of the MOPH 5-month records and as for the nation-wide figures provided by Dr. B. Asmar, the ratio in the sample seems to be as expected.

The MOPH unbalance between CABG and PTCA cases for 2001, reported by Dr. Khalifeh, may be due to the fact that PTCA has been only recently covered by reimbursement and it is still catching-up on a monthly basis.

4.2 Incitement to opt for PTCA instead of CABG was evident when all cases were compared with the guidelines. Indeed, out of 391 cases that should undergo CABG (Class 1 CABG), there are actually only 273 that did, while the other 118 were approved for PTCA instead of CABG: a 30% misallocation. **(Table 11)**

CABG	*273*
PTCA without stent	*2*
PTCA with 1 stent	*95*
PTCA with 2 stents	*21*
Total	*391*

(415 cases could not be fully assessed through the CABG-classification)
Source: Req. In forms
* Class 1 CABG means the Class to which patients are assigned because of strict need for CABG on the basis of the angiography evidence.

Similar misallocation means that the relative cost-effectiveness of alternative operations may have not be optimally exploited. The decisions seems to be influenced by factors others than disease stage and type.

Reasons for misallocation need further investigation, as it is evident that cost-effectiveness of CABG, for instance, is higher when the risk of death is quite important. If the misallocated PTCA cases were serious (e.g. death was imminent), CABG should have been applied.

The supposed "preference " for one or another of surgical interventions may well stem from supply reasons (doctors may have professional or financial preferences) or simply because of "wrong" assessment of the clinical situation of the patient. PTCA preference may also be explained by the strong incentive associated with a relatively favorable reimbursement (see below).

5. Besides the age distribution, MOPH cases could not be assessed for characteristics such as economic, occupational and educational background. These would have been factors especially important to evaluate access to care.

Patients' place of origin was, however, available. A regional distribution could, therefore, be described. (see below table) and considerations on the access to surgery could be made.

5.1 Access is a basic citizens' right, everywhere in the world. Besides this equity or solidarity principles, access may have a concrete impact on expenditures and survival of patients. Moreover, quality of the health care system is associated to the extent to which a sick citizen can treat his/her medical condition.

Access can be limited by financial reasons, cultural, educational (knowledge), social reasons, and physical reasons.

The first of these factors may seem irrelevant in case of MOPH patients, as they will be covered for much if not all the hospital bill.

However, no studies have sufficiently demonstrated that copayments and other additional expenses (some not officially accounted for) do not play a role on restraining access to hospital care. Indeed, they, for starting, may delay self-referral to the specialists and subsequent decisions, even after surgery is performed.

Hospitalization may in fact entail hidden costs besides the simple flat rate and the co-payments.

Some general evidence of financial difficulties faced by patients in hospitalizations can be drawn from the Household Survey 1999 (table 5.41 HS page 226). Almost 70% of those in need of hospitalization in the previous 12 months would renounce for financial reasons.

5.2 Also relevant to the question of access are cultural factors in a context where procedures for authorization may be too complicated for the most and communications with doctors scanty and difficult because of educational and cultural barriers. (this seems to be the case as reported again by the HS data on the reasons for renouncing to hospitalization).

Though dedicated doctors will usually understand medical worries and other patients' problems, it is quite common complain the fact that doctors are "too busy" and quick in dismissing them and decisions are taken on stereotypes on the validity of patients' medical history. Illiterate and poor people may go under-served and under-treated. This would not be a surprise. Studies around the world have exactly shown these medical biases.

No specific studies are available on the subject in Lebanon. This study could not produce any data on this matter: a very regrettable situation, given the importance that authorities across the world currently give to the issue.

5.3 Physical distance from the place of administrative arrangements may discourage patients. Moreover, the distance from the actual hospitalization or medical diagnosis and testing, may affect also the appropriateness of care and in particular outcome and survival. **THE LATTER BECAUSE CONTINUITY OF CARE WOULD NOT BE ENSURED AFTER SURGERY AND THE FOLLOW-UPS WOULD BE MADE DIFFICULT.**

About 13% of patients were from Beirut, followed by Tripoli (11%). About 0.1% are from Bekaa, 0.4% from Bcharreh, and 0.7% from Rashaya. (114 missing values of the leaving place or 14.1%). **(Table 12)**

Against these figures, 32 % of the hospitalizations destinations were requested in the Beirut region, 10% in the Bekaa, 24% in Mount Lebanon, 20% in the North and 15% in the South.

Table 12. [illegible] hospital place

[illegible]	[illegible]										Total
	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		
Beirut	*84*	*32.9%*	*5*	*6.6%*	*8*	*4.1%*	*1*	*0.6%*	*9*	*7.6%*	*107*
Bekaa	*23*	*9%*	*61*	*80.3%*	*20*	*10.3%*	*0*	*0%*	*6*	*5%*	*110*
Mount Lebanon	*66*	*25.9%*	*5*	*6.6%*	*116*	*59.8%*	*1*	*0.6%*	*9*	*7.6%*	*197*
North	*14*	*5.5%*	*1*	*1.3%*	*19*	*9.8%*	*126*	*77.8%*	*0*	*0%*	*160*
South	*30*	*11.8%*	*1*	*1.3%*	*13*	*6.7%*	*1*	*0.6%*	*73*	*61.3%*	*118*
Missing	*38*	*14.9%*	*3*	*3.9%*	*18*	*9.3%*	*33*	*20.4%*	*22*	*18.5%*	*114*
Total	*255*	*100%*	*76*	*100%*	*194*	*100%*	*162*	*100%*	*119*	*100%*	*806*

Source: Req. In forms

If the address is the actual living place and not the place of origin, the table suggests a high mobility across the country, especially towards the well-known Beirut hospitals. (57% of all hospitalizations take place in Beirut and the close Mount Lebanon, while patients originating from the same places are 39%).)

Reasons for such discrepancies may be the patients' perception about quality of the treating centers or the possibility that patients may actually follow the doctors, themselves very mobile in their practice.

Given the fact that hospitals performing cardiac surgeries are available in all the country's regions, the above raises the question on whether hospitals (at least the

major regional ones) are comparable or not in terms of quality, in the eyes of patients and treating doctors, and whether this can be objectively assessed.

If the quality is not the same across the centers, one shall consider why the flat rate applied by the MOPH is the same across performing centers. If the quality is comparable across the centers, the MOPH shall refer patients to the best available center in one region and contracting only with them.

The main issue at stake in the patients' displacement is that compliance and follow-ups may be jeopardized by the distances. Survival and outcome do not depend only on the quality of surgery. Complications and mortalities are directly related to the post-surgery follow-ups and even to the pre-surgery frequency of contacts (a better assessment of the potential complications that need to be counteracted when patients are operated).

5.4 Another aspect raised in many papers and studies across the world concerns the gender's equality of access to coronary surgery and CVD diagnosis and treatments. Generally speaking males outnumber females by a factor from 1 to, maximum, 2 (USA -American Heart Association: ratio of 2).
The gender's distribution in the Lebanese sample was somehow noticeable: the number of all coronary operations on males was 2.5 times more than that on females (at the time, 574 against 232). (**Table 13 + missing cases for age).** Unbalance is especially evident for CABG operations. Such factor is higher than in many other countries.
Considering that the unbalance is viewed everywhere as a sign of under-diagnosis of coronary disease in women, Lebanon seems to be on the highest side of prevalence of discrimination factors for women' access.

Table 13: 5-months MOPH records by age, sex and type of coronary surgery

Cardiac Surgery Technique	*Age Intervals*	*Males*		*Females*		*Total*
CABG	***26 → 50***	*46*	*15.9%*	*6*	*5.5%*	*52*
	51 → 75	*227*	*78.5%*	*96*	*87.3%*	*323*
	76 → 95	*16*	*5.5%*	*8*	*7.3%*	*24*
Total		*289*	*100%*	*110*	*100%*	*399*
PTCA without stent	***26 → 50***	*2*	*50%*	*0*	*0%*	*2*
	51 → 75	*2*	*50%*	*0*	*0%*	*2*
Total		*4*	*100%*	*0*	*100%*	*4*
PTCA with 1 stent	***26 → 50***	*50*	*29.1%*	*9*	*11.4%*	*59*
	51 → 75	*116*	*67.4%*	*57*	*72.2%*	*173*
	76 → 95	*6*	*3.5%*	*13*	*16.5%*	*19*
Total		*172*	*100%*	*79*	*100%*	*251*
PTCA with 2 stents	***26 → 50***	*10*	*40%*	*0*	*0%*	*10*
	51 → 75	*14*	*56%*	*11*	*84.6%*	*25*
	76 → 95	*1*	*4%*	*2*	*15.4%*	*3*
Total		*25*	*100%*	*13*	*100%*	*38*

(114 missing cases for age)
Source: Req. In forms

5.5 The Table also shows that 78% of male patients and 87% of females, undergoing CABG, are between the ages of 51-75. Same distributions can be seen for PTCA with one or two stents.

Women do tend to have a higher operation age. That is usually viewed as the indication for the late development of coronary degeneration (most believe that pre-menopause in women is protective against the disease). However given the age, women shall arrive usually with many other complications and in worst conditions than man.

Instead, women seem to arrive to the surgery with similar or even better clinical conditions than men (**Table 14-15),** a situation which would support the idea of a possible "self-selection" of female patients served by the MOPH. In a word female patients may be fewer than expected and not quite the most serious cases in need of a surgery.

CABG	*0*	*62*	*21.5%*	*18*	*16.4%*	*80*
	1	*75*	*26%*	*28*	*25.5%*	*103*
	2	*77*	*26.6%*	*39*	*35.5%*	*116*
	3	*50*	*17.3%*	*18*	***16.4%***	*68*
	4	*18*	*6.2%*	*7*	***6.4%***	*25*
	5	*5*	*1.7%*	*0*	***0%***	*5*
	6	*2*	*0.7%*	*0*	***0%***	*2*
Total		*289*	*100%*	*110*	*100%*	*399*
PTCA without stent	*0*	*1*	*25%*	*0*	***0%***	*1*
	1	*1*	*25%*	*0*	***0%***	*1*
	2	*2*	*50%*	*0*	***0%***	*2*
Total		*4*	*100%*	*0*	*100%*	*4*
PTCA with 1 stent	*0*	*50*	*29.2%*	*24*	*30.4%*	*74*
	1	*87*	*50.9%*	*42*	*53.2%*	*129*
	2	*24*	*14%*	*12*	*15.2%*	*36*
	3	*8*	*4.7%*	*1*	*1.3%*	*9*
	4	*1*	*0.6%*	*0*	***0%***	*1*
	5	*1*	*0.6%*	*0*	***0%***	*1*
Total		*171*	*100%*	*79*	*100%*	*250*
PTCA with 2 stents	*0*	*8*	*32%*	*4*	*30.8%*	*12*
	1	*7*	*28%*	*6*	*46.2%*	*13*
	2	*8*	*32%*	*2*	*15.4%*	*10*
	3	*2*	*8%*	*1*	*7.7%*	*3*
Total		*25*	*100%*	*13*	*100%*	*38*

(115 missing cases)

Table 15: 5-months MOPH records by gender, type of coronary surgery and cardiac functions

Cardiac Surgery Technique	Ejection Fraction Intervals	Male		Female		Tot.
CABG	***Less than 50%***	*25*	*27.2%*	*5*	*18.5%*	*30*
	50% → 70%	*56*	*60.9%*	*18*	*66.7%*	*74*
	More than 70%	*11*	*12%*	*4*	*14.8%*	*15*
Total		*92*	*100%*	*27*	*100%*	*119*
PTCA with 1 stent	***Less than 50%***	*10*	*26.3%*	*1*	*6.3%*	*11*
	50% → 70%	*22*	*57.9%*	*13*	*81.3%*	*35*
	More than 70%	*6*	*15.8%*	*2*	*12.5%*	*8*
Total		*38*	*100%*	*16*	*100%*	*54*
PTCA with 2 stents	***50% → 70%***	*1*	*100%*	*1*	*100%*	*2*
Total		*1*	*100%*	*1*	*100%*	*2*

(631 missing cases)
Source: Req. In forms

5.6 The gender discrimination towards diagnostics and treatments for CHD is a subject of contentious debate in many industrialized countries.

Mortality and morbidity rates for CHD are everywhere almost similar among the sexes, even when age-standardized (women survive longer). In UK the number of males living with a CHD are estimated at about 1.4 million, while females about 1.2 million. *(http://www.dphpc.ox.ac.uk/bhfhprg/stats/2002/2002)*. Deaths rates from CHD were slightly higher in males than females, but by a marginal factor of 0.3. *(UK ONS 2001)*.

International literature points out that being female is a risk factor in itself and women are subject to more complications and fatality from coronary obstructions (one of the reasons reported is the smaller diameter of coronaries). Females are considered by cardiologists more at risk of death, when their coronaries are affected: being a woman is, de facto, considered to be a risk factor for developing CHD, as age, smoking…

Moreover, women tend to present themselves for operations at a higher age and therefore with more extensive damages, and complications.

Unless a dramatic hypothesis is made about a very low prevalence of the combined risk factors among women (hypertension, smoking, obesity, physical activity, cholesterol, lipids, diabetes, hormonal contraceptives), compared to their male counterparts (except for smoking everything else may be quite worst in women), one can assume that female patients find substantial discrimination on access to cardiac surgery a bit everywhere.

This can be the result of biases in diagnostics. In fact, the rate of angiography and subsequent operations seem to be, internationally, lower among women than men. (Sweden reports 2 times more male angiography than female: *Dr. Benqt Brorsson: Personal communication. 2002).*

Less investigations lead to less cases and later recourse to surgery.

The lower rate of surgery among females is something that seems to decrease in recent years. It has been seen particularly in the early ages of CABG operations in the industrialized countries. At the present the American College of Cardiology (*http://www.acc.org/clinical/guidelines/bypass/bypass.pdf*) has strongly reiterated that:

"Coronary bypass surgery should therefore not be delayed or denied to women who have the appropriate indications for revascularization. "

In conclusion, despite the fact that the burden and absolute risk of coronary disease is roughly similar in the genders, it is possible that many factors will finally lead to fewer interventions for CABG and PTCA in women. In the MOPH sample, an additional indication for discrimination is the fact that even those women who are operated seem not to be the most in need.

6. When the study was first proposed, quality of care was indicated by prominent Lebanese cardiologists and cardiac surgeons as main concern.

Highflying specialists and top cardiac centers were voicing their disappointment at so many doctors and facilities performing few operations, with scarce resources, in remote places. Though reflecting vested interests and, to some extent, overstated, the claims were understandable. Answering such questions, however, would pose special problems.

6.1 Quality of care is a vast issue that entails number of aspects related to all phases of care, some of which are far apart from the actual point of surgery. Quality may have to patients a different meaning from what professionals assume to be.

The common issue, however, for anybody is the impact of care on the health status of the patients (such as complications, health improvements and survival).

Indeed complications (e.g. stroke, pulmonary and renal failures) and deaths during and after the operation, are usually taken as indicators of the appropriateness and quality of coronary surgeries.

It is a matter of fact that none of them could be obtained from the data available on req. in, bills and discharge summary (DS). Complications are not reported. Deaths in hospitals are not always reported in bills or discharge summary, because they may entail reduced payments according to the time of death during the hospitalization or, most likely, because of hospitals' and/or physicians' concerns for bad reputation.

Post-surgery re-hospitalization on emergency basis (an indication of complications) could not be traced back at the moment because of absence of link between two subsequent hospitalizations, the indications for emergency. Readmission will call for a new req. in form number, which is the basis for storage.

6.2 Although all disappointing, the above would clearly show the way to improve data collection and exploitation. Discharge summaries are particularly poorly filled in and followed-up. The prospective study, based on the req. in form, will allow a link between subsequent hospitalizations only if a common code is used and record storage based on such code. Emergency or non-emergency hospitalization should be recorded.

6.3 Post-surgery survival would be better evaluated by direct follow-up. In this sense a call to a sufficient number of selected patients and families, as long as any identification is available, would be the major option. Even for the address of patients, however, researchers would rely on an improbable telephone number, as addresses are not indicated. National deaths certificates do not report any data on the cause of demises.

6.4 Complication and fatality rates, allowing for severity and other factors, linked to CABG and PTCA surgeries are a powerful indication of good standard of care. This information shall be collected on regular basis and recorded in a national register.

Mortality following cardiac surgery varies between places and hospitals, depending on two factors: patients' severity of disease and care capabilities.

In the UK, the average 30-day mortality is 3 /1000 in case of CABGs *(www.doh.gov.uk/nhsperformanceindicators/2002/hadca_d.html)*; it varies between regions from 1 to 5 /1000 (standardized rates).

Researches have shown that such variability, has a strong correlation to the degree of good practice and standard followed by the hospitals and that this is associated to the volume of practice (as much as 5 times more). *(http://www.acc.org/clinical/guidelines/bypass/bypass.pdf)*.

This is actually true for any type of advanced surgery and indeed for any medical practice *(Association of American Medical Colleges- Fact sheet February 26-1998 Vol2N3).*

The volume of activities for both, therefore, can be taken as a proxy indicator of mortality and complications associated to level of quality (if correctly assessed on the basis of the case-mix).

The American College of Cardiology concludes that: *"In summary, studies suggest that survival after CABG is negatively affected when carried out in institutions that perform fewer than a threshold number of cases annually. Similar conclusions have been drawn regarding individual surgeon volumes"*. (ACC/AHA Guidelines for CABG Surgery October 1999:1262–347).

The figures accepted are 200 CABG per year per hospital and about 120 for surgeons. Likewise and according to the same guidelines, there should be at least 400 PTCA by center per year and 75 PTCA by operator per year.

Though these are somehow arbitrary cut-off points, they do make a point: the more you do the better it is for the patient.

6.5 Projections on the data available can give a rough idea of such volume of activities. The number of CABG and PTCA per hospital and doctor is important.

6.5.1 If we consider correct Dr. Asmar's figures (2765 PTCA in 20 centers) we would have 138 PTCA procedures per hospital per year at national level. This is, in itself, clearly far from what is expected (400/p.c/year).

The number of treating centers for the MOPH is assumed to be 20 (in the sample 19). Dr. Khalifeh's caseload for 2001 was 958 PTCA, that is around 48 PTCA procedures per hospital/per year done on the account of the MOPH, much lower than the national average.

6.5.2 It is not possible to assume national averages, as the number of physicians, performing PTCA, is unknown.

In the case of MOPH, 78 physicians were proposing or actually identified as carrying PTCA (proposing cardiologists and surgeons were most likely those who would actually carry the operations) in the 5-month period. Assuming that physicians are the same all year round and on the basis of 958 PTCA, we would have a rate of 12 procedures per physician per year, a ludicrous average. The rate would be even worse if the total number of doctors should be higher than 78.

The possible very low number of PTCA done by each treating physician for the MOPH, does raise questions about the experience and therefore the skills of providers. Shall the MOPH accept to cover PTCA for any proponent physician, without further questions on the size of their practice?

6.5.3 In the case of CABG, national averages based on Dr. Asmar's data would give a figure of 123 CABG per center, still lower than the expected 200 per center/per year.

The MOPH would have a yearly figure of 76 operations per center done on the account of the MOPH (1284 cases, obtained from Dr. Khalifeh for the year 2001, divided by a minimum of 17 contracted centers).

6.5.4 Also in the case of CABG it is not possible to assume national averages, as the number of physicians performing the procedure is not known.

The MOPH sample reports 33 physicians requesting or performing CABG. Even assuming that only these 33 physicians were carrying the all number of CABG reported by Khalifeh (1284), this would give an average of 39/pd/py, again far shorter than the standard (120 /pd/py).

6.5.6 Based on the above assumptions, the following can be pointed out:

a- The volume of operations per center at national level is low. The problem is particularly severe for PTCA operations.

b- For physicians, national averages could not be calculated due to the absence of data on the number of performing doctors.

c- As for the operations specifically proposed or carried on the account of the MOPH, the average of both surgeries per center is still lower than the national

average: that is the MOPH spreads its cases among all the centers available in the country.

d- The majority of physicians performing or proposing coronary surgeries to the MOPH would probably carry on its account very few operations a year.

The Centers' low volume for CABG and PTCA is, therefore, an important issue both at national level and for the MOPH. The number of centers seems to have recently increased to 22.

The situation, therefore, may tend to become worse if the demand for coronary surgeries is not increased dramatically. Indeed, this may give incentives to doctors and administrations to increase the number of operations for cost recovery and profits reasons.

It is not possible to know the number of operations per physician at national level (that is a good reason for having a national register). For the MOPH, even with the optimistic view that the number of physicians will be, over the year, the same as the 5-month sample number (78), the rate per physician would remain low.

Obviously, each of them may have plenty of other operations to carry on the account of other payers. However, this may not be always the case. There is no clear reason on why the MOPH shall be prevented from contracting few centers and physicians, selected on the basis of geographical access and best quality scores. That would ensure them the needed volume to guarantee safe care.

6.6 Recourse to re-operations may also indicate poor quality and/or financial incentives to increase the numbers of readmissions.

The rate of such repeated interventions of the same or different type, over a period of say 1 or 2 years, are unknown.

6.6.1 **Table 16** is based on only 43 cases for which information about previous cardiac surgery was available. Many records may have not reported a previous intervention. The number suggests a repetition rate of 6%, possibly an underestimate.

6.6.2 From the data it seems also that, when re-intervention is required, previously CABG patients may end up with another CABG 29% of the time and that PTCA would end up to have a CABG in 41% of the cases.

If this is the case, in fact, then one shall think that also CABG (as PTCA) is not a conclusive intervention in many patients. Indeed, operations could have been repeated

because of previous failure, or the disease progression to a new coronary or the postponing of an existing indication for a second operation.

However, information on the status of coronaries in previous operations is not available, neither if the operations have been repeated on the same artery or a new one. Records links to previous operations are impossible for lack of filing or automatic retrieval among different records, in different times (the major problem being the lack of a unique identifier).

Also the issue of having a CABG after a PTCA is particularly important because it could suggest poor assessment of the need for CABG as first choice. This point is somehow suggested by the fact that less CABG are done than indicated by the guidelines, always in favor of the PTCA procedure (which could be tied to the incentives of the level of reimbursement).

PTCA after a CABG is a more understandable situation. A PTCA after another PTCA leads also to the suspect of financial incentive to postponing intervention due to the flat rate effect.

Table [illegible] Type of surgery [illegible]

	[illegible]				[illegible]
[illegible]	[illegible]		[illegible]		
CABG	*7*	*29%*	*17*	*71%*	*24*
PTCA	*7*	*41%*	*9*	*59%*	*17*
CABG+PTCA	*0*	*0%*	*2*	*100%*	*2*
Total	*14*		*29*		*43*

(763 missing cases: no previous operations reported)
Source: Req. In forms

6.6.3 In short, whether coronary operations indications as for the MOPH seems to be correct, choice between type and extent of operation is left largely to physicians' discretion, which may not be based on sound medical assessment of the patients' need.

All the above may indicate different things: poor diagnostics and prognostics, poor quality of surgery, financial incentives to repeat, and poor/worsening patient health for insufficient control of the underlying diseases.

Indeed, if confirmed at national level, repetitions may well be a basic reason for the high number of interventions in Lebanon (and the growth rate in the MOPH PTCA cases).

6.7 Interesting is also the fact that the highest number of PTCA referrals to the Committee and number of operations were made by cardiologists and that Committee (mostly cardiologists) took for granted the evidence for the surgeries provided by the cardiologists. This may explain some of the above mis-matchings (CABG vs. PTCA), as cardiologists would tend to prescribe PTCA.

Though the assessment of the clinical situation is better performed by a cardiologist, assessment on the "type of surgery" to be carried out, the "risk" associated to each patient operation, and the same clinical conditions would benefit from a referral to a surgeon. We think, therefore, that cases by cardiologists shall have a supported evidence of assessment by a surgeon.

It is also odd that in some cases the Committee has overturned a proposal for a type or another of surgeries, given the fact that the "treating" doctors is supposed to have a better understanding of the kind of intervention the patients need.

6.8 It is a matter of surprise that few data were reported about underlying diseases and cardiac symptoms **(Table 17-18-19)**.

Table 17: MOPH 5-month records: type of surgery and underlying diseases:

Underlying Disease	*CABG*		*PTCA with 1 stent*		*PTCA with 2 stents*		*Total*
Diabetes	*24*	*55.8%*	*7*	*38.9%*	*0*	*0%*	*31*
Hypertension	*8*	*18.6%*	*1*	*5.6%*	*1*	*50%*	*10*
Dyslipidemia	*3*	*7%*	*2*	*11.1%*	*1*	*50%*	*6*
Diabetes+Hypertension	*4*	*9.3%*	*3*	*16.7%*	*0*	*0%*	*7*
Diabetes+Dyslipidemia	*1*	*2.3%*	*2*	*11.1%*	*0*	*0%*	*3*
Hypertension+Dyslipidemia	*1*	*2.3%*	*2*	*11.1%*	*0*	*0%*	*3*
Diabetes+Hypertension+Dyslipidemia	*2*	*4.7%*	*1*	*5.6%*	*0*	*0%*	*3*
Total	*43*	*100%*	*18*	*100%*	*2*	*100%*	*63*

(743 missing cases)
Source: Req. In forms and DS

Table 18: MOPH 5-month records: type of surgery and cardiac symptoms :

Symptoms	*CABG*		*PTCA without stent*		*PTCA with 1 stent*		*PTCA with 2 stents*		*Total*
Unstable angina	*118*	*25.3*	*1*	*12.5%*	*64*	*22.3%*	*10*	*22.2%*	*193*
Effort angina	*19*	*4.1%*	*1*	*12.5%*	*13*	*4.5%*	*1*	*2.2%*	*34*
Angina pectoris unspecified	*88*	*18.9%*	*0*	*0%*	*56*	*19.5%*	*14*	*31.1%*	*158*
Myocardial infarction	*41*	*8.8%*	*2*	*25%*	*60*	*20.9%*	*5*	*11.1%*	*108*
Total**	*466*	*100%*	*8*	*100%*	*287*	*100%*	*45*	*100%*	*806*

** The total includes the missing values. Source: Req. In forms and DS

Less than 50%	*30*	*25.2%*	*11*	*20.4%*	*0*	*0%*	*41*
50% → 70%	*74*	*62.2%*	*35*	*64.8%*	*2*	*100%*	*111*
More than 70%	*15*	*12.6%*	*8*	*14.8%*	*0*	*0%*	*23*
Total	*119*	*100%*	*54*	*100%*	*2*	*100%*	*175*

(631 missing cases)
Source: Req. In forms

The absence of this data would lead to poor assessment of each patient. In turn, this may induce misallocations between types of operations as well as cause re-interventions and face unexpected complications during the operations.

It has also to be remarked that some basic diagnostic means, like stress tests and ECG, are not at all considered by the Committee and by the same proponent doctors.

6.9 Important assumptions on quality of CABG and PTCA can be based on the length of stay (**Table 20**). The LOS is considered by many as an indicator of quality as it can be associated to surgical complications. Caution is needed as LOS shall be standardized against seriousness of disease, a technique possible when age, sex and clinical data on cardiac functions, underlying diseases and patients' health status are available. This was not possible in the sample.

1 → 8	*221*	*67.4%*
9 → 16	*101*	*30.8%*
17 and more	*6*	*1.8%*
Total	*328*	*100%*

(138 missing cases)
Source: DS and bills

1 → 4	*221*	*92.9%*
5 → 12	*15*	*6.3%*
13 and more	*2*	*0.8%*
Total	*238*	*100%*

(102 missing cases)
Source: DS and bills

As it is evident, CABG has an average LOS of 8 days and PTCA of 2 days (as for the flat rate indication). However, particularly in the case of CABG, are not few those who are hospitalized for more than the average duration. These are those who are suspected to have complications. Age and gender do not seem to influence the LOS for either procedure.

Interesting enough is the fact that a flat rate is paid to cover a maximum stay of 8 days for CABG and 2 days for PTCA. Excess hospital stays are not paid for.

How the hospitals and doctors would recover the extra costs is a matter of speculation. (See the below point)

7. Besides quality, another concern to be addressed by the study was the issue of excessive charges. We could not have the actual settlement of the bills. On the other side, it must be said that the current flat rates system **(Table 21)** is exactly aiming at preventing overspending.

Table 21: Flat rates of the MOH for cardiac surgery procedures in Lebanese Pounds:

Cardiac Surgery Procedure	*Total Flat Rate (100%)*	*Part Paid by the MOH (85%)*	*Part Paid by the Patient (15%)*
CABG	***9,400,000***	***7,990,000***	***1,410,000***
PTCA without stent	***4,500,000***	***3,825,000***	***675,000***
PTCA with 1 stent	***6,500,000***	***5,525,000***	***975,000***
PTCA with 2 stents	***8,500,000***	***7,225,000***	***1,275,000***

As we do not have the actual expenditures we had to speculate about overbilling, rather than overspending.

7.1 Providers tend in more than 30% of the CABG bills to request higher settlements than the flat rate payable by the MOPH would allow **(Table 22)**.

Table 22: Frequency distribution of MOPH bills for CABG:

Intervals of CABG bills	*Frequency*	*Percent*
Lowest → 7,989,999	***44***	***13.2%***
7,990,000	***179***	***53.6%***
7,990,001 → 9,400,000	***99***	***29.6%***
9,400,001 → Highest	***12***	***3.6%***
Total	***334***	***100%***

As we can be seen from the table, 13.2% of the bills for CABG are even less than the MOH portion of the total flat rate, 29.6% are higher than the MOH portion of the total flat rate, and 3.6% are even higher than the total flat rate.

7.2 The table shows that 35.8% of the bills for PTCA with one stent are higher than the MOH flat rate and **18.4% are even higher than the total flat rate. (Table 23)**

Table 23: Frequency of MOH bill for PTCA With One Stent:

Intervals of PTCA With 1 Stent bills	*Frequency*	*Percent*
Lowest → 5,524,999	*1*	*0.5%*
5,525,000	*91*	*45.3%*
5,525,001 → 6,500,000	*72*	*35.8%*
6,500,001 → Highest	*37*	*18.4%*
Total	*201*	*100%*

7.3 About 12% of the bills for PTCA with two stents are less than the MOH flat rate, 52.9% are higher than the MOPH flat rate **and 2.9% are even higher than the total flat rate. (Table 24)**

Table 24: Intervals of MOH bill for PTCA With Two Stents:

Intervals of PTCA With 2 Stents bills	*Frequency*	*Percent*
Lowest → 7,224,999	*4*	*11.8%*
7,225,000	*11*	*32.4%*
7,225,001 → 8,500,000	*18*	*52.9%*
8,500,001 → Highest	*1*	*2.9%*
Total	*34*	*100%*

7.4 In summary, the highest number of bills above the **total** flat rate is found among the bills for PTCA with one stent, though there is a tendency in almost all types of surgery to bill more than the flat rate payable by the MOPH and even more than the total possible flat rate (MOPH plus patients' copayment).

Why providers submit bills in excess of flat rates scheme, knowing that the MOPH would pay only according to the latter, is also a matter of speculation.

7.5 It may also be a matter of interest to examine the distribution of bills by hospital **(Table 25)**.

7.5.1 As we can see from the table below, St. Charles, Hammoud, Sahel and Mounla are those centers more inclined to bill over the usual flat rate payable by the MOPH.

Paradoxically, there are also some cases where the MOH bill is **less** than the flat rate (44 cases or 13% less than LL7,990,000), all of which were hospitalized at the Sahel Hospital.

Bad accounting, trade-off with other overbilling?

Table 25: CABG bills' distribution by hospital:

Name of Hospital	*Intervals of TPP1 for CABG*								*Total*
	Lowest → 7,989,999		*7,990,000*		*7,990,001 → 9,400,000*		*9,400,001 → Highest*		
AUBMC			*21*	*11.7%*					*21*
Centre Hospitalier du Nord			*1*	*0.6%*	*14*	*14.1%*			*15*
Complexe Hospitalier du Sud			*5*	*2.8%*					*5*
El-Nini			*8*	*4.5%*	*5*	*5.1%*	*1*	*8.3%*	*14*
Hammoud			*12*	*6.7%*	*23*	*23.2%*			*35*
Hotel-Dieu de France			*19*	*10.6%*			*1*	*8.3%*	*20*
Khoury General Hospital			*9*	*5%*	*12*	*12.1%*			*21*
Mounla					*14*	*14.1%*	*5*	*41.7%*	*19*
Mount Lebanon Hospital			*3*	*1.7%*					*3*
Notre-Dame des Secours			*23*	*12.8%*	*10*	*10.1%*			*33*
Notre-Dame du Liban			*11*	*6.1%*	*2*	*2%*	*1*	*8.3%*	*14*
Rizk			*14*	*7.8%*	*1*	*1%*	*1*	*8.3%*	*16*
Sacre-Coeur			*14*	*7.8%*			*1*	*8.3%*	*15*
Sahel	*44*	*100%*					*2*	*16.7%*	*46*
St Charles			*26*	*14.5%*	*18*	*18.2%*			*44*
St George Hospital			*13*	*7.3%*					*13*
Total	*44*	*100%*	*179*	*100%*	*99*	*100%*	*12*	*100%*	*334*

7.5.2 PTCAs w/out stent were not reported because of few cases. As for PTCA with one stent, 72 of them (36%) are above the MOH flat rate. However, there are 37 cases (18%) above the total flat rate.

The majority of these cases were hospitalized at Hammoud, St George, Sahel, CHN, Mounla and Khoury **(Table 26)**.

There is also one case where the MOH bill is less than the flat rate at St George Hospital in Beirut.

Table 26: PTCA With One Stent: MoPH bills by hospital

Hospital	Intervals of bills for PTCA With One Stent								Total
	Lowest → 5,524,000		5,524,000 → 6,500,000		6,500,001 → 7,500,000		7,500,001 → Highest		
AUBMC			*7*	*7.7%*					*7*
Centre Hospitalier du Nord			*2*	*2.2%*	*18*	*25%*			*20*
Complexe Hospitalier du Sud							*4*	*10.8%*	*4*
El-Nini			*9*	*9.9%*	*3*	*4.2%*	*1*	*2.7%*	*13*
Hammoud			*5*	*5.5%*	*14*	*19.4%*			*19*
Hotel-Dieu de France			*12*	*13.2%*			*1*	*2.7%*	*13*
Khoury General Hospital			*16*	*17.6%*	*13*	*18.1%*	*2*	*5.4%*	*31*
Mounla			*3*	*3.3%*	*20*	*27.8%*			*23*
Mount Lebanon Hospital			*1*	*1.1%*	*1*	*1.4%*			*2*
Notre-Dame Maritime			*4*	*4.4%*					*4*
Notre-Dame des Secours			*2*	*2.2%*					*2*
Notre-Dame du Liban					*2*	*2.8%*	*4*	*10.8%*	*6*
Rizk			*10*	*11%*					*10*
Sacre-Coeur			*5*	*5.5%*					*5*
Sahel			*1*	*1.1%*			*16*	*43.2%*	*17*
St Charles			*14*	*15.4%*	*1*	*1.4%*			*15*
St George Hospital	*1*	*100%*					*9*	*24.3%*	*10*
Total	*1*	*100%*	*91*	*100%*	*72*	*100%*	*37*	*100%*	*201*

7.5.3 As for PTCA with two stents, most of the bills are above the MOH flat rate but less than the total flat rate (18 or 53%). There is only one case above the total flat rate (from St George Hospital). **(Table 27)**

There are also 4 cases where the MOH bill is less than the flat rate at Mounla Hospital in the North and Notre-Dame des Secours in Mount Lebanon.

Table 27: PTCA with two stents: MOPH bills by hospital:

Name of Hospital	Intervals of bills for PTCA With Two Stents								Total
	Lowest → 7,224,999		7,225,000		7,225,001 → 8,500,000		8,500,001 → Highest		
Complexe Hospitalier du Sud			1	9.1%					1
El-Nini			2	18.2%					2
Hotel-Dieu de France			1	9.1%					1
Khoury General Hospital			2	18.2%					2
Mounla	2	50%							2
Notre-Dame des Secours	2	50%	2	18.2%					4
Notre-Dame du Liban					3	16.7%			3
Rizk					2	11.1%			2
St Charles			3	27.3%	1	5.6%			4
St George Hospital					12	66.7%	1	100%	13
Total	4	100%	11	100%	18	100%	1	100%	34

7.5.4 While the reason for submitting bills over the flat rate is not understandable as the MOPH would (allegedly) reimburse only according to the flat rate scheme, it was tried to find out any possible link to the LOS. The following tables **(Table 28-29)**, however, seem to reject this hypothesis.

Table 28: CABG bills by LOS:

LOS Intervals	Intervals of bills for CABG								Total
	Lowest → 7,989,999		7,990,000		7,990,001 → 9,400,000		9,400,001 → Highest		
1 → 4			2	1.2%					2
5 → 8	33	75%	107	61.8%	71	71.7%	8	66.7%	219
9 → 12	9	20.5%	49	28.3%	27	27.3%	4	33.3%	89
13 → 16	1	2.3%	10	5.8%	1	1%			12
17 → Highest	1	2.3%	5	2.9%					6
Total	44	100%	173	100%	99	100%	12	100%	328

The majority of CABG cases are hospitalized from 5 to 8 days (219 cases or 67%), followed by 9 to 12 days (89 cases or 27%). The majority of the flat rate exceeding bills comes from those hospitalized for less than 8 days. On the other side, an equal

proportion of cases (about 28%) staying above 8 days is found in bills below and above the flat rates.

Strangely enough there are two CABG patients staying for less than 5 days (too quick discharge?).

The same seems to happen for the PTCA patients (**Table 29**).

Table 29: PTCA with one stent bills & LOS.

LOS intervals	Intervals of UPPI for PTCA With One Stent								Total
	Lowest → 5,525,000		5,525,000		5,525,001 → 6,500,000		6,500,001 → Highest		
1 → 4			79	89.8%	69	95.8%	36	97.3%	184
5 → 8	1	100%	6	6.8%	3	4.2%			10
9 → 12			1	1.1%			1	2.7%	2
13 → 16			2	2.3%					2
Total	1	100%	88	100%	72	100%	37	100%	198

7.6 Longer stay shall bear additional costs that any provider would try to recover with any means.

If LOS is not a driving force behind the size of bills, then hospitals may have other reasons to overbill: trying to recover full itemized supply, unforeseen expenses (complications), straight attempt to increase profits, or attempt to require flat rates adjustments.

Here, it is important to notice that flat rates, when poorly adjusted to severity and age (as it is the case in the MOPH), create, by default, strong attempts by providers to overbill, charge directly the patients, produce additional bills not for surgical but for "medical treatments", or cut short on care (typically the postponement of care which could be provided during the surgery: e.g. a second PTCA or a two stents PTCA).

According to the MOPH, the bills are paid only for the amount of the flat rate, whatever complications and higher costs are incurred by providers, and whatever the bill submitted. Indeed, sometimes they are slightly reduced by the department concerned, particularly for PTCA cases.

However, the Department concerned does not deny the possibility of an associated "medical bill" (medical bills and surgery bills records are not linked) or that patients are charged directly. Hospitals and doctors may require the patient to pay for the difference. Patients may tend to pass these additional expenses onto the MOPH, by asking the waving of the co-payments, in many cases provided.

Preliminary conclusions

The preliminary study is a strong attempt to provide a utilization review of one of the most expensive, life-saving and high-tech treatment available on large scale to patients. The utilization of such procedures in Lebanon is meant to grow in parallel with changes in demography and other underlying factors.

Utilization reviews shall not deal (as often is the case) only with the magnitude of the problem and few characteristics of the patients (age, sex, place). They shall try to follow questions about behavior of patients, and providers and their impact on outcome and costs.

No one of these questions can be answered at national level at this stage. No national registers and other assets are available. The easiest and more comprehensive view of the coronary procedures can be obtained only through the collaboration of the 20 or so centers and their doctors providing this type of surgery. Confidentiality and other reasons may hamper the objective.

However, given the fact that the coronary surgery is rarely paid directly by the patients, a sufficient picture can be achieved through private and public payers (actually too many in Lebanon) or at least the major ones.

The MOPH is certainly one of the major contributors. This review, therefore, starts with the MOPH and indeed, it is used to provide nationwide considerations and indications, besides suggestion specifically for the MOPH. Moreover, the findings related to the coronary surgery utilization can easily be transferred to other hospitalizations practices on the account of the MOPH.

1. National data can only be achieved through a national register of cases. Information needs to be taken directly from providers, as payers are too many. The MOPH shall require the Centers to make available a number of basic data about the coronary procedures, performed for all patients (not just the MOPH ones).

Data can be collected from clinical files and logbooks from the administration, emergency entries and directly from the surgical theaters.

2. The population rates of coronary surgery in the country when related to other countries (except UK) look in the average (unadjusted).

The age specific surgical rate for the target population is, however, very high by any standard.

Excluding abuses of diagnosis and treatment indications (especially for CABG), may lead to the conclusion that an epidemic of CHD is underway and will keep increasing

for the next 20 years on the ground of the slow increase of the proportion of the population above 65 years of age.

National and MOPH expenditures on cardiac surgery, where open or closed, may mount by the years. That is because the population is "ageing", other insurances (particularly private) will refuse to cover and attempts to shift cases from one public to another public payer will increase.

A major financial crisis may be ahead, unless tough controls on indications are brought about, the number of centers decreased, and, specifically the disease control is improved.

Facing this epidemic, the MOPH has the duty to improve, with all the means at its disposal, the control of underlying diseases and risk factors. Changing lifestyles, (prevalence of smoking in particular) and controlling diabetes are certainly measures which (as in many industrialized countries) will decrease the financial burden of CHD and coronary surgery. It would be a sound investment.

3. For the above reasons the MOPH shall promote a nationwide survey on risk factors and prevalence of certain non-communicable diseases, as it has been done in several countries in the Region.

4. The MOPH shall provide, with the advice of and through scientific associations, national guidelines on the diagnostic and prognostic procedures best practice. Risk stratification scores shall be used to define the diagnostic pattern and reported in records and financial coverage authorizations.

According to one of these score tables (ACC/AHA) a risk of coronary diseases below 70% would first require as most cost-effective diagnostic and prognostic tool, the use of the highly specific stress tests (negative tests are true negative cases).

Above such cut off point (angina and MI, age and sex...) the angiography can be used. This would save money and undue sufferance, operations and complications. As for angiography and surgical operations, stress test shall be carried by experienced centers and hands and not be used as population screen measure.

5. Angiography reading and reports shall be equally standardized according to international guidelines. Particular attention shall be put on avoiding using angiographies as the only diagnostic and prognostic tool. Clinical data and other non-invasive tests shall be assessed and reported as the bases for angiography.

The MOPH and other payers shall undertake such more rigorous approach to the diagnosis and the indication for surgery.

Again, this would avoid a too approximate evaluation of the patient, which may have disastrous consequences on the outcome, no optimal allocation of resources, and patients to be misallocated to one or another type of coronary surgeries.

Studies have shown that the lack of guidelines in the use of angiography leads to high-risk patients being denied such test and low risk patients being provided it.

Proper assessment of the patient can help in anticipating complications and improve mortality and morbidity. This is possible only by using properly the clinical and diagnostic means.

Angiography, moreover, shall be carried out in the proper setting with emergency services and intensive care closely available. As far as possible angiography shall lead to angioplasty (when required) in the same session.

6. Quality of care also is a matter (recognized by many) of concern: too many small centers and doctors practicing too few operations, sometimes with no other care support. Specific data on hospital fatality rates (case-mix adjusted), re-admissions on emergency for coronary problems and hospital complications could not be obtained, because records would not report them (for hospitals and physicians' confidentiality or for economic reasons).

Small volume Centers, however, may have low risk case-mix and therefore low mortality. If this is the case, they shall be encouraged to keep this kind of approach. However, if this is not the case remedial action by the MOPH is due.

While it is difficult to close centers and prevent any cardiologist to practice few PTCA, a moratorium can be established at national level at least for the approval of new centers. The MOPH can, from its part, define preferential centers and set contracts with well-established surgeons' practice based on convenience of geographical distribution and quality scores. This would improve performance, costs, and fatality rates.

7. The MOPH shall require providers to report complications and deaths as confidential information. This not with the aim of drawing table leagues but with the intention of stimulating hospitals to look and audit their own outcomes.

The ACC/AHA (1999) concludes on the issue in this way: "Outcome reporting in the form of risk-adjusted mortality rate after CABG has been effective in reducing mortality rates nationwide". This can be useful also for PTCA.

In UK the Cardiovascular Intervention Society estimates that similar clinical confidential auditing (no name, no blame) can help hospitals and doctors to improve their internal standard of care (www.bcis.org.uk/audit).

Reimbursement schemes shall be subject to both requirements: internal hospital auditing and national confidential submission of mortality data. As for the former, the hospital shall identify and empower a focus person, for the latter the MOPH shall do the same in order to preserve confidentiality. Data shall lose immediately the identification elements. Reports and recommendations shall be issued routinely. (The same Heart Surgery Committee of the MOPH can be entrusted for it).

8. Access seems to be a problem given the mobility required to the patients. *Custumers (patients) follow the doctors instead of the contrary.*

This has a financial and clinical cost. Continuity of care before and after surgery is an essential element in ensuring full benefits from coronary operations on cure, complications and survival. Lack of control, for instance, of cholesterol, diabetes and hypertension, after the surgery, will greatly reduce the prognostic benefits of the operation. The MOPH (and other payers) will bear the burden of the lack of follow-up: patients will be most likely re-admitted.

Solutions are not easy: education can be a form of intervention. The MOPH may have to introduce reimbursement scales for re-admission based on the evidence of what has been done for controlling the risk factors.

In any event, the MOPH could provide guidelines on regionalizing the authorizations for coronary surgery. Worries about freedom of choice and allegedly better care in Beirut and Mount Lebanon, are overdue and contrary to the health and economic interests of the patients.

9. The ratio between sexes in patients calling the MOPH for coronary surgery coverage is somehow striking. The unbalance between genders in utilization of the MOPH coverage is exceeding what is seen elsewhere and cannot be explained by difference in demography, epidemiology and clinical expression of CHD and it contrasts with data in other countries.

The reasons for that may be a family cultural one, a more difficult access to cardiologists, more resumption to angiography tests for males or unsound believes that CHD are more severe in the male population. Educational campaign among physicians shall be started by the Order of Physicians.

10. MOPH flat rate system is not good enough to take in due consideration complications and severity of cases (case-mix). A sign of this are the bills submitted in excess of even the total flat rate. Rates should be adjusted to allow for additional costs for seriously ill or risky patients. Providers may in fact try all possible ways to recover the additional costs, including (but not exclusively) providing less than

optimal care, submitting extra medical bills or asking the patients to cover the difference.

11. A MOPH specific recommendation, where urgent action is needed, is relative to the appalling status of the information and recording system at the MOPH.

The poor handling of the records' storage, retrieval and utilization cannot be overemphasized and in fact it is a well-known situation to many.

In the case of coronary surgery, important information problems were met, most of which are not specific of coronary hospitalizations. In particular:

11.1 Access to hard copies of bills, req. forms, and discharge summaries was puzzling as they were often in different places. As far as we understand, the req. forms (with other identification documents, approval by the cardiac commission and filled in all part with different signatures), after entered in computers at the Visa Center, will be returned with the discharge summaries and the log of the bills from the hospitals for a certain month to the Central Inspection. The logs will mention the hospital name, date, name of patients, name of physician, type of coronary procedures, LOS and payments required. They will be forwarded to the accounting office for settlement, once "verified by the central inspector office".

11.2 No physical storage was made of the above records at the Central Inspection Office. Records (req. in forms, logs and discharge summaries) were piled up with no classification criteria, left for one year in the rooms and then dislodged to the Quarantine Hospital. The Accounting Office will keep the logs (no computers entry), but not stored with criteria. Final bills settlements are not linked to the other forms.

11.3 The Visa Center was the only place where only computers (with limited storage and memory capacity) would allow to trace back patients and look for repeated coronary surgeries or previous hospitalization. They do have a unique identification number.

Allegedly summary statistics are possible, but we could not see what and how, because the process "would take much time". They will not obviously contain data about the hospitalization of the patients.

11.4 Given the situation, utilization reviews are limited to the req. forms at the Visa Center, and some financial data at the Accounting Office. Reviews at the Central Inspection will be done on ad hoc basis and only for the previous year, running the risk of records' misplacements and losses. Links between repeated hospitalizations and between bills, discharge summary, and req. forms could not be ensured and even possible.

11.5 Similar situation applies to links between surgical and medical records. This would allow to understand whether additional bills to coronary surgeries are made on medical ground.

11.6 Completeness was not at all guaranteed (e.g. the discharge summary).

11.7 The requests for approvals through the Commission were made on the basis of a simple prescription paper and an angiography tape. Additional clinical and tests information were often lacking.

11.8 All the above requires a major drive in reorganizing the physical collection, storage and links of records of hard copies, especially at the Central Inspection Office. Even if the storage will relate to one-year records, it could be useful (though we would suggest to organize the subsequent storage at the Quarantine too).

11.9 Computerization would not solve problems that pertain to the quality and usefulness of what is collected and stored. (As it is often said, and forgotten, garbage in is equal to garbage out).

Nor computers can improve data utilization review if directions are no clear on what to look for, for what reasons and in what case. Data, however well stored in computers and whatever the software capacity, cannot be transformed into information and decisions if the user does not know, or is not willing, to do so.

Furthermore, it is not uncommon to find potential users across Departments who find available software applications, specifically set for them, of difficult use: indeed some have set up their own friendly, albeit elementary, database and reviews, adding to the general fragmentation of the information.

Standard outputs, line of responsibilities shall be devised, not before the previously mentioned hard copies' problems are solved.

11.10 In few words, the first thing to do is to have a proper archive, some capable clerks and a sense of what data to use and for what purpose. Training of the existing staff is needed and supervision established.

ANNEX 1:

PROSPECTIVE QUESTIONNAIRE
CABG-PTCA (PCI)

Source: REQ IN FORM

1. IDENTIFICATION DATA

Name _____ Family name _____
Date of birth ___ / ___ / ___
Gender □ Male □ Female
Marital status □ Single □ Married □ Divorced □ Widowed
Place of living (City / Region) _____
Phone number _____ _____

Source: REQUESTING PHYSICIAN

2. CLINICAL DATA

2.1 Symptoms
□ None
□ Chest pain
□ Shortness of breath
□ Palpitations
□ Left arm discomfort or pain
□ Angina
□ Mild □ Stable □ Unstable □ Typical
□ Response to medical treatment □ Sign of ischemia
□ Myocardial infarction
□ Non-Q-wave □ Q-wave
□ Poor LV function
□ Ventricular arrhythmias
□ Other cardiac or vascular conditions _____
Date of first appearance of symptoms _____

2.2 Previous medical treatment _____

2.3 Previous cardiac surgery
□ CABG Number of vessels ____
□ PTCA
□ Without stent □ With 1 stent □ With 2 stents
□ Valves

2.4 Underlying disease
□ Diabetes

□ Hypertension
□ Dyslipidemia (hyperlipidemia, triglyceride, cholesterol)

2.5 Stress test
□ Performed
□ Positive □ Negative
□ Not performed

2.6 EKG
□ Performed
□ Positive □ Negative
□ Not performed

2.7 Angiography
□ Performed
□ Not performed (please skip question 3.7)

2.8 Pathology
□ LMCA (left main coronary artery)
% stenosis ____ Run off _____

□ LAD (left anterior descending)
□ Proximal
% stenosis ___ Run off _____
□ Distal
% stenosis ___ Run off _____

□ LCA (left circumf.artery)
□ Proximal
% stenosis ___ Run off _____
□ Distal
% stenosis ___ Run off _____

□ Other vessels _____
□ Proximal
% stenosis ___ Run off _____
□ Distal
% stenosis ___ Run off _____

LVEF (ejection fraction) _____

3. DIAGNOSIS AT ENTRY _____

4. REFERRING PHYSICIAN _____

5. SPECIALTY OF REFERRING PHYSICIAN _____

Source: HOSPITAL (Nurse or MOPH Medical Inspector)

6. RISK FACTORS

Weight (KG) ___
Height (CM) ___
Age (YEARS) ___

Education:
□ Illiterate □ Primary school □ Secondary school □ University degree

Present occupation _____
years of occupation ___ years

Smoking habit:
□ Never smoked
□ Stopped smoking
  □ Less than two years ago
  □ Two years ago or more
□ Smokes daily
  □ Less than 20 cigarettes per day
  □ 20 or more cigarettes per day

Exercise:
Type of exercise:
□ Walking □ Jogging □ Tennis
□ Swimming □ Aerobics □ Other _____

Frequency of exercise:
□ No exercise □ 1 to 2 hours per week
□ 3 to 4 hours per week □ 5 to 9 hours per week
□ 10 to 14 hours per week □ 15 or more hours per week

Source: THE BILL

7. HOSPITAL _____

8. ADDRESS OF HOSPITAL _____

9. SURGEON _____

10. DATE OF ADMISSION ___/___/___

11. DATE OF DISCHARGE ___ / ___ / ___

12. LENGTH OF STAY

□ Intensive care __ day(s) □ Hospital __ day(s)

13. HOSPITAL TREATMENT

□ Hospital medical treatment _____
□ Surgical intervention
- □ CABG Number of vessels ___
- □ PTCA
  - □ Without stent □ With 1 stent □ With 2 stents
- □ Valves

14. HOSPITAL BILL
Hospital fees _____
Physician fees _____

15. HEALTH CARE COVERAGE
First third-party payer _____
Second third-party payer _____

Source: DISCHARGE SUMMARY

16. DIAGNOSIS AT DISCHARGE _____

17. OUTCOME

17.1 Intra-hospital:
□ Complications
- □ Acute MI
- □ Distant organ failure
- □ Stent occlusion
- □ Stroke
- □ Other _____

□ New operation
- □ One PTCA
- □ Two PTCA
- □ CABG

□ Weakness
□ Shortness of breath
□ Feeling of improvement
□ Death

Source: HOME CALLS

17.2 After one month:

- ☐ Return to work
- ☐ Exercise
- ☐ Complications
  - ☐ Acute MI
  - ☐ Distant organ failure
  - ☐ Stent occlusion
  - ☐ Stroke
  - ☐ Other _____
- ☐ New operation
  - ☐ One PTCA
  - ☐ Two PTCA
  - ☐ CABG
- ☐ Weakness
- ☐ Shortness of breath
- ☐ Feeling of improvement
- ☐ Death

17.3 After one year:

- ☐ Return to work
- ☐ Exercise
- ☐ Complications
  - ☐ Acute MI
  - ☐ Distant organ failure
  - ☐ Stent occlusion
  - ☐ Stroke
  - ☐ Other _____
- ☐ New operation
  - ☐ One PTCA
  - ☐ Two PTCA
  - ☐ CABG
- ☐ Weakness
- ☐ Shortness of breath
- ☐ Feeling of improvement
- ☐ Death

RETROSPECTIVE DATABASE
CABG-PTCA (PCI)

Source: REQ IN FORM

1. IDENTIFICATION DATA

Name _____ Family name _____
Date of birth ___ / ___ / ___
Place of birth _____
Place of living _____
Phone number _____
Present occupation _____

2. PATHOLOGY

□ LMCA (left main coronary artery)
% of stenosis ____ Run off ____

□ LAD (left anterior descending)
□ Proximal
% of stenosis ___ Run off _____
□ Distal
% of stenosis ___ Run off _____

□ LCA (left circumf.artery)
□ Proximal
% of stenosis ___ Run off _____
□ Distal
% of stenosis ___ Run off _____

□ Other vessels _____
□ Proximal
% of stenosis ___ Run off _____
□ Distal
% of stenosis ___ Run off _____

LVEF (ejection fraction) _____

3. PRINCIPAL DIAGNOSIS _____

4. EXPECTED HOSPITAL TREATMENT

- ☐ Expected hospital medical treatment _____
- ☐ Expected surgical intervention _____
  - Code _____

5. TREATING PHYSICIAN _____

6. SPECIALTY OF TREATING PHYSICIAN _____

7. HOSPITAL _____

8. EXPECTED DATE OF ADMISSION ___/___/___

9. EXPECTED LENGTH OF STAY ___ DAYS

Source: DISCHARGE SUMMARY

10. HOSPITAL TREATMENT

- ☐ Hospital medical treatment _____
- ☐ Surgical intervention
  - ☐ CABG Number of vessels ___
  - ☐ PTCA
    - ☐ Without stent ☐ With 1 stent ☐ With 2 stents
  - ☐ Valves

11. DIAGNOSIS AT DISCHARGE _____

12. OUTCOME

- ☐ Successful
- ☐ Complications
  - ☐ Acute MI
  - ☐ Distant organ failure
  - ☐ Stent occlusion
  - ☐ Stroke
  - ☐ Other _____
- ☐ New operation
  - ☐ One PTCA
  - ☐ Two PTCA
  - ☐ CABG

□ Death

Source: THE BILL

13. DATE OF ADMISSION ___/___/___

14. DATE OF DISCHARGE ___/___/___

15. LENGTH OF STAY

□ Intensive care __ day(s) □ Hospital __ day(s)

16. HOSPITAL TREATMENT

□ Hospital medical treatment _____
□ Surgical intervention _____
Code _____

17. HOSPITAL BILL
Hospital fees _____
Physician fees _____
Procedure fees _____
Pharmaceutical fees _____

18. HEALTH CARE COVERAGE
First third-party payer _____
Second third-party payer _____

23/7/2002

MedNet Database

CABG and PTCA from July to December (included) 2001

Surgery Type:

Cardiac Surgery Technique	Frequency	Percent
Angioplasty	100	68.0
CABG	47	32.0
Total	147	100.0

Age Intervals for CABG:

Age Intervals	Frequency	Percent
26 thru 50	2	4.3
51 thru 75	41	87.2
76 thru 95	4	8.5
Total	47	100.0

Age Intervals for PTCA:

Age Intervals	Frequency	Percent
26 thru 50	28	28.0
51 thru 75	69	69.0
76 thru 95	3	3.0
Total	100	100.0

The age distribution is comparable to that of the MOH patients. However, for CABG, the MedNet population is slightly older.

Gender for CABG:

Gender	Frequency	Percent
Male	35	74.5
Female	12	25.5
Total	47	100.0

Gender for PTCA:

Gender	Frequency	Percent
Male	83	83.0

Female	17	17.0
Total	100	100.0

The number of procedures done on males is more than double that done on females in the MedNet patients (comparable to the gender distribution in MOH patients).

Age Intervals * Gender Crosstabulation for CABG:

			Gender		Total
			Male	Female	
Age Intervals	26 thru 50	Count	2		2
		% within Age Intervals	100.0%		100.0%
		% within Gender	5.7%		4.3%
		% of Total	4.3%		4.3%
	51 thru 75	Count	32	9	41
		% within Age Intervals	78.0%	22.0%	100.0%
		% within Gender	91.4%	75.0%	87.2%
		% of Total	68.1%	19.1%	87.2%
	76 thru 95	Count	1	3	4
		% within Age Intervals	25.0%	75.0%	100.0%
		% within Gender	2.9%	25.0%	8.5%
		% of Total	2.1%	6.4%	8.5%
Total		Count	35	12	47
		% within Age Intervals	74.5%	25.5%	100.0%
		% within Gender	100.0%	100.0%	100.0%
		% of Total	74.5%	25.5%	100.0%

Age Intervals * Gender Crosstabulation for PTCA:

			Gender		Total
			Male	Female	
Age Intervals	26 thru 50	Count	26	2	28
		% within Age Intervals	92.9%	7.1%	100.0%
		% within Gender	31.3%	11.8%	28.0%
		% of Total	26.0%	2.0%	28.0%
	51 thru 75	Count	55	14	69
		% within Age Intervals	79.7%	20.3%	100.0%
		% within Gender	66.3%	82.4%	69.0%
		% of Total	55.0%	14.0%	69.0%

	76 thru 95	Count	2	1	3
		% within Age Intervals	66.7%	33.3%	100.0%
		% within Gender	2.4%	5.9%	3.0%
		% of Total	2.0%	1.0%	3.0%
Total		Count	83	17	100
		% within Age Intervals	83.0%	17.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%
		% of Total	83.0%	17.0%	100.0%

Marital Status for CABG:

Marital Status	Frequency	Percent
Single	8	17.0
Not single	39	83.0
Total	47	100.0

Marital Status for PTCA:

Marital Status	Frequency	Percent
Single	13	13.0
Not single	87	87.0
Total	100	100.0

83% of persons undergoing CABG and 87% of persons undergoing PTCA are married.

Smoking Habit for CABG:

Smoking Habit	Frequency	Percent
Smoker	1	2.1
Non-smoker	37	78.7
Unspecified	9	19.1
Total	47	100.0

Smoking Habit for PTCA:

Smoking Habit	Frequency	Percent
Smoker	4	4.0
Non-smoker	64	64.0
Unspecified	32	32.0
Total	100	100.0

If we consider that those who did not specify about their smoking habits were smokers (they tend to hide it from the insuring company), we get 21% of persons undergoing CABG and 36% of persons undergoing PTCA who are smokers. This is unexpected but again it is difficult to assess the reliability of these answers.

Stress Test * Surgery Type Crosstabulation:

			Surgery Type		Total
			Angioplasty	CABG	
Stress Test	yes	Count	32	15	47
		% of Total	21.8%	10.2%	32.0%
	no	Count	68	32	100
		% of Total	46.3%	21.8%	68.0%
Total		Count	100	47	147
		% of Total	68.0%	32.0%	100.0%

32% of persons undergoing CABG and 32% of persons undergoing PTCA did a stress test before.

EKG * Surgery Type Crosstabulation:

			Surgery Type		Total
			Angioplasty	CABG	
EKG	yes	Count	15	10	25
		% of Total	10.2%	6.8%	17.0%
	no	Count	85	37	122
		% of Total	57.8%	25.2%	83.0%
Total		Count	100	47	147
		% of Total	68.0%	32.0%	100.0%

22% of persons undergoing CABG and 15% of persons undergoing PTCA did an electrocardiogram before.

Angiography * Surgery Type Crosstabulation:

			Surgery Type		Total
			Angioplasty	CABG	
Angiography	yes	Count	11	11	22
		% of Total	7.5%	7.5%	15.0%
	no	Count	89	36	125
		% of Total	60.5%	24.5%	85.0%
Total		Count	100	47	147
		% of Total	68.0%	32.0%	100.0%