Medical Technology: A friend or a foe for insurers?

Slide 2. Photo

This is the CyberKnife® Robotic Radiosurgery System. Cyber Knife is a remarkable example of the capabilities of modern technology. The system is designed to treat tumors throughout the body non-invasively and in most cases it is used for inoperable or surgically complex tumors, especially in the brain. Its operation is based on advanced image analysis software that guides a robotic arm to deliver high radiation doses with pinpoint accuracy, avoiding damage to adjacent tissue or nerves. The system has the ability to autocorrect its aim in case of a slight movement and hence the patient does not need to be absolutely still during the operation.

According to relevant studies, treatment through Cyber knife could actually be lifesaving in certain serious cases. However, to acquire this remarkable system, hospitals have to pay a very high price. The cost of acquiring CK is about 5 million Euro and the maintenance cost exceeds 250.000 Euro per annum.

Slide 3. Remarkable yet expensive

Cyber Knife is one of many innovative medical devices that have been designed and introduced to medical practices in the last two decades. These devices have greatly facilitated the treatment of many serious illnesses, increased its effectiveness, reduced complications and made recovery easier and faster. And of course, all of them are expensive to buy and also expensive to maintain.

The advance of technology has a profound effect on the way medicine is practiced. Everyday medicine becomes more and more dependent on technology as new tools for diagnosis and treatment are devised that rapidly become the new standard.

A typical example is robot assisted surgery. Only a few years have passed since the introduction of the first robot-guided surgical system (Da Vinci®) yet its use has become the recommended practice by international Medical Protocols for a number of surgeries for which precision and minimum invasion are crucial (e.g. prostatectomy). Moreover, it has become the preferred method for a very wide range of procedures and is gradually replacing laparoscopic surgery.

Slide 4. … does medical technology increase the cost of healthcare?

The effect of technology development on the cost of health insurance, whether in the private or public sector, is a controversial issue. Medical equipment companies, healthcare companies and doctors usually argue that medical technology is actually reducing the cost of healthcare in many cases and that, ultimately, the overall benefits to society are such that any increase in the cost of healthcare is justified. On the other hand, health economists and some insurers argue that however beneficial to society the new medical technology may be, it entails a substantial and continuous increase in the cost of healthcare provision. They

suggest that, because of the rising technology costs, it is becoming increasingly challenging to finance an adequate level of healthcare provision.

The fact that the use of modern medical technology is beneficial for patients and hence has a positive effect on society's wellbeing is beyond argument. Modern equipment allows earlier and more accurate illness detection, allowing for timely and more precise intervention that results in higher recovery and lower mortality rates. Serious surgeries are performed without incisions, have fewer complications, require a shorter hospitalization period and allow for a swifter recovery.

It is therefore apparent that medical technologies have very significant benefits. But they certainly increase the cost of health insurance as most independent studies (and I emphasize the word 'independent') have shown. From an insurer's point of view (that is, our point of view) new technologies affect the severity and frequency of claims. And they affect them both directly and indirectly.

The direct effect arises from the fact that investment in technology has to be recuperated. As I said earlier, the acquisition and maintenance of advanced medical devices requires significant expenditure on the part of healthcare institutions. To cover these additional costs, institutions charge a higher price for procedures that are performed with the aid of the new equipment. Hence new procedures are generally more expensive than older ones and, as a result, the amount of average claim increases with time.

Slide 5. … does medical technology increase the cost of healthcare?

The cost of insurance is also affected indirectly in cases where methods based on modern technology prolong the survival period of a patient with a terminal illness. A prolonged serious illness that needs continuous special care usually amounts to a very large claim. Even the higher recovery and corresponding lower mortality rate has an indirect effect on the cost of insurance. Simply put, for the fortunate patients that survive an illness, we are likely to receive more claims involving higher amounts as they grow older, whereas for the unfortunate patients that do not survive, we pay a much higher claim amount than before, as their treatment is now either more expensive, or lasts longer than before, or both. So in fact the cost of insurance will increase in any case.

Another factor that adds to the insurance cost but is often overlooked is that in health insurance, the party that will pay (the insurer) is not involved in the process of deciding on the type, and hence the cost, of treatment. This decision is made by the doctor and in rare cases by the patient but the insurer is never involved in the decision-making process. Clearly, this arrangement leaves a lot of room for induced demand and therefore increases the frequency and the average amount of claims.

Even when disregarding the possible induced demand, it is absolutely logical that doctors will tend to suggest the most modern methods of treatment for their patients regardless of the cost as they are generally safer, more effective and more comfortable for the patient than traditional ones. Moreover, the "Modern Method" reduces the doctors' risk and is often easier to administer.

Nevertheless, in our claims management process we may decline to cover the cost of more expensive modern methods, especially when their degree of effectiveness is virtually the same as those of more traditional methods. In the long run however, as new procedures gradually become standard, it will become increasingly difficult to refuse such payments.

Slide 6. Healthcare Institutions must invest in modern technology

I will now focus on the local market

In Greece, we have nine major Private Healthcare groups that provide inpatient and outpatient health services to our customers (the insured) and to private patients. There are also a relatively large number of smaller private clinics and independent diagnostic centers.

Private Healthcare Institutions compete actively with each other, mainly in terms of the range and the quality of medical services rendered. Since now, more than ever before, both the range and the quality of their services depend on medical technologies, it is absolutely essential for them to have an ongoing strategy for investing in modern medical equipment.

Generally, hospitals do not compete to attract patients but rather to attract doctors, as in most cases the choice of hospital is not made by the patient but by his/her doctor. Doctors are compelled to keep up with the latest methods of diagnosis and treatment which are almost invariably performed with the aid of modern technology, to avoid losing patients. As a result, hospitals have no option other than to make the most modern equipment available to them to in order to stay competitive and attract doctors and their patients.

Slide 7. Healthcare Institutions must invest in modern technology

However, while this may be the way the private healthcare providers' market works under normal circumstances, in fact the local market circumstances are anything but normal. Greece is in a period of a severe and prolonged financial crisis that has left its footprint on every market, including the medical services sector. It will be interesting to see whether or not the private healthcare institutions have continued to invest in medical technology during this period.

To answer this question, I sent a brief questionnaire to the ten largest private medical groups to ask them, among other things, the annual amount they invested specifically in medical technology, either diagnostic or operative, during the years 2011 to 2015 inclusive. I also asked them to list their major corresponding acquisitions. All but one responded. And as you can see the results are certainly impressive.

During the above period of severe financial crisis, private healthcare institutions invested almost 93 million Euro in medical technology. That's an average of 18.5 million per annum. To help you realize the relative value, the total premium volume of the local health insurance market for 2015 was 643 million Euro.

Slide 8 …but guess who pays in the end

So, private healthcare institutions invest large amounts in technology. Viewed from their perspective, this is actually the most appropriate strategy to select, as they must maintain a high level of services in order to survive in a competitive market.

However, the significant costs of investing in new technologies, as well as the associated maintenance costs, have to be recovered somehow. And since private health care providers are in fact companies, their only way to recover additional costs is by increasing revenues. Revenues are increased either by treating more patients, or by increasing the average earnings per patient, or both. It should be noted that increasing the average revenue per patient does not necessarily imply increasing the pricelist. As I am sure some of you know, healthcare companies have ways of increasing expenditure per patient even when underlying prices are reduced. The issue here is that their revenue is in fact our cost. Or, to be precise, a large and **growing** part of their revenue is our cost.

There are three sources of revenue for the private healthcare institutions: private patients, insurance companies and the state. The state has a type of "agreement" for certain DRGs (or Diagnosis Related Groups), paying a predetermined amount that varies according to the cause of hospitalization, for patients covered by social security. In practice, a large part of the fees, that can be as high as 55%, is never paid by the state as there are cost sharing mechanisms in place that cover this, which are very descriptively named "rebate" and "claw back". Furthermore, the remaining amounts are paid by the state sometimes with months or even years of delay, imposing a funding strain on healthcare companies that is actually visible on their published accounts.

Furthermore, as the crisis has slashed the available income of individuals, the number of those that can afford to be treated in a private hospital, without having a health insurance policy, is diminishing. In contrast, every single one of our customers would definitely opt to be treated in a private hospital. In fact, this is exactly the reason for which he/she bought a health insurance policy in the first place! Therefore, the revenue from private patients is expected to decrease and the insurers' share of the technology investment bill, to increase.

Slide 9. Are we already paying more in claims?

As a matter of fact, we are already paying a substantial part of the technology investment bill and it can be proven using data drawn from claims experience.

As I mentioned earlier, insurance costs increase as a result of technology investments primarily through an increase in the average claim. This results from the fact that in cases where the insured is treated using a modern technology-aided method, the cost is generally higher than in cases where he/she is treated using a traditional method. To test the validity of this assertion I analyzed the last three years of claims for the insurance company Ethniki.

The aim of the analysis was to answer three main questions:

1) What are the most usual cases in which a new technology-aided procedure seems to be replacing a traditional one?

2) Does the use of the new method increase the average claim? If so, by how much? and
3) Can the reduced hospitalization period offset the increase in cost?

Slide 10. We are already paying more in claims

The four cases for which a technology-aided procedure is most frequent are: (*show table)*

Prostate cancer, Kidney cancer, Osteoarthritis of the knee where Robotic Surgery is used instead of conventional surgery and aortic valve disorders that require a valve replacement whereby transcatheter aortic valve implantation (TAVI) is used instead of conventional open heart surgery. It should be noted that for these four particular conditions the use of the new method is becoming more frequent with time.

As you can see (*show table*) in all cases, when the new procedure is used the average claim increases significantly. This difference is equally impressive in absolute monetary terms but unfortunately I cannot disclose the actual average claim amount for each case.

Slide 11. We are already paying more in claims

The length of stay in hospital, on the other hand, is decreased by roughly 1/3 on average in all cases. Modern methods therefore require a shorter hospitalization period but, as many of us would expect, the reduction in the number of hospitalization days cannot offset the increased costs.

Slide 12. …and assisting factors will increase our future claims further

Unfortunately, technology is not the only factor that contributes to the ever-increasing cost of health insurance. An aging population along with the growing prevalence of chronic diseases is expected to have a massive impact on the cost of healthcare in the long run and will constitute a very significant challenge for health insurers.

As stated in the European Commission Aging Report, the percentage of the population that is currently aged 65 or more in this country is 21%. This figure is expected to become 31% by 2040. You can imagine the magnitude of the impact on the cost of healthcare when, according to international studies, the average annual healthcare expenditure per individual aged 65 is 4 times higher than the annual expenditure of an individual aged 40. Note that this comparison is for current prices, which means it does not take into account additional factors that inflate the cost such as technological developments. Therefore, in reality, the healthcare expenditure on 65 year olds, compared to 40 year olds, is expected to increase by an even higher factor.

Since the prevalence of chronic diseases increases with age, increased longevity is a major contributor to the high and steadily rising prevalence of chronic diseases in most developed countries. However, many of the most common chronic illnesses such as diabetes, cardiovascular disorders and some types of cancer are directly associated with unhealthy lifestyles and habits such as a lack of physical activity, poor nutrition and tobacco use. Chronic illnesses are responsible for a large number of deaths and their treatment already

absorbs the best part of healthcare expenditure worldwide. According to the U.S. Department of Health, Chronic illnesses account for 70% of deaths and of over 75% of direct health care costs in the United States. As the upward trend in the prevalence of chronic diseases is expected to continue, they would account for an even larger proportion of future health care costs.

Slide 13. Traditional methods are not enough to contain costs in the long run

As the issue of growing healthcare costs is not new, health insurers have over time devised various cost control mechanisms. Some of the earlier ones are related to product design and aim to protect the insurer from the overuse of medical services. These include exclusions, special conditions, co-payments and deductibles.

There are also mechanisms related to claims management or, in a broader sense, to managing the utilization and cost of healthcare services. These have proven particularly effective in containing the cost of claims in the last two decades.

Case auditing during hospitalization is one of the successful mechanisms in controlling inpatient costs. Teams of doctors located in the main private hospitals review and audit the services provided to the insured patient and also the corresponding cost in order to control overuse or overcharging.

Insurers also try to minimize the overuse of services and excessive costs by controlling access to specialized services – a function called “gate keeping” – and additionally through exclusive cooperation agreements with specific healthcare provision networks. Furthermore, as is very common in the local market, insurance companies sign special pricing agreements with private healthcare institutions. In this context, risk sharing or risk transferring agreements between insurers and private healthcare institutions, such as capitation, are not uncommon.

Traditional cost control / cost sharing mechanisms maybe very effective in the short and medium term but are not enough to control healthcare costs in the long term, simply because they do not affect the underlying long term cost drivers. Tighter claim controls and better agreements with providers would not prevent costs from increasing due to advances in medical technologies, the aging population or the increasing prevalence of chronic diseases. Even if we were able to completely eliminate the unnecessary use and excessive pricing of medical services, we would still reach a “core” healthcare cost, the progression of which is beyond our control.

Our conclusions so far paint a very gloomy picture of the future of the health insurance market. As the average cost of healthcare care per insured individual will continue to rise at an accelerated rate, the average premium will have to follow suit. This would generally be a serious issue for health insurers and an intractable problem for the Greek market in particular. While our product is not considered cheap, especially during the financial crisis, if current trends continue, we run the risk of having a product that everybody needs but very few can afford.

Slide 14. … but fortunately modern technology provides tools that can help us

Luckily, despite the significant contribution that modern technology makes to the cost of health insurance, at the same time it can provide the tools to help us control it. Actually, technologies that are already available allow us to influence the development pattern of major underlying cost factors and overcome the limitations of the traditional insurance cost containment mechanisms. Using insurance terminology, current technology can help us reduce claims frequency and restrain claims growth not only in the short but also in the long term. The key to unlocking this opportunity is provided by the I. T. field that is generally referred to as "Health Information Technology" (HIT).

A short definition of HIT is the management and exchange of health information using computerized systems. This definition of HIT includes:

Slide 15. … but fortunately modern technology provides tools that can help us

Telemedicine: the use of telematics for the collection of vital data, remote doctor consultation and diagnosis.

Electronic Health Record: Specialized software that stores and manages detailed personal health data and medical history.

Mobile health: Smartphone software applications that collect, store and manage health related data.

Connected Diagnostic devices: Diagnostic devices that monitor vital data (e.g. blood pressure, glucose levels), store it as an Electronic Health Record and automatically transmit it to designated physicians.

Wearable technologies: Wearable sensors that monitor activity and basic vital data (e.g. steps taken, pulse rate) and corresponding software that is designed to motivate people to be more active and healthier.

These breakthrough technologies provide the ability to prevent illness from occurring, to have an early diagnosis if illness occurs and to control its development after it has occurred.

Slide 16. … but fortunately modern technology provides tools that can help us

Users of these technologies, who are healthy, are more informed on the everyday habits and activities that form a healthy lifestyle and are thus more empowered to pursue a healthy lifestyle than ever before. Similarly, users of these technologies who have an illness are more informed of their condition and far more engaged in their therapy than ever before.

Constant remote monitoring of vital data provides doctors with the ability to act on early signs of possible health problems and implications or to immediately take appropriate action in life-threatening situations.

The adoption of this technology is expected to have a substantial impact on the cost of all levels of healthcare. Remote monitoring leads to fewer visits to doctors and a lower number of duplicate or unnecessary diagnostic tests. Early intervention leads to lower costs in caring

for acute conditions. More effective disease management leads to fewer hospitalizations and shorter hospital stays. It seems that HIT can actually disrupt the increasing trend of medical costs.

Slide 17. …provided that we can stretch the boundaries of traditional insurance

The effects on overall healthcare expenditure may be apparent, but what about health insurance costs? How can insurance companies benefit from this technology? And also, how can the application of this technology fit within our operational model?

The answer is: Yes we can benefit from this technology but we need to stretch our conventional role; we need to move beyond the traditional boundaries of our business.

I will explain using an example: The average prevalence of diabetes is around 10%. Therefore, we expect that 10% of our insured population, about 160.000 people, suffer from diabetes, whether they are aware of it or not. So, what do we do? We keep our fingers crossed that's what we do. We hope that they do not suffer a heart attack, a stroke, kidney failure, leg amputation, blindness or any other of the possible severe consequences of diabetes that would be totally devastating for them and give rise to a very big claim for us.

And what are we expected to do for them? Well, it is our job to pay claims when they arise, right? Wrong! Our job is to manage risk. One of the rules of proper risk management is risk prevention and, in this case, technology provides us with the tools to do it in a very efficient way.

A disease management program designed to take advantage of the capabilities that modern technology provides in order to help participants keep diabetes under control, would have a very significant effect on both the overall health status of the participants and of course the cost of claims. Most participants would lead a better and longer life, avoiding the pain and suffering that serious complications of diabetes would have brought to them. The insurer of this particular group, on the other hand, would have a much smaller number of claims overall, particularly much fewer big claims than expected.

Slide 18. …and become the proactive health ally instead of the reactive claims settler

It is clear that in the face of ever-increasing healthcare costs, driven by factors upon which we have limited influence, we need to review our operational model in a creative way in order to stay competitive. Instead of being reactive, just waiting to pay a claim when it occurs, we need to be proactive and prevent the claim from occurring, using programs that provide modern, technology-enabled services to the insured.

Together with technology and healthcare companies, we can design Disease Management Programs for our chronically ill customers that assist them in keeping their illness under control; and Disease Prevention Programs for our healthy customers that encourage them to remain healthy. Through these programs, we would not only improve claims experience and contain rising costs but would also offer a service of great value to the insured.

It is true that, as in most innovative projects, implementation is not as easy as it may seem. It entails serious technical and administrative challenges as well as significant initial and running expenses that have to be recovered. However, the pioneering efforts of a few health insurance companies in the US have shown that initial problems can be overcome, and that such an investment can be justified by the results.

Slide 19. …the way forward

"Prevention is better than cure" (Hippocrates 460-377 B.C.)

Technological progress might be a major cost driver for health insurance but at the same time it can provide insurers with the tools to effectively control rising costs. Embracing technology and using it to prevent rather than cure, as Hippocrates suggested 2.500 years ago, can reduce health insurance costs and resulting premiums to a level that is sustainable in the long term, while providing an invaluable service to our customers.

Thank you.

Heracles Daskalopoulos

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