Health Economics

Dr Pratap C Mohanty

Department of Humanities and Social Sciences,

Indian Institute of Technology Roorkee

Week – 05

Lecture 24- Information Economics in Health: Moral Hazard

Welcome, friends, once again to our NPTEL MOOC module. In health economics, we have been discussing financing issues in continuation of our discussion. There are some linkages we have given in earlier topics. Even next week, we will also discuss some of the aspects of financing issues as part of the health system. This week, we are discussing financing and insurance in healthcare, which is very relevant to understanding health economics in detail. To recap our previous lecture, we discussed the theory of health insurance, welfare gains from health insurance, patient payments, reimbursements, types of health insurance, etc.

In this lecture, we will emphasize asymmetric information in economics, and in economic health in particular, we will emphasize moral hazard. Then, within this, we will be discussing what is called moral hazard, what are the different types, their determinants, how to limit moral hazard, how to control moral hazard and what the evidence of moral hazard and preventive care and moral hazard and the last one to discuss is offsite of moral hazard. What is asymmetric information? You might not have read the micro in detail. It used to be explained in the advanced microeconomics theory.

However, if you have not read it, it is good to follow it from here. I will just clarify. It is all about AI that is asymmetric information in this context refers to a situation where one party possesses more knowledge or information than the other, leading to potential market inefficiencies, adverse selection and moral hazard. Reducing this information asymmetry could lead to decreased insurance costs, improved product offerings and increased nationwide insurance coverage. As mentioned in the recent economic survey published in 2021-22.

So what are the problems due to asymmetric information, largely due to information gaps existing defining market inefficiencies and how it is famous, and it is due to the work of George Akerlof, Michael Spence and Joseph Stiglitz in the work of 2001 by which they received the Nobel Prize. All three shared the Nobel Prize and Akerlof, especially for the paper 1970 essay that is called The Market for Lemons published in QJE, the quarterly journal of economics. Discuss about adverse selection, moral hazard, principal-agent problems, and signalling. Spence especially advocated in the year 1973 of his PhD thesis and screening, which was mentioned clearly by Stiglitz in the work. Hence, we will be discussing moral hazard problems in more detail, especially in health

insurance. In the health insurance market, buyers of information that those are the patients have little to no information until they purchase or sometimes never at all. Especially in skin care cases, information is available after treatment, which is referred to as low-quality providers who will have to reduce prices.

So, open heart surgery cases were difficult to evaluate in terms of quality, and patients may rely on the reputation of doctors. So, altruism among doctors can eliminate this problem. Reimbursement rates pre-negotiated with insurance companies advertising private incentives for testing can exacerbate this conflict of interest. They already mentioned about C-section deliveries in India, and the cases are rising, and the most preferred number of cases in this case are of private hospitals. Why is it so? What is the connection with moral hazard etc.

, we will emphasize in other slides. Health insurance creates informational problems in health markets. There are aspects of ex-ante moral hazard and ex-post moral hazard. Ex-ante is in anticipation when actions are taken, like health insurance, mainly to lessen the incentive to avoid poor health behaviour and another ex-post moral hazard, basically, the cost of individuals' excess usage of healthcare spread over all the other insurance purchases. Everyone overutilizing healthcare is part of the discussion of ex-post, also called the free rider problem as part of moral hazard.

Akerlof, in 1970, explained how the quality of goods traded in the market could degrade the presence of informational summation. The design of the healthcare systems must account for this market failure, or this can lead to a loss of consumer faith and result in underinvestment in healthcare. So, let us explain moral hazards in detail, as I have already mentioned. Moral hazard is related to the insured individual's tendency for insurance against loss to reduce incentives to prevent or minimize the cost of loss mentioned in the work of Becker 1996. So, the insured individual's tendency for insurance against the loss or reduce incentive to prevent or minimize the cost of loss.

Hence it is explained in two ways: ex-ante moral hazard and ex-post moral hazard. Ex-ante, as I already mentioned, the behaviour gets anticipated, that is, the behavioural changes that occur before an insured event happens and make that even more likely, like skipping the flu vaccine, people skip or another example like consuming artery, clogging, cheeseburgers, the usual example for the anticipated actions before insurance is called moral hazard problem. Then ex-post is basically overused after the insurance event and such examples like knee replacement surgery, over painkillers or taking an expensive drug like Bone-Grow rather than a more inexpensive remedy etc. It also gives you some context on whether moral hazard is ex-ante or ex-post. The context is the pattern we are explaining, and then we will exercise an example.

An individual is exposed to the risk of a negative event labeled as X, and the actions can influence the likelihood of this event. The individual opts to purchase an insurance policy which provides financial coverage for some or all of the expenses associated with event X. With insurance in place, the perceived cost of event X decreases and distorts the actual consequences of that action. Due to this distortion, the individual modifies the

behavior to either heighten the probability of event X or increase the cost associated with its recovery. So, two ways as I told you ex-ant or ex-post.

So, two implications are attached to the process as part of some moral hazards. So, either the probability of that event gets heightened, or it is increasing the cost associated with that. Cost may not be borne by the individual who has taken the insurance, but the overall cost increases. The insurance company remains aware of these behavioural changes due to information asymmetry, as the contract would have been designed differently to discourage or finalize riskier behaviour if such information had been available. The individual's riskier behaviour contributes to a social loss.

Since they are over-utilizing or the riskier behaviour in different stages results in social loss. We will also present this in our graph. As the occurrence of costly event X became more frequent, it would have been without the presence of insurance. Now, we are just giving a citation with our own settings. We are situated near Haridwar, Rishikesh.

Hence, we thought of our own team and cited some names. You might have heard about river rafting in Rishikesh, which is considered a tourist destination. Three friends were there: Akash, Priyam, and Nandan. The students own special trips to Rishikesh that included river rafting. Out of three, only Nandan, the last one, loves adventure actions.

They were all part of the employee health insurance. So that means at this moment, though they are the student at IIT, we are taking these names as they work in some companies. So company's name need not be cited, not required. So basically, our assumption is that they are part of the employee health insurance. Unfortunately, Priyam and Nandan lost their job during a recession.

As a result, their access to health insurance also gets stopped. Priyam, who was not a big fan of river rafting, decided to withdraw from the trip due to the risk involved since he no longer had health insurance. On the other hand, Nandan who we said is a risk lover who loves adventure life joined with Akash who still continues with the health insurance. His job is still continuous to go for Rishikesh despite not having health insurance. That means Nandan did not have but still he loves to be part of this trip.

During the river rafting adventure, they are both capsized in an accident. Akash and Nandan suffered multiple fractures and were advised bed rest along with expensive treatment. Akash, with the help of his health insurance, completed the required medication. However, Nandan lacks that insurance, as I already told him, due to legislation, job loss, etc., he could not afford the expensive treatment and faced a catastrophic expenditure.

Hence in this context, given these three sentences or paragraphs through these three friends, we have seen that whoever has opted for the insurance has utilized it. Hence, Akash decided to take the extra risk, knowing that he would be covered. This highlights the concept of moral hazard, which we have discussed, which is moral hazard in health insurance. So, after this, the Nandan case is fine because he is a risk lover and in that

case, the moral hazard aspect is not discussed because he is ready to pay for it. But in this case the payment is already made and Akash prefers to go for it because he knows that insurance is there.

Hence, it is a famous moral hazard. Which type of moral hazard is this? In anticipation, action is taken to go for a river rafting trip in Rishikesh, which is called an ex-ante moral hazard problem. Another one from a recent clip of the newspaper, you can easily see that in the event of injury, you can just see I have figured out what was causing Marvin's toe to be cold. From the first figure you can say Marvin is being picturized; the figure is getting cold, but why is it so? The response is that I still want to take him to; basically, the cut mark or the finger's injury seems minor. It is visible from the figure that as if nothing is making it so serious.

However, he wants to cross-check with the doctor, I still want to take him to a doctor just to be sure. That means since it seems as if the doctor is going to deal with the matter and will take care of these aspects if insurance is there or insurance is taken. That post-event basically happens once the event has happened. If the treatment is taken in that case and the decision is still taken, it is an ex-post moral hazard problem. So what are then the determinants of moral hazard? There are largely three; one is a very necessary criterion called asymmetric information, which we have already explained, and the other two are price distortion- or price sensitivity-based. In the price distortion case basically a function of price distortion where price is dominating and in that case, the function of completeness of insurance.

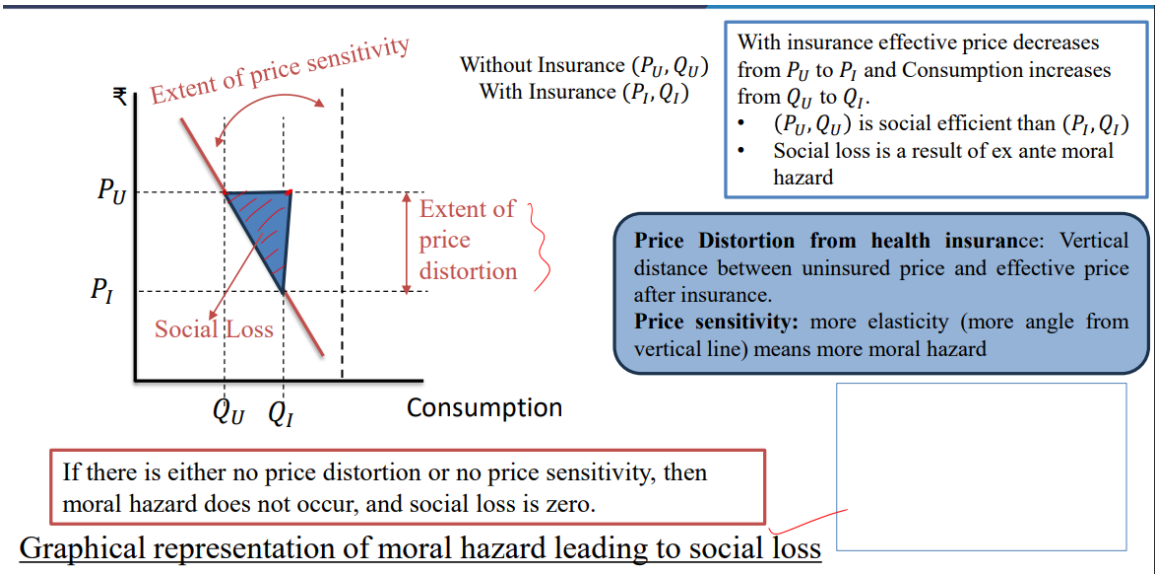
So, complete insurance if it is there that is actually distorting the price and that way the patient might take advantage because of price changes. Hence, price distortion leads to the possibility of moral hazard. Sensitivity is another reason. If the change in price also affects, sensitivity again depends on the nature of risk being insured and how controllable it is depending upon how sensitive the price is respective to that of the event. Hence, the cost of risky action, distortion, changes, etc., matters a lot in case of moral hazard behaviour. In this diagram, we are just trying to explain the social loss resulting from price sensitivity or price distortion. Here, we present the demand without insurance. The first diagram does not show price sensitivity. We are just presenting the simple linear diagram.

We are just trying to explain the price distortion at this moment. So, without insurance, the choice is the price is corresponding with the quantity of the consumption. So, Pu, Qu is called without insurance and if insurance is taken then the price gets completely distorted to P_I level and hence higher quantity is consumed, and that is basically due to the extent of price distortion. And if there are any sensitivities, then of course, it will change the narrative and we will just see how it happens. So, with insurance, effective price decreases from Pu to P_I and consumption increases from Qu to Q_I.

So, Pu, Qu is a social efficient one. However, Pu, Qu is not the best taken because insurance is opted. So, the final choice is P_I, Q_I, and social loss resulting from the ex-ante moral hazard problem. So, price distortion from health insurance is explained as the

vertical distance between the uninsured price and the effective price after insurance. And we will explain these things. And in case of the extent of price sensitivity, if it is getting changed and it is becoming, price is responsive enough in this diagram when it is flatter or relatively flatter.

When it is inelastic, the price is insensitive. In that case, it is not the price distortion that really matters regarding moral hazard. If there is either no price distortion or no price sensitivity, then if that is the case, then moral hazard does not occur. If it is completely vertical, or there is no sensitivity of the price, or it is completely even fixed, in that case, no moral hazard occurs and hence social loss is 0. So, this is where we are presenting the issues of social loss.



Graphical representation of moral hazard leading to social loss

You can see, so till Q_I as I already mentioned from this till this, this portion is over-utilized, leading to social loss. How to limit this moral hazard? Some suggestions are given, like as I already mentioned, due to price or sensitivity. Insurers include provisions in their contracts that attempt to mitigate the effect of moral hazard. The extent of moral hazard depends on how sensitive the demand is to price and amount of price distortion caused by insurance. So, there are suggestions given out of the five or three are used to be negligible.

One, deductibles, gatekeepers and monitoring. The most effective approaches are the first two, co-insurance and copayment. It is not that the one-time insurance is paid, but that is safeguarding completely. The co-insurance is taken, or copayment is taken with a certain amount or with certain percentages; that way, cost is being shared and carries certain pressure on the patient's mind and so overuse might be controlled.

So, we are going to discuss this. We said that how sensitive demand is to price in that case, insurers usually does not have the control. However, in the second one, insurers can reduce price distortion like if price distortion if it is the important cause behind then that way, co-insurance and copayment might work since cost sharing is considered. So, here we are

mentioning one by one that is copayment and co-insurance rate. This reduces the social loss at the expense of increasing uncertainty faced by consumers who are no longer fully insured. So, co-insurance is clarified as an insurance provision in which enrollees pay a percentage of each medical bill and the insurer covers the remaining portion. That is basically a certain percentage in each medical bill to be paid called co-insurance.

In the case of copayment, a provision for a fixed amount to be paid is called co-pay for each medical coverage. So, we are discussing the context of social loss from full insurance plan. You can see that I think we have partly discussed it and are going to discuss it in the next unit as well, which is our health system unit. We are emphasizing this about the systems and how they control social losses. So this is the one where we already mentioned that it is Qu without insurance case and individually on insured he gets or she gets what is here she pays, which is marginal benefit equal to marginal cost since there are no losses.

And once full insured at the level of the total demand, that is Qu if it is covered, if it is complete coverage by insurance, so that means all the access you can do it and that is considered to be the one with full insurance. When an individual has full insurance, the marginal cost of medical care is 0, and hence it is the entire one where it is over-utilized and so it is since the individual is emitting or is bearing no marginal cost and all the cost of access goes to the society and hence it is called social loss. Effective demand in case full insurance becomes upward and straight line that is inelastic irrespective of price individual purchases optimal healthcare since his marginal cost is 0, which we already mentioned. We are referring the case of copayment.

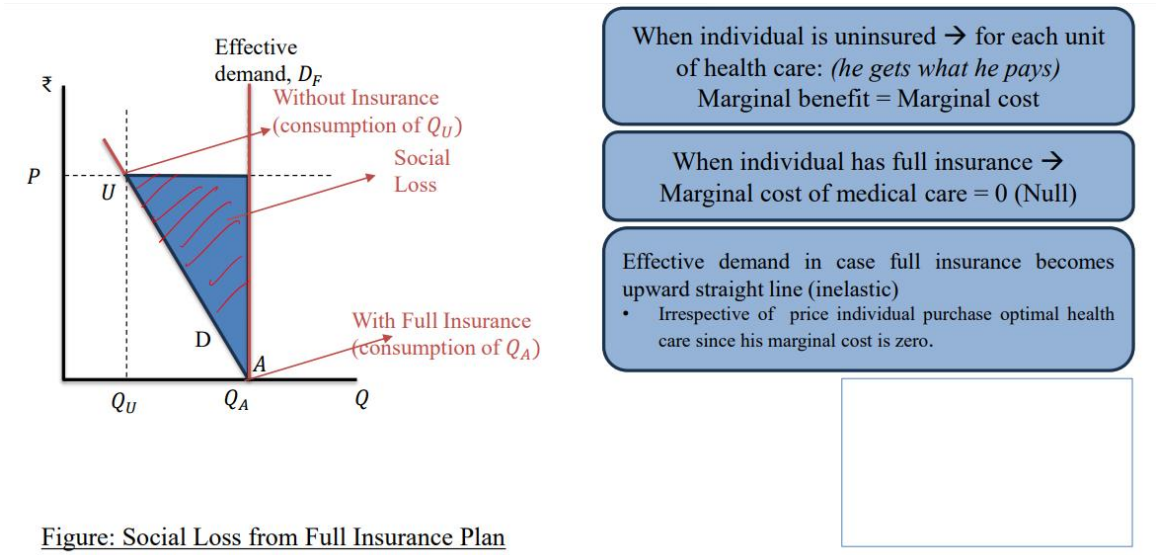


Figure: Social Loss from Full Insurance Plan

Copayment you can just see once. This is the entire amount on the box is of social cost or social loss. Since the individual marginal cost is 0, the entire cost is social. We are discussing if copayment is introduced. A certain amount is to be paid, fixed amount to be paid out of the total. So individually bearing and the cost hence total consumption reduces till this, you

can just see.

So the total social loss is reduced. In another case, if there are some sensitivities due to co-insurance, you are paying a certain percentage of your insurance. Yes, a major percentage is covered by the insurance company, but a certain percentage you are bearing. Hence the social cost will be different and use will be different. So you can just see that the co-insurance plan rotates the insured individual's demand outward from the case of no insurance. Zero co-insurance is nothing but the vertical line, which we already discussed, and it overlaps with the full insurance line.

As the co-insurance rate increases, the line goes towards the actual demand curve, that is, D. It is tilting towards the D line, and 100 percent co-insurance rate means no insurance line that will be the original demand curve. So effective demand swivels to left when co-insurance are present from the case of insurance. Hence less social loss against the full protection or the full insurance case. So now we are discussing the case of deductibles which we negated a bit because it hardly carries the cost-sharing basis.

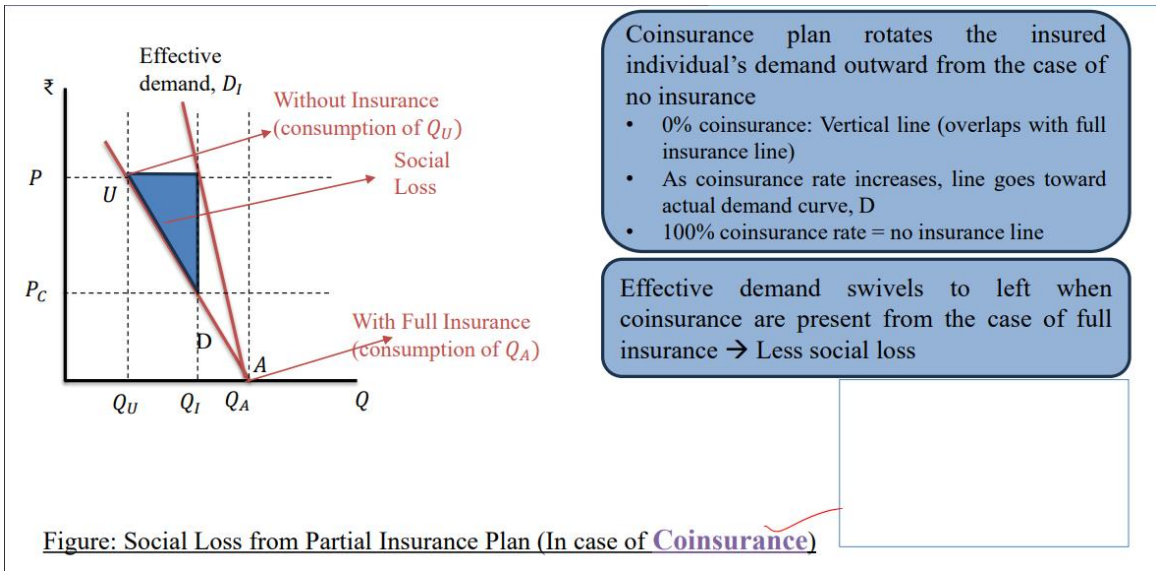
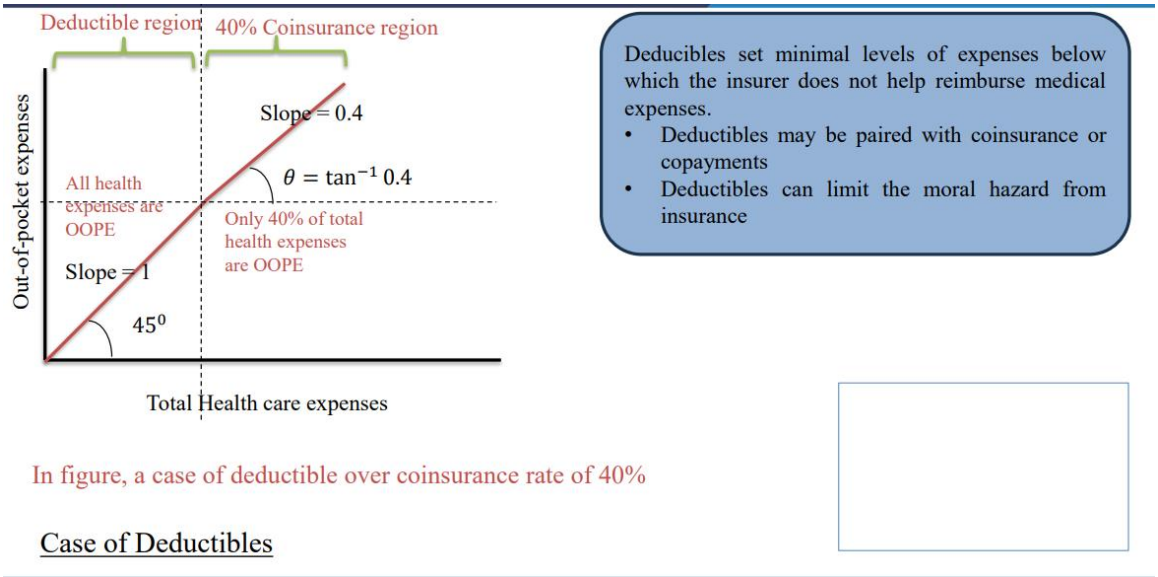


Figure: Social Loss from Partial Insurance Plan (In case of Coinsurance)

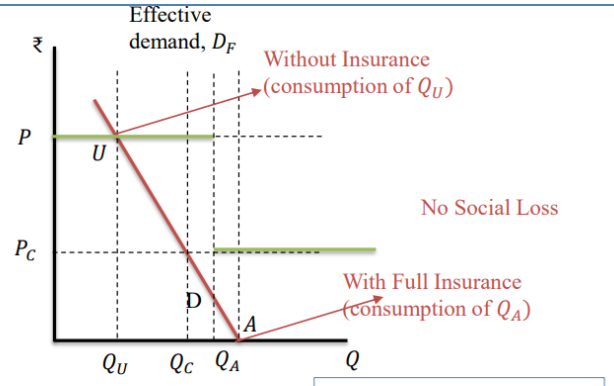
However, if deductibles are there, still it controls the moral hazard. Deductibles are set of minimal levels of expenses below which the insurance does not help reimburse medical expenses. Deductibles may be paired with co-insurance or copayment or deductibles can limit the moral hazard from insurance. This is what we said total healthcare expenses increase, hence the out-of-pocket burden increases which means the person is bearing the cost. However, if deductibles are there, some deductibles after a certain level is there, in case of deductible over insurance rate of 40 percent we are saying, we have drawn a 45 degree line to highlight that with the axis your rate of bearing the cost is same or at the same rate, but if deductibles are there that means 40 percent is covered. So, 40 percent co-insurance region is now given, some deductibles are there. So, in that case, you can just see the change tilled in the line, it is no more the 45 degree line. So, some deductibles are there,

hence we can present it differently. So, only 40 percent of the total held expenses are OP. Basically the individual bears 40 percent, another 10 percent may be covered.



So, if 40 percent deductibles are there that is also somewhere controls the moral hazard. So, case 1, when the deductible is greater than that of Qc, you can see deductibles are even higher than that of that is if that deductible is δ greater than that of Qc, insured person has to pay deductible amount for all the cost below delta and hence copayment price and no incentive for moral hazard and no social loss. So, in this case, case 2 when the deductible is less than the Qc, insured person has to pay the deductible amount for all the cost below delta in the range above deductible and below copayment he has incentive for moral hazard and less social loss. So, there are other indicators of controlling moral hazards, such as monitoring and gatekeeping. So, we already discussed some of those examples earlier like gatekeeping, how it is relevant.

Case 1: High deductibles (δ)
If $\delta > Q_c$
Insured person has to pay deductible amount for all the cost below δ and hence copayment price
→ No incentive for moral hazard
→No social loss



Case of High Deductibles + Copayments

However, I am discussing some of them. In the chapter and other chapters, we also discuss how insurance companies reduce moral hazards by confronting information asymmetry through medical care supervision. Insured persons, what is getting motivational or incentive programs for insured persons to follow healthy habits like pre-event motivations? We will also discuss health systems with monitoring and gatekeeping in unit 7. So, specific importance is given in the health system chapter, unit number 7.

There is some evidence of moral hazard in health insurance. If you look closely, we cited the example of the USA lab experiment based on the run RAND HIE, which suggests that enrollees with more generous insurance are more reckless with their health. So, in that case, you can just see patients with full insurance who were 25 percent more likely to appear at the doctor's office or hospital with a broken bone or dislocated joint and 18 percent more likely to present. You can just see from the estimation the table 18 percent more likely to present with some other serious trauma. This is given here and 35 percent more likely to be hospitalized for drugs or alcohol abuse. Hence, ex-ante moral hazard is explained when those with insurance coverage take more risk.

In Ghana, another example is the tendency of insured households to have fewer people sleeping under mosquitoes than uninsured households. In one work identified Yilma et al 2012 paper, health insurance decreases the cost of malaria treatment for insured households. Full insurance induces ex-ante moral hazard. Another one is called preventive care and moral hazard how it is controlled. Such as they told you low use of preventive care means person is taking more health risk.

This is found in Mexico's Segumo Popular en Salud 2003 health insurance scheme. Another case is the use of preventive care, which is an ex-post moral hazard problem. We have already cited the RAND experiment and Oregon's Medicaid study. Both ex-ante and exposed moral hazard effects arise when preventive care is covered by insurance. Offside of another

last one to discuss is the offside of moral hazard that is what if people routinely consume less health care than they should and that may be because of ignorance of the benefits of health care and inability to judge the likelihood of rare events rightly.

There are income effects as well. The poor and middle-class families can afford expensive treatments can face expensive treatment. The person may change his behaviour by opting for an expensive treatment that is well worth it, which he might not have chosen without insurance. So that is all. We have discussed all the possibilities of controlling moral hazards and how they affect the patients' families. To understand this in detail, we suggest you read Bhattacharjay et al.'s book as Health Economics in Bloomsbury publication. In the next lecture, we will be discussing information asymmetry, and we will discuss the adverse selection issues as well.

With this, I must thank you. You raise your queries, I will be happy to address it. Thank you. Thank you.