Consider the market for health insurance. Suppose that the market is comprised of 4 groups of people of differing risk categories. There are a large and equal number of people in each group, but insurers cannot tell which group a person belongs to (i.e. this is a situation of asymmetric information). Each group faces a risk of requiring medical treatment of value $10,000.

Suppose that the willingness to pay of people in each group is as follows:

Risk	20	40	60	80
WTP	2,500	5,200	6,800	8,500
Actuarially fair premium	**2,000**	**4,000**	**6,000**	**8,000**
Risk Premium	500	1,200	800	500

   a) Complete the table of actuarially fair insurance premiums that could be charged to each group separately by an insurance company large enough to diversify the risks. How do these compare to the willingness to pay?

The actuarially fair premium is equal to the expected loss = 10,000xprobability. It is always lower than the willingness to pay since people exhibit risk aversion.

   b) Suppose now that the risk category is private information. What is the average riskiness of a person seeking insurance? What premium would an insurance company have to charge to break even?

If all agents participate the chance of a loss in the population as a whole is 50%. The insurance company will have to charge at least 5,000 to avoid a loss, and in a competitive market this will be the price of insurance

   c) Will all the agents participate at this price? If not what would be the composition of risks facing the insurer? Would the premium found above be sufficient to cover the risks taken by the insurer?

At this price the lowest risk 20% category would not participate as the premium is too high. If only the 40%, 60%, 80% risks are in the market then the chance of a loss is 60%. The insurer would need to charge 6,000.

   d) Continue with this logic. What will be the price of insurance in the equilibrium and which groups will participate?

Continuing as above, when the price is 6,000 only the 60% and 80% risks remain with overall risk 70%. The insurer would raise the premium to 7,000 driving out the 60% group and thus the equilibrium price will be $8,000 and only the highest risk agents will insure.

   e) Is this an efficient outcome?

This is not an efficient outcome – if insurance could be provided on actuarially fair terms to each group individually this would generate a surplus since they are risk averse. Instead, the adverse selection problem leads to the collapse of the insurance market leaving many agents uninsured.

Can we do any better? If there is no way to obtain the private information then the policy maker faces the same constraints as the market and the insurance market creates only $500 of surplus per high risk person.

Making participation mandatory can create more total surplus. In this case insurers would know that the aggregate risk is 50% and the competitive price of insurance would be 5,000. At this price the surplus of the agents is:

Risk	20	40	60	80
WTP	2,500	5,200	6,800	8,500
Actuarially fair premium	**2,000**	**4,000**	**6,000**	**8,000**
Pooled premium	**5,000**	**5,000**	**5,000**	**5,000**
Surplus	**-2,500**	**200**	**1,800**	**3,500**

Note, however, that even though the total surplus has increased this is NOT A PARETO IMPROVEMENT – the low risk agents are worse off with mandatory participation and there is no way to compensate them since that would require that we can somehow identify them, which by the assumption of private information is impossible.