

# E-MATERI



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## BUILDING RESILIENCE IN **TUNA** WORLD:

“Control Your Future  
or Someone Else Will”

HOTEL TENTREM YOGYAKARTA

5-6 JULI 2023

KONFERENSI & WISUDA YPIA



**PERTAMINA**



**PLN**



# ***Current Trends and Future Challenges in Healthcare Industry***

## **>> *Cost Quantification Perspective***

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*Konferensi Audit Internal YPIA – July 5-6, 2023*

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## ***Insurance Mechanism – Law of Large Numbers (1)***

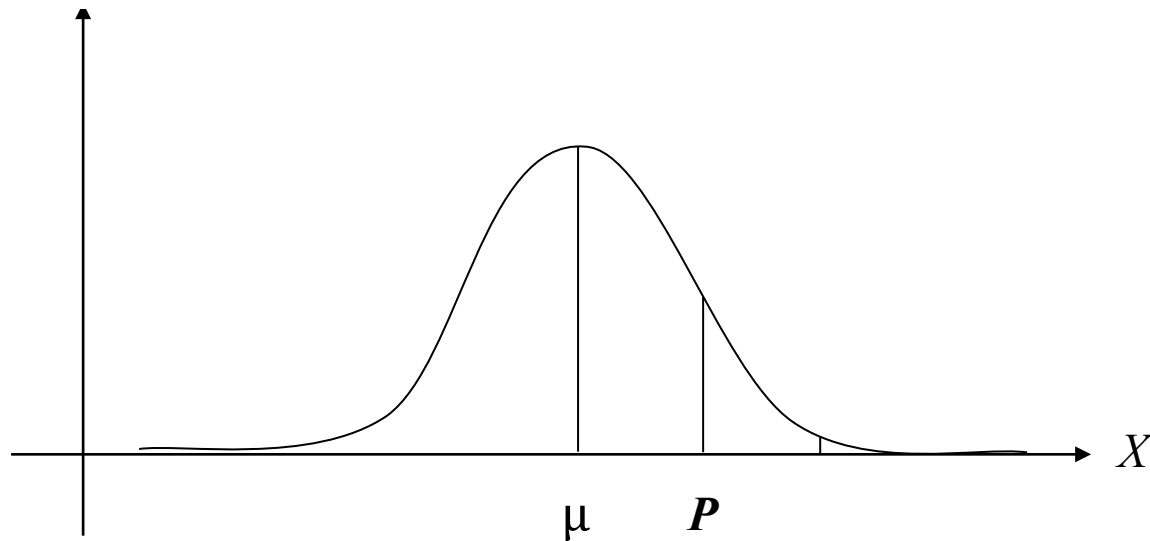
- *Pooling of individual risks, and each individual risk is conceptually a random variable*
- *Gotong royong and contributory (there is contribution from each individual risk party in the pool)*
- *The more individual risks included in the pool the smaller the ratio of deviation to mean of the total risk*
- *If each individual contribution is “enough”, the more individual risks included in the pool the larger the probability of outcome of total risk being less than total of contributions would be*
- *Quantification of individual risks is importantly needed to be able to identify “enough” individual contributions, to make sure the mechanism work*

## ***Insurance Mechanism – Law of Large Numbers (2)***

- $X_1, X_2, \dots, X_n$  are similar and independent individual risks
- Total risk =  $X_1 + X_2 + \dots + X_n$
- $E(X_i) = \mu$  and  $SD(X_i) = \sigma$
- $E(\text{Total Risk}) = n \cdot \mu$  and  $SD(\text{Total Risk}) = \sqrt{n} \cdot \sigma$
- Ratio of deviation to mean of total risk is  $\frac{SD(\text{total risk})}{E(\text{total risk})} = \frac{1}{\sqrt{n}} \cdot \frac{\sigma}{\mu}$
- The larger  $n$  the smaller the deviation to mean ratio
- $P$  is “enough” individual contribution (then  $P > \mu$ )
- The larger  $n$  the larger the probability  $\text{Pr}(\text{outcome of total risk} < n \cdot P)$
- Quantification of individual risks is importantly needed to identify  $P$ , to make sure the mechanism work

## ***Insurance Mechanism – Law of Large Numbers (3)***

*Density function of  $X$*



- *Quantification of random variable  $X$  is importantly needed*
- *$P$  is “enough” individual contribution ( $P > \mu$ )*

# Quantification of Individual Healthcare Costs (1)

- *Individual healthcare cost is conceptually an individual risk*
- *Total healthcare cost is then conceptually the total risk*
- *Sample space or set of possible outcomes of the individual healthcare cost is set of possible agreed benefits the insurance operator can pay to patient, hospitals or clinics, related to health treatments given by hospitals or clinics to patient*
- *This set of possible agreed benefits represents **exposure** or **severity** aspect of the individual healthcare cost, and is a dynamic set changing from time to time, following agreements between insurance operator and patient or hospitals or clinics typically based on treatment forms, their actual costs and inflation*
- *Probabilities of occurrences or incidences of patient getting health treatments from hospitals or clinics represent **likelihood** aspect of the individual healthcare cost*

## ***Quantification of Individual Healthcare Costs (2)***

- *This likelihood component of the cost, represented by set of incidence probabilities, is also very dynamic, changing from time to time, following among others changing behavior of patient toward getting health treatments, illness cycles, and condition of macro health environment, affected by epidemics or catastrophes such as Spanish Flu and Covid 19*
- *Estimation of these incidence probabilities, usually called **statistical analysis** or **experience studies**, is a must from time to time for the insurance operator, as monetary value of the healthcare cost or insurance benefits changes from time to time following the changing incidence probabilities (as well as the agreed insurance benefits)*
- *Insurance operators lacking on this statistical analysis are generally exposed to risk of inadequate pricing*

# ***Agreed Insurance Benefits vs Actual Costs***

- *The agreed insurance benefits in our quantification discussion represent actually revenues for hospitals and clinics, so they are not the same as actual costs of hospitals and clinics*
- *Under BPJS context agreements on insurance benefits are there between BPJS and hospitals or clinics*
- *Alignment between agreed insurance benefits and actual costs should be maintained from time to time so that hospitals and clinics do not get into economic/monetary loss condition*
- *Ways to create cost control and efficiency should be there for hospitals and clinics to achieve this alignment*
- *Under private insurance context gap between agreed insurance benefits and actual hospital and clinic costs is generally more manageable as agreements on insurance benefits are based more on fee for service philosophy*



*Thank You*