

# **Assessing the effects of demographic and non-demographic factors on healthcare utilization in ageing population in low-middle income country: a case of Indonesia.**

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## **Introduction**

The ageing of population is often associated with strain of health system due to increasing healthcare utilization among elderly. Various studies suggested that effects of aging on health expenditure are significant [1-3]; while others, believed that the effects are more subtle [4-7]. In all these studies however, the extent to which ageing mingles with other factors was rarely addressed.

Most of the future healthcare utilization is projected solely by the change in size and structure of future population, and therefore assuming all other factors influencing healthcare utilization to be constant. While the method is simpler, it may be misleading for it is ignoring the dynamic of social economic, epidemiology and public intervention which are quite substantial in developing countries.

This study aims at simulating the effects of demographic and non-demographic changes to the future healthcare utilization and therefore the effects ageing can be proportionally compared with those of non-demographic factors. Indonesia is chosen as a case for it is undergoing early stage of population ageing and in the same time substantial changes in other influential factors such as public policy intervention and epidemiological transition are occurring.

## **Data sources and methods**

The data for this research came from three surveys conducted in 2007. Indonesia Family Life Surveys (IFLS) is used for the determinants analysis (N=30,614). National Social Economic Survey (Susenas) gathers information on individual healthcare utilization including health insurance subscription status (N=1,167,019). Data on chronic diseases status were obtained from National Health Surveys which also record healthcare utilization (N=800,621). All surveys are nationally representative with multistage, random sampling method. 2010 Population census is used as the baseline for the population projection until 2025.

The propensity of healthcare utilization in the baseline year (2010) by age and sex (demographic factors), health insurance subscription (socio-economic factor) and chronic diseases status (health need factors) was estimated using logistic regression model. These propensities is then simulated to the projected population 2010-2025 period, with the assumption of increased health insurance rate to 100% (universal coverage) and increased chronic disease rate 0.5 percentage point annually (age and sex-standardized increased rate).

## **Results**

Age is found to be significant predictor of healthcare utilization. Younger children are more likely to use healthcare. The probability of utilization, however, starts to increase from age 14 until entering elderly period where the use of health service start to decline until the end of life. Among children the effect of sex is insignificant. Among adult and elderly, women are more likely than man to visit health care provider when sick. Non-demographic factors associated with utilization include education level, income, and general health status, severity of illness and place of residence. Health insurance subscription and chronic diseases contraction effects are significant to both women and men at all age group although the magnitude of effects are not significant different.

During 2010-2015 the total population of Indonesia is estimated to increase by 16%. By age groups, children (age 0-14), adult (age 15-64) and elderly (age 65+) the population is projected to grow -4% (decreased), 21% and 68%, respectively. This change in size and structure of population affects overall increased of healthcare utilization by 25% in 2025.

The effects of demographic change however, are specific for each population group: decreased utilization among children, but increased among adult and elderly.

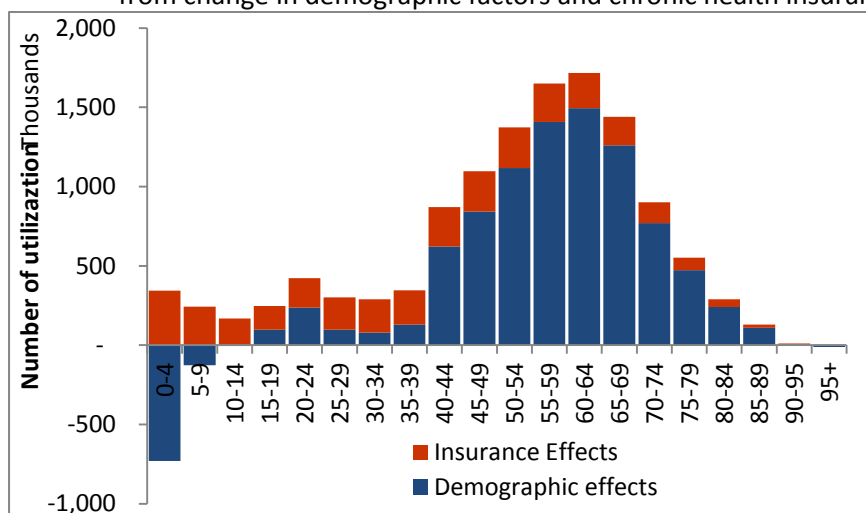
Table 1. Effects of demographic, health insurance and chronic disease rate to healthcare utilization 2025.

Determinants	Increase of utilization (%) in 2025 as compared to 2010			
	Total population	Population by age group		
		0-14	15-64	65+
Demographic (Increased population 16%)	+25	-7.2	32.2	84.3
Health Insurance subscription rate (Increased from 29-100%)	8.3	8.1	8.6	7.5
Chronic diseases rate (Increased from 6.8 – 14.3%)	4.7	0.0	5,0	5.0

The increase of health insurance subscription and chronic diseases rate also affects the use of health care. Achieving universal coverage of insurance will increase total healthcare utilization by 8.3%; while increased 0.5% of chronic disease annually also increases the utilization by 4.7%. Unlike the effect of demographic factors, the effect of health insurance and chronic diseases do not vary significantly across age group. This is primarily due insignificant in their propensity of utilization by age.

Evaluation at 5-year age groups reveals that the effects of health insurance and chronic diseases can be meaningful compared to demographic effects. For example, increased health insurance adds the future utilization of age group 0-4 and 5-9 which otherwise would be decreased (negative). In fact the effects of health insurance are higher than the effect of demographic change for age group 5-9 to 39-39 (Picture 1). Similarly, the number of utilization due to increased chronic disease rate among young adult than elderly is much higher.

Picture 1. Projected change in number of healthcare utilization 2010-2025 by age group resulted from change in demographic factors and chronic health insurance subscription



## Discussion

In general, the effect of demographic change on health care utilization is quite substantial and more profound than the effect of health insurance subscription or increased chronic diseases. Although the probability of visiting healthcare provider among elderly is high, leading to substantial increased of utilization between 2010 and 2025, its contribution for the total utilization of all ages is marginal. In other words, the effect ageing is relatively modest. For individual age groups, however, the effect of non-demographic factors (in this case health insurance and chronic diseases) can exceed that of demographics.

All these comparisons is possible since the model is capable in simulating other factors than demographic. These properties would be very beneficial to probe the future utilization affected by changing in dynamic of population characteristics. This study offers an insight that the effects of demographic change to healthcare utilization is not straightforward if we are to acknowledge that ageing progresses along with the non-demographic factors as the case in many developing countries.

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