Public health insurance and healthcare utilisation decisions of young adults

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Abstract

This paper investigates the impact of a dependent coverage age-eligibility rule on young adults' health insurance coverage and healthcare utilisation under Indonesia's National Health Insurance (NHI) program. Using a regression discontinuity design and data from 1.9 million NHI enrolees, it documents a significant 14.6 to 20.9 percentage point drop in coverage among young adults at age 21. Analysing the 2018 National Socioeconomic Survey, the study finds no immediate change in young adults' health status at the age threshold but a marked decrease in utilisation of outpatient care, particularly in public primary care facilities. Specifically, there is an abrupt 5.3 to 8.4 percentage point reduction in the probability of young adults having any outpatient visit in the past month, primarily driven by lower utilisation of primary care services. The study also finds an increased likelihood of self-treatment and use of traditional healers, indicating a substitution effect. Further analysis shows a larger impact on those who are poor, less educated, and live in regions with higher healthcare costs. Overall, this paper highlights the need for greater attention to young adults in the design and implementation of public health insurance programs in developing countries.

Keywords: health insurance, healthcare utilisation, health status, young adults
JEL Codes: I13, I18, O15, G5

1. Introduction

To achieve Universal Health Coverage (UHC), many low and middle-income countries (LMICs) have been expanding their public health insurance programs (Wagstaff et al., 2016). This expansion requires a combination of various financing sources to provide coverage for different population groups. One common strategy is to use tax revenues to fund insurance for the poor and mandate the rest of the population to join the health insurance programs via contributory mechanisms (Lagomarsino et al., 2012). However, because enforcing the mandate is difficult, this approach is prone to low program uptake and persistent adverse selection, where enrolment is primarily concentrated among the least healthy individuals (Einav & Finkelstein, 2011).

In Indonesia, the National Health Insurance (NHI) program, launched in 2014, has been facing similar challenges. As of 2018, a year before the program was initially targeted to reach full population coverage, approximately 57 million individuals or about 21% of the Indonesian population remained unenrolled (National Social Security Council, 2020). Furthermore, because coverage in NHI depends on enrolees continue to pay their contributions or meet their ongoing eligibility criteria, some of them may lose their health insurance benefits at some points. According to NHI membership records, approximately 20% of enrolees was without coverage in December 2018, with the highest rate of 30% observed among individuals aged 21-25.[1] Previous studies examining this pattern have mainly looked at the issue of premium non-payment among contributory enrolees. Notable examples include Dartanto et al. (2020) and Muttaqien et al. (2021), which explore factors associated with payment compliance, and Banerjee et al. (2021), who experimentally test multiple interventions to promote NHI enrolment and coverage retention. However, evidence on the causes and consequences of the significantly higher coverage dropout rate among young adults is lacking.

This paper contributes to this sparse literature and policy-relevant question by investigating how a dependent coverage age-eligibility rule affects young adults' likelihood to have coverage and, as a result, how the change in coverage impacts their health and healthcare utilisation decisions. The rule specifically applied to young adults enrolled as dependent children within NHI's employment-based scheme, which covers employees and their families.[2] It states that young adults can only be covered under their parent's coverage if they are younger than 21, are not formally employed, and are never married. Using a regression discontinuity design (RDD), I compare the outcomes of

[1] These estimates are based on the publicly available random sample of individuals who have successfully registered into the NHI database until 31 December 2018, one of the two data sources used in this paper.
[2] About 25% of NHI enrolees is part of this scheme.

individuals just older and just younger than 21, assuming there is no systematic difference between them except that the older group is affected by the rule. This approach is similar to those used in other contexts, such as Anderson, Dobkin, and Gross (2012), and Card, Dobkin, and Maestas (2008).

Utilising a newly available 1.9 million random sample of NHI enrollees, which include those who have successfully registered with the program as of 31 December 2018, I document for the first time that the age-eligibility rule leads to an abrupt loss of insurance coverage among young adults in Indonesia. Specifically, the fraction of enrolees with coverage decreases by about 14.6 percentage points at age 21. Restricting the sample to those enrolled as dependent children and their parents have active NHI coverage, the reduction is bigger, at 20.9 percentage points. My further analysis indicates that this change only affects those enrolled as dependent children under their parents' employment-based coverage, the specific group targeted by this rule. Additionally, there seems to be no coverage rebound after the age limit, indicating that young adult enrolees did not immediately seek to reactivate their coverage.

To investigate the subsequent impact of coverage loss on health and healthcare decisions, I analyse data from the 2018 wave of the National Socioeconomic Survey or Susenas, a large annual household survey conducted by Statistics Indonesia. Examining the health outcomes, my estimates indicate that the probability of young adults reported having health problems in the past month does not change at age 21, suggesting no immediate impact of NHI coverage on young adults' health. Focusing on individuals who report health problems, I observe that the loss of coverage is associated with some notable changes in individuals' healthcare decisions. Specifically, reaching age 21 causes a significant 5.3 to 8.4 percentage points reduction in the likelihood of them getting outpatient care in either primary care or hospital outpatient services. I further show that this decline in utilisation mainly occurs in public primary care facilities.[3] Additionally, there is suggestive evidence of a substitution effect with the increased rate of self-medication and visits to a traditional healer.

Past studies have examined the impacts of health insurance on health and healthcare in Indonesia. However, only a few are based on the current NHI regime. For example, using data from the Indonesia Family Life Survey (IFLS), Erlangga, Ali, and Bloor (2019) find that individuals who gained NHI coverage between 2007 and 2014 have higher healthcare utilisation compared to the

[3] In Indonesia, public primary care facilities consist of government-run health centres (Puskesmas), mostly available at sub-district level, and their satellite village-level health posts and community health posts. For the uninsured, their services are not free although the costs are generally cheaper than private primary care clinics.

matched sample of individuals who remained uninsured. Another study is Anindya et al. (2020), which shows that NHI coverage is associated with increased utilisation of maternal health services. The remainder of the studies are mostly on the pre-NHI schemes like the health card ("Kartu Sehat") program in the early 2000s (Johar, 2009), the social health insurance program for the poor (the "Askeskin" and "Jamkesmas" program) in 2005-2006 (Shrestha, 2021; Sparrow, Suryahadi, & Widyanti, 2013; Vidyattama, Miranti, & Resosudarmo, 2014), and the 2007-2010 district health insurance program (Sparrow et al., 2017).[4]

The last part of the paper explores the potentially important heterogeneous impact of the age threshold on young adults' health and healthcare utilisation. I find that those who are poorer, are less educated, live in urban areas, and live in areas with above median average outpatient costs are more heavily affected by the rule. However, only the difference in effects between those who at least attended senior high school (more than 9 years of schooling) and those who only have junior high school degree or less (9 or lower years of schooling) appear to be statistically significant. Finally, I show that the results presented in this paper, particularly on the impact of reaching age 21 on coverage status and healthcare utilisation, are robust to the choice of bandwidths and possible anticipation effects. No discontinuous changes in outcomes are observed at other arbitrary (placebo) cut-offs other than age 21, confirming that the found effects are indeed driven by coverage loss due to the age-eligibility threshold.

Collectively, these results add to the growing literature on the consequences of losing health insurance coverage or increasing co-payments experienced by young adults globally. In high-income countries, the change in health insurance entitlement is generally found to reduce the use of various healthcare services.[5] On the other hand, evidence from LMICs is very limited and inconclusive. For example, a study in Colombia finds that losing health insurance coverage reduces young adults' likelihood of having preventive healthcare visits and increases their use of free treatment provided in the emergency department (Gaviria & De la Mata, 2015), while a study in the Philippines finds no effect on overall healthcare utilisation (El Omari & Karasneh, 2020).[6]

[4] Most of these studies also find a positive insurance effect on healthcare utilisation, but not health. Only one of them (Shrestha, 2021) shows estimates for young population aged 15-35 where it finds the insured women have higher utilisation of outpatient services in public primary care.

[5] These studies include outcomes such as utilisation of primary care (Johansson, Jakobsson, & Svensson, 2019; Nilsson & Paul, 2018), emergency department or inpatient hospitalisation (Anderson et al., 2012; Anderson, Dobkin, & Gross, 2014), and mental healthcare services (Lee & Kim, 2020; Lopes et al., 2022).

[6] These two studies use similar strategy as this paper where dependent coverage age-eligibility rule is applied to young adults (age 18 in Colombia and age 20 in the Philippines). The study by El Omari et al. (2020), however, only shows the reduced-form effect of reaching age threshold without reporting its effect on insurance coverage. Therefore, the extent to which their findings can be attributed to the effect of coverage loss is unclear.

Unlike this present paper, these two studies rely solely on self-reported health insurance coverage in which misreporting could be frequent (Kanmiki et al., 2019).

The remaining sections of this paper are structured as follows. Section 2 discusses the institutional setting of the Indonesia National Health Insurance (NHI) program. Section 3 describes the methodology, including the data sources and empirical approach. Section 4 presents and discusses the findings, followed by several robustness checks in Section 5. Section 6 concludes.

2. The Indonesia National Health Insurance (NHI) program

In 2014, Indonesia established a National Health Insurance (NHI) program known as "Jaminan Kesehatan Nasional" or JKN. This program operates as a single-pooled health insurance system managed by a quasi-governmental body called the Social Security Agency for Health (SSAH). This section summarises the relevant features of the NHI program, including its membership schemes, enrolment and coverage rules, as well as the delivery and cost of healthcare services.

2.1. Membership schemes

NHI adopts the Social Health Insurance (SHI) model in which insurance coverage is financed by monetary contributions of its members (see Wagstaff (2010) for more detailed discussion about this concept). In implementing this model, NHI creates three distinct membership schemes based on individuals' income and employment status. First is the fully subsidised scheme, which provides free insurance coverage for low-income households. Eligibility for this scheme is determined through community targeting and proxy means-testing based on a set of easily observed household assets. In 2018, the amount of NHI contribution paid by the government from tax revenues was Rp.23,000.00 per person per month.

Second is the employment-based scheme, covering formal sector employees who receive wages regularly. Coverage in this scheme is linked to salary deductions. A 5% deduction (4% by employers and 1% by employees) is applied to a maximum base salary of Rp. 8 million. Primary enrollees can include a spouse and up to three children as dependents, with the option to add more family members (parents, parents-in-law, and additional children) by paying an extra 1% per person. Children must be under 21 (25 if full-time students), unmarried, and not formally employed.

Third is the contributory scheme, which targets the remaining population not eligible for the full subsidy but also not formally employed. This group primarily consists of employed individuals who do not receive wages regularly (often classified as informal sector workers) and non-workers

such as veterans, retirees, and business owners. Coverage for this scheme is based on monthly premium payments, which are available in three options: Rp.25,500 for Class III, Rp.51,500.00 for Class II, and Rp.80,000.00 for Class I coverage.[7]

2.2. Enrolment and coverage

Enrolment in the NHI is mandatory for all Indonesian residents, including foreigners who have resided in the country for at least six months. Enrolment is defined as the successful registration of individuals into the NHI system. Hence, enrolees are often referred to as registered members. Each NHI scheme follows a slightly different route of registration. In the fully subsidised scheme, the government does the registration for households that are deemed eligible. In the employment-based scheme, employees and their eligible family members are enrolled by their employers. Lastly, for contributory scheme, individuals must register themselves.

The program was initially targeted to enrol the whole Indonesian population by January 2019. However, as shown in Figure 1, about 35 million individuals, constituting 13% of the Indonesian population, remained unenrolled as of December 2021, two years after the initial deadline. In December 2018, the period of this study, NHI had about 200 million enrolees, with 60% of them in the fully subsidised scheme, 25% in the employment-based scheme, and the remaining 15% in the contributory scheme. Weak enforcement of the mandate and the significant administrative hassles associated with the registration process are thought to be the main barriers to NHI enrolment, especially for those who must enrol in the contributory scheme (Banerjee et al., 2021).

Enrolment in the NHI stays for life, but its coverage runs monthly. By law, enrollees are obliged to maintain their coverage by paying their insurance contributions or meeting the ongoing eligibility criteria. Ensuring the continuity of coverage is, however, challenging because each membership scheme has different coverage rules. For example, an initially subsidised enrolee may lose their coverage when they are no longer deemed eligible for the subsidy. In this case, their options to regain coverage are to reapply for the subsidy or move to the contributory scheme. For contributory enrollees, non-payment of premiums would also lead to coverage loss. To reactivate, any outstanding premiums (capped at 24 months) must be settled. Alternatively, they can apply

[7] Information presented in this subsection are based on Presidential Regulation No. 19/2016 which was current during the study period (2018). Several changes to these figures have been made afterwards. Per January 2021, the rule was replaced by Presidential Regulation No. 64/2020. The new amount of contribution paid by the government is Rp.42,000.00 per person per month, the deductible monthly salary cap for the employment-based scheme is Rp.12 million, and the premiums options for the contributory scheme are Rp.35,000.00 for Class III, Rp.100,000.00 for Class II, and Rp.150,000.00 for Class I coverage. It should be noted that variation in "coverage class" only affects the type of hospital accommodation when patients have an inpatient episode and does not affect the provided medical services, including when patients access outpatient services.

for the full subsidy if their economic situation worsens. This general rule also applies to current employment-based enrollees, in which a job loss, retirement, or loss of eligibility as a dependent will result in a coverage loss. The options for them are switching to the contributory scheme or applying for a subsidy.

2.3. Healthcare services delivery

In general, the NHI is designed to finance personal healthcare services, focusing on the curative aspect. Meanwhile, most preventive health services (e.g., vaccination and screening) fall under the responsibility of the Ministry of Health and local health offices. Everyone can access these services without incurring any out-of-pocket cost when it done in public healthcare facilities. As part of its role, the NHI offers a comprehensive benefits package that includes all medically necessary treatments. To date, no co-payment has been set, including for the purchase of prescription medicines. In terms of the structure of healthcare delivery, a gate-keeping system is adopted, with primary care providers (PCPs) serving as the first point of contact, and hospitals acting as referral or advanced care providers.[8]

In December 2018, 22,072 PCPs were contracted by the NHI, averaging 43 providers per district. These include 9,933 health centres, known as *Puskesmas*, and 12,139 private primary care clinics, which may include polyclinics or private GP offices. The health centres *(Puskesmas)* mostly consist of one main clinic per subdistrict and their network of village-level health posts. At this level, patients are expected to have access to general practitioners (GPs), dentists, midwives, essential prescription medicine, and basic laboratory services. These PCPs are not always operated by one firm. A mix of different independent providers can also be contracted by the NHI. Additionally, since PCPs are paid through a capitation system, enrollees are required to register themselves with a single or a pair of providers and are only entitled to free services from those providers.

For advanced or referral care services, 2,053 hospitals (46.8% of them are private) were contracted by the NHI, averaging about four hospitals per district.[9] Hospitals are expected to provide outpatient care, inpatient services, and emergency care services, and they are paid based on diagnosis-related groups (DRGs) for each episode of care. To access outpatient services, referrals

[8] All NHI enrolees are entitled with the same medical services. However, their insurance schemes and premium level determine the type of hospital accommodation during their inpatient stays.

[9] In most districts, the available hospitals are of Class D or C (small to medium size hospitals providing basic specialist service). Class B hospitals (intermediate size and more sub-specialistic service) exist in some districts while Class A hospitals (the most advanced level) are only available in few areas, mostly in province capital cities. Information on the number of contracted providers for each month can be accessed through the NHI public dashboard (https://sismonev.djsn.go.id/pelayanan/)

from primary care providers are needed. However, enrolees may bypass this requirement by paying out-of-pocket or via their private health insurance.

2.4. Cost of healthcare services

Without insurance cover, the costs of healthcare services faced by patients vary greatly between providers and regions. The 2018 consumer price report published by Statistics Indonesia (2018) shows that the price for one consultation with a GP ranges from Rp.30,000 (US$2) in Surakarta, Central Java Province, to Rp.150,000 (US$10) in Meulaboh, Aceh Province. For specialists, the price is about Rp.220,000 (US$15). These prices, which mostly reflect the price set by private providers, are considerably higher than the regulated fee schedule for private or uninsured patients used in public healthcare facilities. For example, an outpatient consultation with a GP (in a government-run health centre) and specialist (in a public hospital) could cost as low as Rp. 10,000 (US$0.67) and Rp. 50,000 (US$3.33), respectively. Overall, with a national average monthly expenditure per capita of about Rp.1,054,939 (US$70) in 2018, an individual could spend between 0.7% to 5% of their monthly expense for a GP visit and 3% to 10% for a specialist consultation.

3. Methods

3.1. Data

This paper uses two sources of data: the sample of administrative NHI membership records, known as the NHI dataset, and Susenas or "Survei Sosioekonomi Nasional". The NHI dataset records basic information such as date of birth, sex, membership scheme, and coverage status of the randomly selected 1,971,174 individuals out of the 208 million enrolled individuals as of 31 December 2018.[10] Susenas is an annual cross-sectional households survey conducted by Statistics Indonesia. Specifically, I use the 2018 wave of the survey, the same year as the NHI dataset. This survey collects information on various demographic and socioeconomic indicators, including health status and healthcare utilisation of 1,131,825 individuals from all 514 districts in Indonesia.

3.1.1. NHI coverage

My first outcome of interest is the NHI coverage status. For this, I mainly use the information provided in the NHI dataset, as it contains administrative coverage records. From the data, I construct a binary indicator of whether individuals have coverage or not in December 2018. To

[10] The number of NHI enrolees at that time was about 78% of the Indonesian population. The sampling procedures of the NHI dataset involve a stratification of families into three groups based on their healthcare utilisation history. They are (i) families that have not yet utilised any healthcare services, (ii) families that had utilised primary care services only, and (iii) families that had utilised both primary care and referral services. From each primary care facilities, ten families were then randomly selected from each of the strata.

supplement my analysis, I gather information on self-reported NHI coverage from Susenas, which is based on the question, "What type of health insurance do you currently have?" Individuals are classified as having self-reported NHI ownership if they answer the question with "BPJS Kesehatan" or "Jamkesda".[11] However, since the question does not explicitly differentiate whether the coverage is active or not, this indicator is not directly comparable to the one obtained from the NHI dataset and may only reflect whether individuals have enrolled in the NHI or not.

3.1.2. Health status and healthcare utilisation

Susenas is used to measure health and healthcare outcomes because no information on health status and only the utilisation of individuals with coverage is recorded in the NHI dataset. In Susenas, the health module starts by asking respondents whether they have had health problems in the past month. The survey guideline indicates that these health problems include acute illnesses (e.g., fever, headache, sneezes, asthma attacks, diarrhea, and toothache), chronic conditions, and injuries. Susenas also asks whether those health issues affect respondents' daily activities, indicating severity.

Two questions related to healthcare utilisation are then asked to (only those) people who report health problems. First, the survey asks whether individuals resorted to self-medication, defined as taking medication or receiving treatment without a doctor's prescription. This includes purchasing over-the-counter medication or using medication provided by other people. Second, respondents are asked whether they used outpatient care at healthcare facilities.

If respondents report the use of outpatient care, they are then asked where they received it. The non-mutually exclusive options include (i) public hospital, (ii) private hospital, (iii) doctor's or midwife's private clinic, (iv) subdistrict-level government-run health centre and its village-level satellites (*Puskesmas* and *Puskesmas Pembantu*), (v) community health posts (*Poskesdes, Polindes, Posyandu*, and *Balai Pengobatan*), (vi) traditional healer or alternative medicine, and (vii) other venues. As discussed in Section 2.3, doctors' and midwives' private clinics can be grouped into private primary care providers. Government-run health centres and community health posts can be classified as public primary care providers. In my main analyses, I group individuals who use primary care or hospital outpatient services (or both) into one category. It should be noted that

[11] Susenas uses mixed terms to identify the type of health insurance available in Indonesia. In the 2018 survey, the questionnaire includes two options that can be categorised as NHI coverage. First is "BPJS Kesehatan", which refers to NHI, and "Jamkesda", which refers to the old fully subsidised insurance scheme funded by local governments but is now part of the NHI.

because the utilisation is conditional on health problems, services like medical check-ups, screening, routine pregnancy care, and immunisation are not reported.

3.1.3. Sample selection

In this paper, I consider two analytical samples. First is a sample of individuals aged 18 to 23 from both the NHI dataset and Susenas. This "all individuals" sample contains 209,667 and 93,121 observations from the NHI dataset and Susenas, respectively. Second is a restricted sample that only includes young adults whose parents have NHI coverage, a population that is likely to be affected by the rule. In the NHI dataset, enrolees are classified into this "dependent young adults" sample if they are recorded as "dependent children" in their relationship with primary NHI enrolees and their parents must have an active NHI coverage. In Susenas, this group is defined as young adults co-residing with parents whoose parents have (self-reported) NHI coverage. This sample selection is illustrated in Figure 2.

3.2. Empirical approach

Within the employment-based scheme of the NHI, young adults are only eligible to stay under their parent's coverage if they are younger than 21, are never married, and are not formally employed.[12] The age-eligibility threshold imposed by this rule may cause some individuals to lose their insurance coverage when they turn 21. Consequently, this may affect young adults' health and healthcare decisions.

In this paper, I investigate the reduced-form effects of turning 21 on young adults' NHI coverage and, subsequently, their health and healthcare decisions using a regression discontinuity design (RDD) following the approach used by Anderson et al. (2012). Formally, I estimate the following regression equation:

$$Y_i = \beta_0 + \beta_1 Z_i + \beta_2 (A_i - 21) + \beta_3 Z_i (A_i - 21) + u_i,$$

where Y_i is the outcome of interest and Z_i is a binary indicator with a value of 1 if age, A_i, is greater or equal to 21 years old, Y_i is the outcome of interest and β_1 is the main parameter representing the discontinuous change of outcomes at the cut-off.

For the affected individuals, coverage will be deactivated starting the following month after they turn 21. Given the recorded coverage in the NHI dataset is based on data from December 2018,

[12] The age limit is 25 for young adults who are still enrolled in a full-time education program. In Susenas 2018, only about 25% of individuals aged 21-25 are full-time students. Hence, only a small fraction of young adults would be able to access this extension after they turn 21. Moreover, because they need to manually submit proofs of school enrolment, even fewer people are expected to have their age limit extended.

I use November 2018 as the index month to calculate the age. In Susenas, interview was conducted in March 2018, hence the index month is February 2018. In both datasets, age is calculated in years and months because NHI coverage runs by calendar month.

3.2.1. Model specification

My preferred specification is a local linear regression with uniform kernel weighting. I apply a consistent 18-month bandwidth for all analyses. This bandwidth is obtained from the use of Mean-Squared Error (MSE) optimum approach (Calonico, Cattaneo, & Titiunik, 2014) when estimating the effect of age threshold on NHI coverage – my first main outcome. As a sensitivity analysis, I re-estimate my main analyses using various arbitrary bandwidths as well as using the MSE-optimum bandwidths and then compare it with my main results.

3.2.2. Identification assumptions

My empirical strategy relies on several key assumptions. First, the changes in health and healthcare utilisation (if present) must occur only at the age threshold. Second, there must be no other factors affecting the outcomes, except for the reduction in coverage, that discontinuously changes at the age cut-off. One potential factor can be college graduation or other lifestyle changes. However, they do not occur abruptly, hence unlikely to affect my results. Other concerns are the minimum marriage age without parental permission and the minimum legal drinking age, which are both set at 21. I address the former by showing the lack of sudden change in marital status (see the result in Table 1 and the discussion in Section 3.2.3). For the latter, I re-run my analyses by excluding all individuals with non-zero alcohol consumption from my estimation sample (about 3% of the initial observations are excluded). The final assumption is no anticipation effect, in which young adults increase their utilisation of healthcare services, which may also affect health, just before they turn 21. To address this, I use a doughnut-hole approach where several observations very close to the threshold are removed (Almond & Doyle, 2011; Barreca et al., 2011). The results of these sensitivity analyses are shown and discussed in Section 5.

3.2.3. Summary statistics and covariate balance

Table 1 presents the sample means of observed characteristics among individuals aged 18-20 and 21-23 and their estimated discontinuities at age 21. In Susenas, the included variables are sex, household size, location (rural vs. urban), level of education, activity (working or not in the past week), marital status (never vs. ever married), household expenditure per capita (log-transformed), and the precalculated household wealth tercile (poorest third vs. the rest). For the NHI dataset, I only include sex and location of residence as covariates. I do not include marital status from this

age because about 30% of individuals have missing value, especially among fully subsidised members.

To test whether there is any discontinuous change in covariates at the age cut-off, I run the main regression specification with each covariate as the outcome. In general, I find no statistically significant discontinuities in all included covariates, particularly when using the "all individuals" sample.[13] In Appendix Figures A3 and A4, I show the regression discontinuity plot of each of the included covariates to visualise their changes at age 21.

4. Results

4.1. Changes in NHI coverage

I start my analysis by examining whether the age-eligibility threshold contributes to young adults' high coverage dropout rate. Utilising the NHI dataset, Figure 3 depicts the proportion of enrolees with coverage in December 2018 by age (re-centred at age 21), overall and decomposed by schemes. The decomposition implies that in each age bin (month), the sum of coverage rate from each scheme equals the overall coverage rate (indicated by black hollow circles). The left panel illustrates the trend from the "all individuals" sample, where no restriction is made, and the right panel displays the trend for young adults enrolled as dependent children whose parents have active NHI coverage (the "dependent young adults" sample). In both samples, there is a clear discontinuous reduction in coverage rate at age 21, specifically among those enrolled in the employment-based scheme.[14]

Table 2 presents the estimated effects of reaching age 21 on young adults' coverage rate based on the NHI dataset (Panel A) and based on the self-reported information from Susenas (Panel B). In Panel A, I show the estimated change in overall coverage rate and the estimated change in coverage rate decomposed by scheme. Entries in the column "Mean" report the proportion of individuals aged 20 with coverage, or the baseline coverage rate. Focusing on the "all individuals" sample, the first row of Panel A shows that about 84% of young adult enrolees aged 20 have coverage, with 22% coming from the employment-based scheme, 56% coming from the fully subsidised scheme, and 6% coming from the contributory scheme. In the column "RD", which reports the regression discontinuity estimates, I show that the age-eligibility rule causes a significant 14.6 percentage point decline in the probability of young adults having NHI coverage. This is equivalent to an 18%

[13] When using the "dependent young adults" sample, there seems to be a statistically significant (at 5% level) reduction in the probability of individuals ever attended senior high school. However, this could be a spurious result that may purely occur by chance given several covariates being examined.
[14] Appendix Figure A5 presents the NHI coverage rate by age within each scheme.

reduction relative to the coverage rate of 20-year-old enrolees (the baseline). The decomposed estimates (by scheme) suggest that the decline only occurs among the employment-based enrolees. Moving to the "dependent young adults" sample, the estimated reduction in coverage is much bigger. Overall coverage rate decreases by 20.9 percentage points (20% relative to the baseline). Similarly, nearly all the reduction is driven by dependent enrolees within the employment-based scheme.

In contrast, results derived from the Susenas (reported in Panel B) indicate much smaller effects of reaching age 21 on (self-reported) NHI coverage. The reductions in self-reported NHI coverage at the cut-off are 2 percentage points among all individuals and 1.8 percentage points among dependent young adults.[15] This striking difference in estimates between the administrative and survey data can potentially be attributed to two factors. First, observations in these two datasets are not drawn from the same population, with Susenas representing the overall population and the NHI dataset representing enrolees. Second, unlike the administrative data, the survey does not explicitly ask whether the coverage is active or not.

Another noteworthy pattern shown in Figure 3 is the lack of coverage rebound after the age cut-off, indicating the generally low demand for insurance among this demographic. The first possible explanation is young adults' low expected healthcare needs and limited financial capacity, e.g., due to a lack of formal employment (Mulcahy et al., 2013). On top of that, the costs to regain coverage can be prohibitive. For example, those who are still unemployed but are no longer enrolled in formal education must switch to the contributory scheme.[16] Although the switch is compulsory by law, the enforcement of coverage mandates is known to be very weak (Banerjee et al., 2021). On top of that, switching to the contributory scheme would require young adults to pay the premiums every month until they get formal employment. The second possible explanation is the inattention of young adults to their coverage status, resulting in no active effort to regain it. This is consistent with a study in Ghana showing that many public health insurance cardholders do not realise that their insurance policy has expired (Kanmiki et al., 2019).

4.2. Changes in self-reported health problems

In the previous section, I have shown that NHI coverage declines sharply once young adults reach age 21. The subsequent question is whether this has any impact on young adults' health outcomes.

[15] The corresponding plots underlying these results are provided in Appendix Figure A6.
[16] Young adults who are still enrolled in formal education are still eligible to remain under their parents' coverage up to age 25. However, their parents must submit the proof of school enrolment to the SSAH. For many, the hassle of this manual process could also be an important barrier, especially for those who do not feel the need to stay covered.

To study this, I use two indicators from Susenas: (i) whether individuals have encountered any health issues in the past month (any health problems) and (ii) whether these health problems have disrupted their daily activities (disruptive health problems). Figure 4 presents the percentage of individuals with these health problems by age for the "all individuals" sample and for the "dependent young adults" sample separately. Before turning 21, about 18% of individuals had any health problems, and about 7% had disruptive health problems. These figures indicate that young adults' self-reported health does not discontinuously change at age 21.

The estimated effects of reaching age 21 on young adults' self-reported health are presented in Table 3. Overall, consistent with the trend shown in Figure 4, I find a very small and insignificant change in the likelihood of young adults reporting any health problems or disruptive health problems at age 21. Specifically, the probability of young adults having any health problems increases by 0.5 percentage points (about 0.2% relative to the baseline level of 20-years-old individuals) at age 21, while the probability of having disruptive health problems decreases by 0.6 percentage points (a high 9% reduction relative to the baseline), both are not statistically significant at a 10% level. Results are similar when I restrict the sample to young adults whose parents reported having NHI coverage (the "dependent young adults" sample).

These point estimates suggest that the loss of NHI coverage may not have an immediate impact on young adults' self-reported health. One possible reason is that people of this age mostly do not have major health conditions that need expensive treatment. Therefore, the treatment cost may still be affordable without insurance, or in most cases, self-treatment can be sufficient.[17] Despite this, these findings cannot rule out the possibility of insurance coverage affecting the severity and duration of the reported health problems. Unfortunately, this information is not available in the data. Alternatively, there could be more subtle or longer-term effects of insurance, as indicated by several studies from high-income countries. For example, Cardella and Depew (2014) observed that young adults are less likely to report having excellent subjective health when they lose insurance coverage from their parents at age 18. Another study by Roth et al. (2022) demonstrates that extending coverage for dependent young adults up to the age of 26, as opposed to 18, significantly reduces cancer-related mortality.

[17] Using Susenas 2014, where more detailed information about the type of respondents' health problems is recorded, 76% of the health problems reported by individuals aged 18-23 are acute illnesses. These include fever, cough, sneeze, asthma attack, breathing difficulties, diarrhea, headache, and toothache.

4.3. Changes in healthcare utilisation

While there appears to be no immediate health impact of the age threshold, the sudden loss of NHI coverage might affect whether and where young adults use healthcare services when needed. In Figure 5, I plot the proportion of individuals with any health problems who utilised either primary care or hospital outpatient service (Panel A), who engaged in self-medication (Panel B), and who utilised care from traditional healers (Panel C). The left figure shows the utilisation trend based on the unrestricted "All individuals" sample and the right shows the trend based on the restricted "Dependent young adults" sample.[18] Visually, these figures suggest that, at age 21, there is a reduction in primary care or hospital outpatient utilisation, an increase in the rate of self-medication, and a rise in the likelihood of visiting traditional healers. The estimated changes for these three measures are presented in Table 4. In addition, Table 4 also reports the estimated changes for primary care and hospital outpatient utilisation and whether they are public or private providers separately.[19]

Healthcare utilisation pattern among young adults aged 20 are presented in Column "Mean" of Table 4. Focusing on the "all individuals" sample, entries reported in this column shows that 73% of young adults used self-medication, only 39% of them visited primary care or hospital outpatient services (formal healthcare services), and only 0.6% visited traditional healers when they are ill. Of those who use formal healthcare services, 33.8% used primary care services, 5.5% used hospital outpatient services, and roughly 0.4% used both. Among those who visited primary care, 18.7% used public facilities, 16.1% used private facilities, and about 1% used both. For hospital outpatient utilisation, the number of individuals who did it in public hospitals is almost twice the number of individuals who did private hospitals (3.9% vs 1.7%), with only less than 0.1% used both. Limiting the sample to young adults whose parents have (self-reported) NHI coverage (the "dependent young adults" sample), the use of formal healthcare appears to be higher while the self-medication rate and the use of traditional healers are lower than those found in the "all individuals" sample.

[18] Because the sample used in this analysis is conditional on individuals having any health problems, I report in Appendix Table A1 the sample mean and covariate balance using this conditioned sample in a similar manner to Table 1. The corresponding discontinuity plots are illustrated in Appendix Figures A7 and A8. Overall, no apparent change in sociodemographic characteristics is observed at age 21, with two exceptions: a decrease in the likelihood of young adults working for pay in the past week, and an increase in per capita household expenditure. Both changes are statistically significant at the 10% level. These findings might suggest that there is an increase in expenditure caused by coverage loss, although this interpretation is unclear given expenditure is measured at the household level. On the other hand, the reduction in work may indicate a decrease in labour supply, possibly due to prolonged illness associated with lower healthcare utilisation. However, as both outcomes (working for pay and healthcare use) are measured contemporaneously, and there is no information regarding why someone is not working, it is difficult to directly attribute the reduction in the probability of working for pay to the loss of coverage.

[19] The corresponding regression discontinuity plots for the disaggregated outcomes of primary care and hospital outpatient services utilisation are presented in Appendix Figures A9 and A10, respectively.

Regression discontinuity estimates reported in Table 4 show that, at age 21, there is a statistically significant 5.3 percentage point reduction in the propensity of young adults with health problems visiting primary cares or hospitals to receive outpatient services in the past month. This is equivalent to a 14% decrease relative to the utilisation rate of 20-year-old individuals (the baseline). This change appears to mainly come from lower utilisation of public primary care services, with 5.1 percentage points reduction (22% relative to the baseline). No statistically significant changes are observed in the use of hospital outpatient services, either in public or private facilities. When restricting the sample to young adults whose parents have NHI coverage (the "dependent young adults" sample), the reduction in primary care or hospital outpatient utilisation is now a larger 8.4 percentage points or about 20% relative to the baseline, while the change in hospital outpatient utilisation remains small and statistically insignificant. Back to the "all individuals" sample, I show that the proportion of young adults resorting to self-medication increases by 4.5 percentage points (6% relative to the baseline) and the use of traditional healers increases by 0.9 percentage points (130% relative to the baseline) at age 21, both are statistically significant at the 5% level. When using the restricted "dependent young adults" sample, however, these estimates are no longer statistically significant.

Overall, these findings reveal an important pattern of young adults' healthcare utilisation decisions after an increase in the relative price of healthcare services. When individuals must cover the full cost of outpatient care due to the lack of insurance, some may choose to skip primary care visits, but almost none would forgo hospital outpatient care. In general, this is consistent with standard economic theory and empirical evidence indicating the price elasticity of demand for different types of healthcare services may vary (Aron-Dine, Einav, & Finkelstein, 2013; Ellis, Martins, & Zhu, 2017; Lohr et al., 1986). Several reasons might explain this finding. First, young adults may think that visiting primary care, which mostly include consultation with a GP, is less urgent than visiting hospital outpatient clinics, where a consultation or treatment session with a medical specialist is made. Second, if their health conditions are not severe, individuals may perceive that a cheaper substitute for a primary care visit is available and could be sufficient. Meanwhile, individuals who have severe and more complex conditions might believe that they do not have other options, hence they would still go to the hospital despite the increased price.

Relatedly, the increased rate of self-medication at the age cut-off indicates that a substitution effect. As a relatively common option taken by people in developing countries (Chang & Trivedi, 2003; Pagan et al., 2006), self-medication can be seen as a cheaper but less effective substitute for formal healthcare services. Self-medication would incur lower costs for the uninsured than seeing a doctor

because they only need to purchase necessary medicines without the expense and waiting time associated with doctor visits. This decision, however, may entail some important risks, such as prolonged sick days, unanticipated adverse reactions to medicines, or missing an early diagnosis of chronic illnesses (Hughes et al., 2001). In many cases, self-medication may also involve an unsupervised use of antibiotics, which, in the longer term, may contribute to the development of antimicrobial resistance (Michael, Dominey-Howes, & Labbate, 2014).

4.4. Heterogeneous impact of the age threshold on health and healthcare use

So far, I have shown that the age-eligibility threshold contributes significantly to young adults' high coverage dropout, has no impact on their self-reported health problems, and leads to meaningful changes in healthcare utilisation patterns of those with health problems. This section aims to examine whether the effects turning 21, mainly on health and healthcare utilisation, differ by key individual characteristics, including sex, education level, household wealth, and location of residence. To do so, I split the sample into two groups for each category and estimate the regression separately for each group. For education level, I divide individuals into those who attended senior high school (more than 9 years of schooling) and those who did not attend senior high school (9 years of schooling or less). The household wealth category is split into those in the first tercile (the poorest third, or simply poor) and those in the second and third tercile (non-poor). Location of residence is based on urban vs. rural comparison and how expensive outpatient services are in the respondents' province. I use the province-level average outpatient claims in 2018 published in the NHI program annual statistics (National Social Security Council, 2020).[20]

Table 5 presents the estimated coefficients for my two main outcomes: whether individuals reported having any health problems and whether individuals with health problems sought outpatient care in either primary care or hospital. I focus on the "dependent young adults" sample, where my main estimates show larger effects on healthcare utilisation. Overall, the effects of turning 21 on young adults' self-reported health problems are all close to zero and statistically insignificant across subpopulations. For healthcare utilisation, more pronounced effects among individuals with lower wealth, less education, and those residing in provinces with higher average healthcare costs are observed.[21] In terms of magnitude, young adults in the lowest wealth tercile experience an 11.5 percentage points decrease in their likelihood of using primary care or hospital

[20] It should be noted that this measure might be imperfect because variation in average claims could also be driven by case-mix differences, not only the differences in prices faced by patients when they do not have insurance coverage. Possible variation in purchasing power across region further complicate the measurement. Therefore, more careful interpretation is needed when discussing any findings related to the classification of regions based on this measure.
[21] As reported in Appendix Table A2, similar trends are observed in the "all individuals" sample.

outpatient services when they turn 21, while those in the second or third tercile exhibit a 6.7 percentage points reduction. Individuals with no senior high school education show a substantial drop of 20.7 percentage points, whereas those with higher educational attainment only decrease their utilisation by 4.9 percentage points. The reduction in utilisation rate is also slightly bigger among those who reside in urban areas compared to those from rural areas (9.8 vs. 7 percentage points reduction, respectively). Lastly, individuals who live in a province with more expensive outpatient services have a higher 10.7 percentage points decrease than a 6.2 percentage point decrease among those who live in less expensive regions. These differences in effect sizes are, however, only statistically significant in the education category.

All in all, it is important to note that these findings are based on a reduced-form model, meaning that two sources of variation are driving these found effects: differences in the effect of the age threshold on NHI coverage and the variation in coverage effect on health and healthcare use. Therefore, the varying estimates can only be attributed to the latter (heterogeneous impacts of insurance or coverage) if the age-eligibility rule has a constant effect on NHI coverage across subpopulations.[22] Assuming this condition holds, these findings generally align with recent quasi-experimental evidence indicating stronger effects of higher co-payments among young adults from lower socioeconomic backgrounds (Johansson et al., 2019; Lopes et al., 2022; Nilsson et al., 2018).

5. Robustness test

In this section, I test my key identification assumptions by running several robustness tests. For this, I focus on three outcomes: NHI coverage, utilisation of primary care or hospital outpatient services, and self-medication. Results of these sensitivity analyses are reported in Figure 6.

First, I investigate whether the estimated changes in outcomes only occur at the prescribed age threshold. As shown in Panel A, all estimates are close to zero and statistically insignificant when other arbitrary (placebo) age cut-offs are used. The placebo age cut-offs included in this analysis are 16, 17, 18, 24, 25, and 26. Age 19, 20, 22, and 23 are excluded because they are too close to the true threshold.

[22] Since the effect of the age threshold on NHI coverage is largely determined by the proportion of young adults enrolled as dependents under their parents' employment-based coverage, I would expect that the first stage effect would be larger among non-poor, more educated, and urban individuals. Hence, the gap in insurance effect between the poor and non-poor could be bigger than the observed difference in age threshold effect. On the other hand, the gap in insurance effects between urban and rural individuals, and between less and more educated individuals, could be smaller than the observed differences in age threshold effects.

Second, to address the concern about anticipation effects, such that young adults increased their use of healthcare service just before they turn 21, I employ a "doughnut" regression discontinuity approach (Almond et al., 2011; Barreca et al., 2011). To do so, I exclude observations on the radius of 1 to 6 months around age 21. Results in Panel B indicate that my main estimates are stable in terms of sign and magnitude across different size of "doughnut hole". However, I find that the confidence intervals are wider when more observations are excluded.

Third, I test whether my main estimates are sensitive to the choice of bandwidth. In Panel C, I compare the estimated change in NHI coverage and healthcare utilisation from my preferred 18-month bandwidth with the estimates resulted from varying age bandwidth. The results indicate that the choice of bandwidth have no influence on the estimated change in NHI coverage. The effect on primary care or hospital outpatient care utilisation is also not affected, although the point estimates become smaller with larger bandwidths. The estimates for self-medication, however, seem to be sensitive. Additionally, I report in Appendix Table A3 that the reduction in primary care and hospital outpatient utilisation at the cut-off is robust to the use of data-driven MSE-optimal bandwidth (Calonico et al., 2014), although the point estimates are smaller. For example, using the "dependent young adults" sample, the data-driven estimate is 5.3 percentage points, whereas the main estimate is 8.4 percentage points. The estimated effects on the use of self-medication and traditional healers, however, are no longer statistically significant.

Another potential identification concern related to my identification strategy is the fact that 21 is also set as the minimum legal drinking age in Indonesia. If turning 21 suddenly makes individuals more likely to drink alcohol, and consequently has higher healthcare needs, the found effect of reaching age 21 on healthcare use might be biased. To account for this, I re-estimate the effects of the age threshold on health and healthcare utilisation excluding households with non-zero alcohol consumption. As shown in Appendix Table A4, this approach yields qualitatively similar results compared to my main estimates. Furthermore, In Appendix Table A5, I show that my main findings are robust to the inclusion of sociodemographic covariates as control variables, although the magnitudes become slightly lower and noisier.

6. Conclusion

Indonesia aims to achieve Universal Health Coverage (UHC) through the expansion of its National Health Insurance (NHI) program. However, reaching full population enrolment and maintaining the coverage are evidently difficult (Agustina et al., 2019; Banerjee et al., 2021; Dartanto et al., 2020), particularly for younger people whose health risks are considerably lower. This paper

investigates the impact of a dependent coverage eligibility rule on young adults' NHI coverage rate and, subsequently, their health and healthcare decisions.

Using a random sample from the NHI administrative database, I confirm that the propensity of enrolees to remain covered decreases substantially at age 21, the threshold set by the dependent cover eligibility rule. I then show that, based on a large nationwide household survey, young adults' self-reported health is not affected by the sudden loss of coverage. Among those with health problems, however, reaching the age limit appears to discontinuously change their healthcare use decisions. Specifically, they become significantly less likely to use outpatient care from either primary care or hospital outpatient services while resorting more to self-medication and traditional healers.

Although the short-term health effects of coverage loss seem minimal, the potential long-term risks due to reduced utilisation of necessary healthcare services must be anticipated. To address this, the government should consider stricter enforcement of the mandatory coverage rule and simplifying administrative procedures to help enrolees maintain their insurance coverage. Additionally, more flexible options for parents to extend the coverage of their young adult children, such as by paying higher insurance contributions, could also be introduced. This is particularly important because the age-eligibility rule seems to have a more pronounced effect on lower-educated young adults, who may have fewer opportunities to secure coverage through formal employment.

Overall, the findings of this paper should be interpreted in a specific context of a particular group of young adults losing insurance coverage from their parents. As such, the generalisability of these findings to other age groups is not warranted. Nonetheless, these results are still valuable for policymakers aiming to reduce the uninsurance rate among this specific age cohort.

Reference

Agustina, R., Dartanto, T., Sitompul, R., Susiloretni, K. A., Suparmi, Achadi, E. L., Taher, A., Wirawan, F., Sungkar, S., Sudarmono, P., Shankar, A. H., Thabrany, H., Agustina, R., Dartanto, T., Sitompul, R., Susiloretni, K. A., Suparmi, Achadi, E. L., Taher, A., . . . Khusun, H. (2019). Universal health coverage in Indonesia: concept, progress, and challenges. *The Lancet*, *393*(10166), 75-102. https://doi.org/10.1016/s0140-6736(18)31647-7

Almond, D., & Doyle, J. J. (2011). After Midnight: A Regression Discontinuity Design in Length of Postpartum Hospital Stays. *American Economic Journal: Economic Policy*, *3*(3), 1-34. https://doi.org/10.1257/pol.3.3.1

Anderson, M., Dobkin, C., & Gross, T. (2012). The Effect of Health Insurance Coverage on the Use of Medical Services. *American Economic Journal: Economic Policy*, *4*(1), 1-27. https://doi.org/10.1257/pol.4.1.1

Anderson, M. L., Dobkin, C., & Gross, T. (2014). The Effect of Health Insurance on Emergency Department Visits: Evidence from an Age-Based Eligibility Threshold. *The Review of Economics and Statistics*, *96*(1), 189-195. https://doi.org/10.1162/REST_a_00378

Anindya, K., Lee, J. T., McPake, B., Wilopo, S. A., Millett, C., & Carvalho, N. (2020). Impact of Indonesia's national health insurance scheme on inequality in access to maternal health services: A propensity score matched analysis. *J Glob Health*, *10*(1), 010429. https://doi.org/10.7189/jogh.10.010429

Aron-Dine, A., Einav, L., & Finkelstein, A. (2013). The RAND Health Insurance Experiment, three decades later. *J Econ Perspect*, *27*(1), 197-222. https://doi.org/10.1257/jep.27.1.197

Banerjee, A., Finkelstein, A., Hanna, R., Olken, B. A., Ornaghi, A., & Sumarto, S. (2021). The Challenges of Universal Health Insurance in Developing Countries: Experimental Evidence from Indonesia's National Health Insurance. *American Economic Review*, *111*(9), 3035-3063. https://doi.org/10.1257/aer.20200523

Barreca, A. I., Guldi, M., Lindo, J. M., & Waddell, G. R. (2011). Saving babies? Revisiting the effect of very low birth weight classification. *Q J Econ*, *126*(4), 2117-1223. https://doi.org/10.1093/qje/qjr042

Calonico, S., Cattaneo, M. D., & Titiunik, R. (2014). Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs. *Econometrica*, *82*(6), 2295-2326. https://doi.org/10.3982/ecta11757

Card, D., Dobkin, C., & Maestas, N. (2008). The Impact of Nearly Universal Insurance Coverage on Health Care Utilization: Evidence from Medicare. *Am Econ Rev*, *98*(5), 2242-2258. https://doi.org/10.1257/aer.98.5.2242

Cardella, E., & Depew, B. (2014). The effect of health insurance coverage on the reported health of young adults. *Economics Letters*, *124*(3), 406-410. https://doi.org/10.1016/j.econlet.2014.06.036

Chang, F. R., & Trivedi, P. K. (2003). Economics of self-medication: theory and evidence. *Health Econ*, *12*(9), 721-739. https://doi.org/10.1002/hec.841

Dartanto, T., Halimatussadiah, A., Rezki, J. F., Nurhasana, R., Siregar, C. H., Bintara, H., Usman, Pramono, W., Sholihah, N. K., Yuan, E. Z. W., & Soeharno, R. (2020). Why Do Informal Sector Workers Not Pay the Premium Regularly? Evidence from the National Health Insurance System in Indonesia. *Appl Health Econ Health Policy*, *18*(1), 81-96. https://doi.org/10.1007/s40258-019-00518-y

Einav, L., & Finkelstein, A. (2011). Selection in insurance markets: theory and empirics in pictures. *J Econ Perspect*, *25*(1), 115-138. https://doi.org/10.1257/jep.25.1.115

El Omari, S., & Karasneh, M. (2020). Social health insurance in the Philippines: do the poor really benefit? *Journal of Economics and Finance*, *45*(1), 171-187. https://doi.org/10.1007/s12197-020-09525-5

Ellis, R. P., Martins, B., & Zhu, W. (2017). Health care demand elasticities by type of service. *J Health Econ*, *55*, 232-243. https://doi.org/10.1016/j.jhealeco.2017.07.007
Erlangga, D., Ali, S., & Bloor, K. (2019). The impact of public health insurance on healthcare utilisation in Indonesia: evidence from panel data. *Int J Public Health*, *64*(4), 603-613. https://doi.org/10.1007/s00038-019-01215-2
Gaviria, C. F., & De la Mata, D. (2015). *Losing Health Insurance When Young: Impacts on Usage of Medical Services and Health*. Universidad del Rosario.
Johansson, N., Jakobsson, N., & Svensson, M. (2019). Effects of primary care cost-sharing among young adults: varying impact across income groups and gender. *Eur J Health Econ*, *20*(8), 1271-1280. https://doi.org/10.1007/s10198-019-01095-6
Johar, M. (2009). The impact of the Indonesian health card program: a matching estimator approach. *J Health Econ*, *28*(1), 35-53. https://doi.org/10.1016/j.jhealeco.2008.10.001
Kanmiki, E. W., Bawah, A. A., Akazili, J., Agorinyah, I., Awoonor-Williams, J. K., Phillips, J. F., & Kassak, K. M. (2019). Unawareness of health insurance expiration status among women of reproductive age in Northern Ghana: implications for achieving universal health coverage. *J Health Popul Nutr*, *38*(1), 34. https://doi.org/10.1186/s41043-019-0190-4
Lagomarsino, G., Garabrant, A., Adyas, A., Muga, R., & Otoo, N. (2012). Moving towards universal health coverage: health insurance reforms in nine developing countries in Africa and Asia. *The Lancet*, *380*(9845), 933-943. https://doi.org/10.1016/s0140-6736(12)61147-7
Lee, J., & Kim, J. (2020). The role of health insurance in mental health care for young adults. *Applied Economics*, *52*(42), 4577-4593. https://doi.org/10.1080/00036846.2020.1738326
Lohr, K. N., Brook, R. H., Kamberg, C. J., Goldberg, G. A., Leibowitz, A., Keesey, J., Reboussin, D., & Newhouse, J. P. (1986). Use of medical care in the RAND Health Insurance Experiment: diagnosis-and service-specific analyses in a randomized controlled trial. *Medical care*, *24*(9), S1-S87.
Lopes, F. V., Riumallo Herl, C. J., Mackenbach, J. P., & Van Ourti, T. (2022). Patient cost-sharing, mental health care and inequalities: A population-based natural experiment at the transition to adulthood. *Soc Sci Med*, *296*, 114741. https://doi.org/10.1016/j.socscimed.2022.114741
Michael, C. A., Dominey-Howes, D., & Labbate, M. (2014). The antimicrobial resistance crisis: causes, consequences, and management. *Front Public Health*, *2*, 145. https://doi.org/10.3389/fpubh.2014.00145
Mulcahy, A., Harris, K., Finegold, K., Kellermann, A., Edelman, L., & Sommers, B. D. (2013). Insurance coverage of emergency care for young adults under health reform. *N Engl J Med*, *368*(22), 2105-2112. https://doi.org/10.1056/NEJMsa1212779
Muttaqien, M., Setiyaningsih, H., Aristianti, V., Coleman, H. L. S., Hidayat, M. S., Dhanalvin, E., Siregar, D. R., Mukti, A. G., & Kok, M. O. (2021). Why did informal sector workers stop paying for health insurance in Indonesia? Exploring enrollees' ability and willingness to pay. *Plos One*, *16*(6). https://doi.org/10.1371/journal.pone.0252708
National Social Security Council. (2020). NHI Statistics 2014-2018.
Nilsson, A., & Paul, A. (2018). Patient cost-sharing, socioeconomic status, and children's health care utilization. *J Health Econ*, *59*, 109-124. https://doi.org/10.1016/j.jhealeco.2018.03.006
Pagan, J. A., Ross, S., Yau, J., & Polsky, D. (2006). Self-medication and health insurance coverage in Mexico. *Health Policy*, *75*(2), 170-177. https://doi.org/10.1016/j.healthpol.2005.03.007
Roth, M., Berkman, A., Andersen, C. R., Cuglievan, B., Andrew Livingston, J., Hildebrandt, M., & Bleyer, A. (2022). Improved Survival of Young Adults with Cancer Following the Passage of the Affordable Care Act. *The Oncologist*, *27*(2), 135-143. https://doi.org/10.1093/oncolo/oyab049

Shrestha, R. (2021). Health Insurance for the Poor, Healthcare Use and Health Outcomes in Indonesia. *Bulletin of Indonesian Economic Studies*, *57*(1), 85-110. https://doi.org/10.1080/00074918.2020.1753655

Sparrow, R., Budiyati, S., Yumna, A., Warda, N., Suryahadi, A., & Bedi, A. S. (2017). Sub-national health care financing reforms in Indonesia. *Health Policy Plan*, *32*(1), 91-101. https://doi.org/10.1093/heapol/czw101

Sparrow, R., Suryahadi, A., & Widyanti, W. (2013). Social health insurance for the poor: targeting and impact of Indonesia's Askeskin programme. *Soc Sci Med*, *96*, 264-271. https://doi.org/10.1016/j.socscimed.2012.09.043

Statistics Indonesia. (2018). *Consumer Price in Health, Education, and Transportation Sector*.

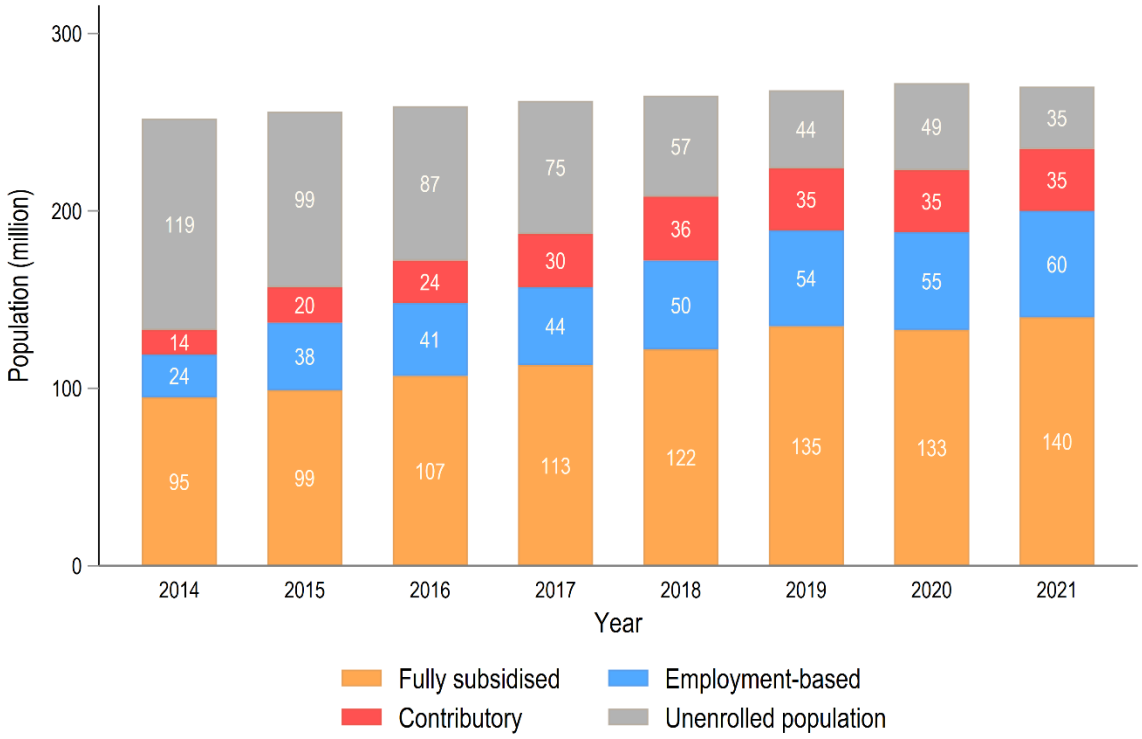
Vidyattama, Y., Miranti, R., & Resosudarmo, B. P. (2014). The Role of Health Insurance Membership in Health Service Utilisation in Indonesia. *Bulletin of Indonesian Economic Studies*, *50*(3), 393-413. https://doi.org/10.1080/00074918.2014.980380

Wagstaff, A. (2010). Social health insurance reexamined. *Health Econ*, *19*(5), 503-517. https://doi.org/10.1002/hec.1492

Wagstaff, A., Cotlear, D., Eozenou, P. H.-V., & Buisman, L. R. (2016). Measuring progress towards universal health coverage: with an application to 24 developing countries. *Oxford Review of Economic Policy*, *32*(1), 147-189. https://doi.org/10.1093/oxrep/grv019

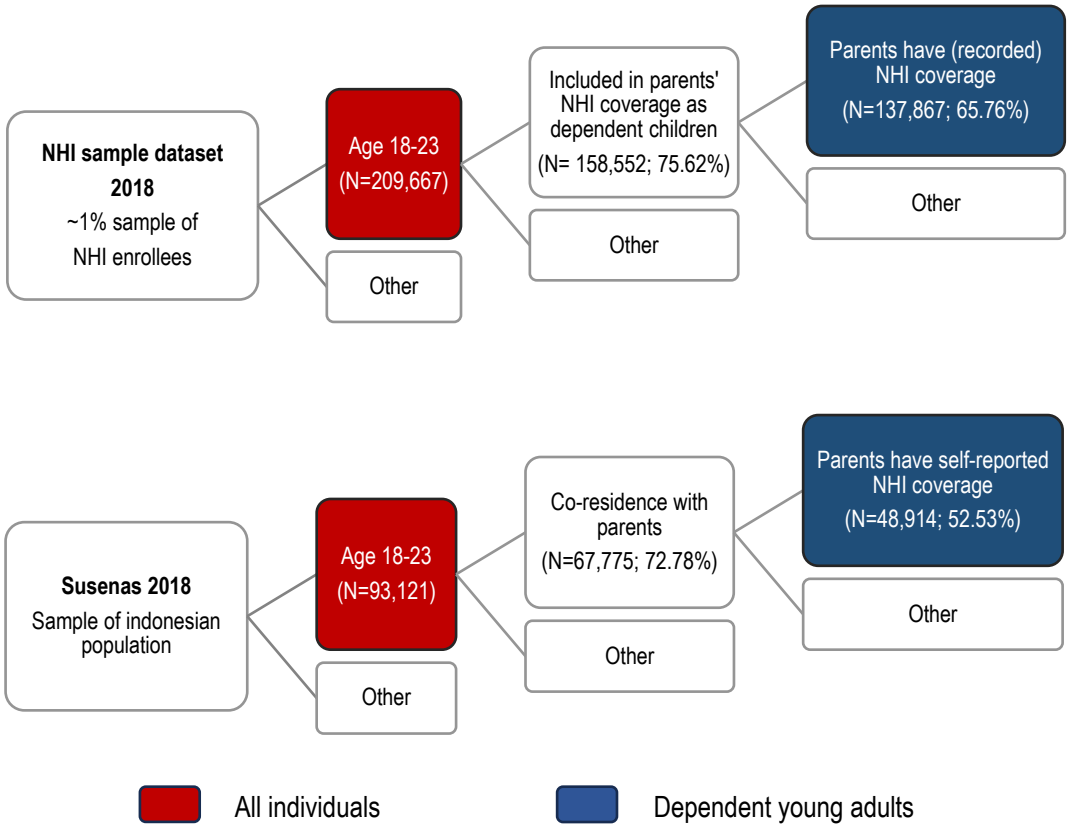
Figure

Figure 1. Enrolment in the NHI by schemes, 2014-2021



Notes: This figure reports the number of individuals enrolled in the NHI program for each scheme from 2014 to 2020. Data are obtained from the official NHI statistics 2014-2018 (Social Security Council, 2020) and the NHI public dashboard (http://sismonev.djsn.go.id/kepesertaan/). Unenrolled population is calculated by subtracting the population size estimates published by Statistics Indonesia with the number of NHI enrolees.

Figure 2. Sample construction in the NHI dataset and Susenas



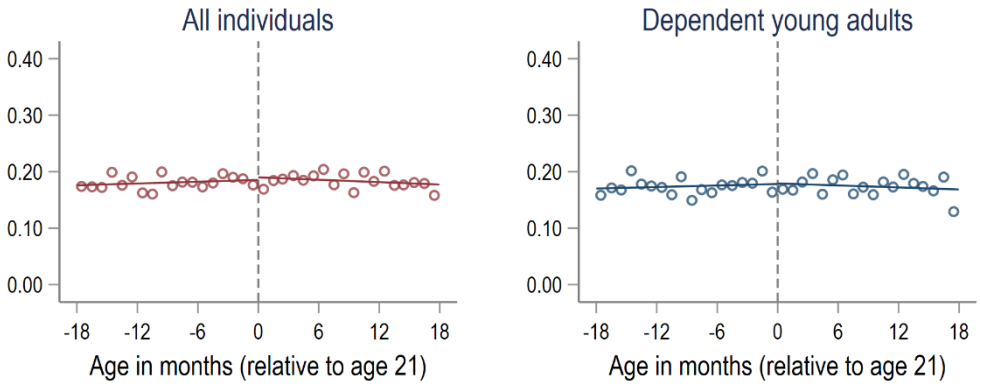
Notes: This figure describes the flow of constructing the "dependent young adults" sample from Susenas 2018 and the 2018 Indonesia NHI sample dataset. Percentages are measured relative to the number of individuals aged 18-23 in each dataset.

Figure 3. NHI Coverage by age

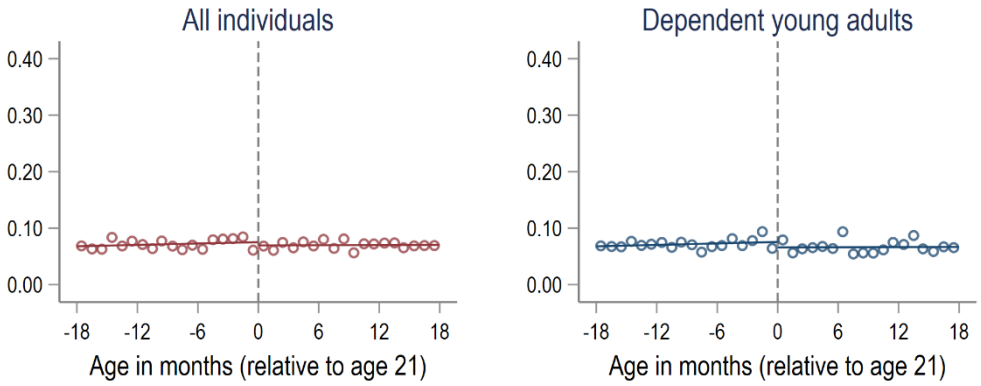
Notes: This figure plots the proportion of enrolees with NHI coverage in December 2018 by age (in months relative to age 21) and decomposed by scheme. Sample is individuals who have had registered with the NHI (the NHI enrolees) as of 31 December 2018. Solid lines depict the linear age trends from each side of the age cut-off.

Figure 4. Self-reported health problems by age

A. Any health problems



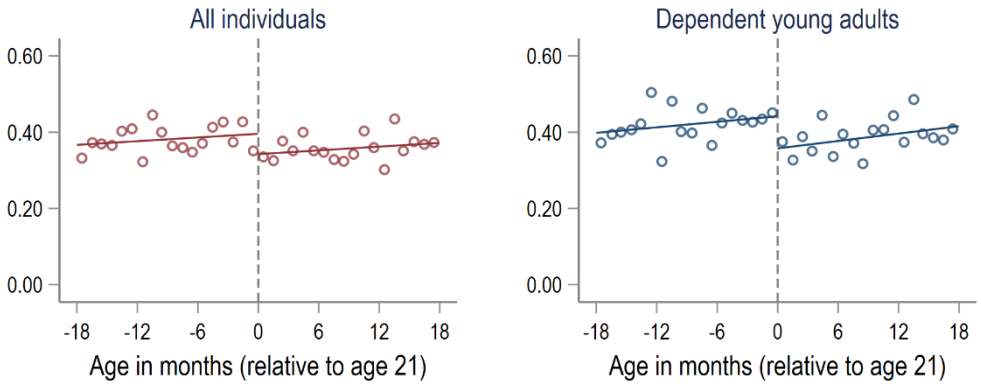
B. Disruptive health problems



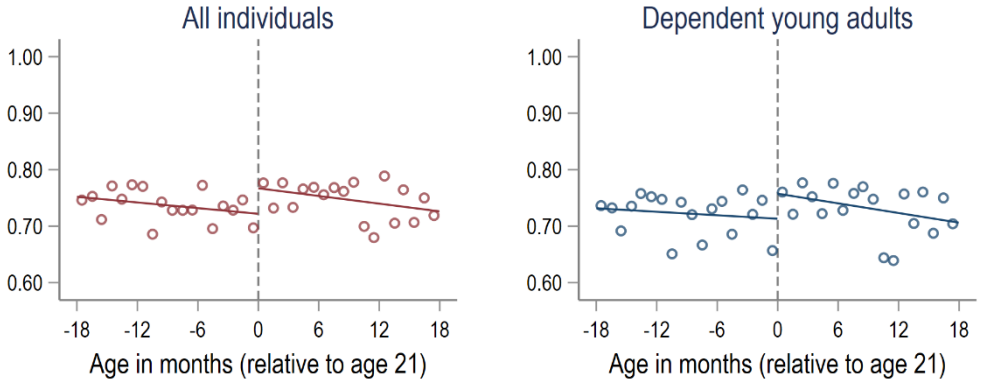
Notes: This figure plots the proportion of young adults with self-reported health problems (A) and disruptive health problems (B), by age (in months relative to age 21). Solid lines depict the linear age trends from each side of the cut-off.

Figure 5. Healthcare utilisation by age, conditional on having any health problems

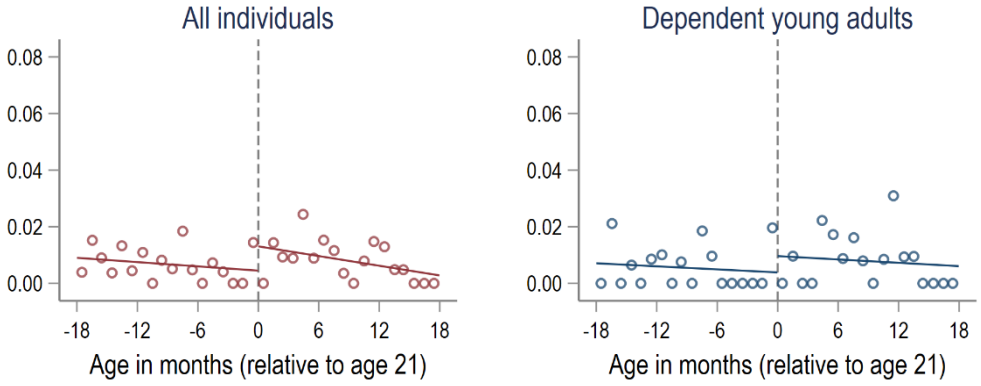
A. Primary care or hospital outpatient



B. Self-medication



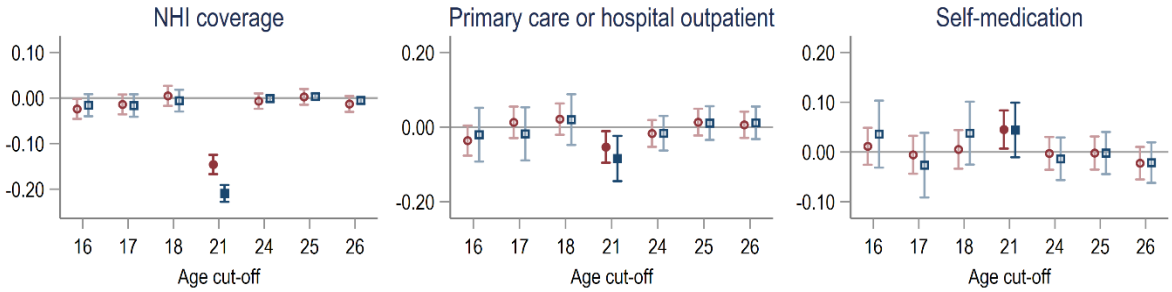
C. Traditional healers



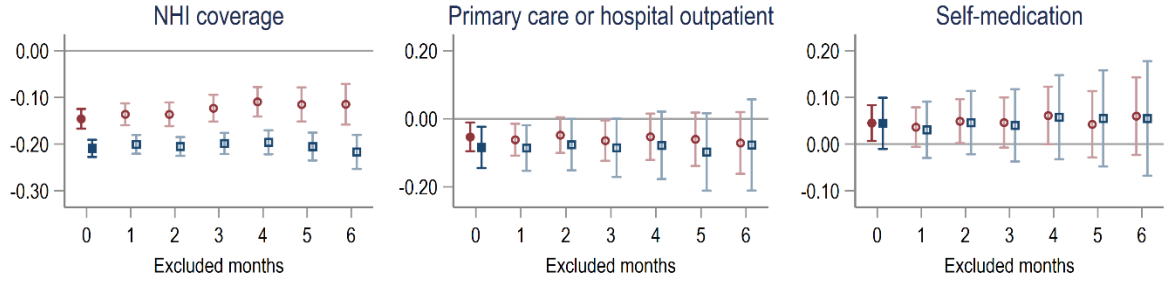
Notes: This figure plots the proportion of individuals with health problems who sought outpatient care in either primary care or hospital outpatient service (A), who engage in self-medication (B), and who sought care from traditional healers (C), by age (in months relative to age 21). Solid lines depict the linear age trends from each side of the cut-off. Each dot corresponds to sample means of outcomes within the respective age-months bins.

Figure 6. Robustness test

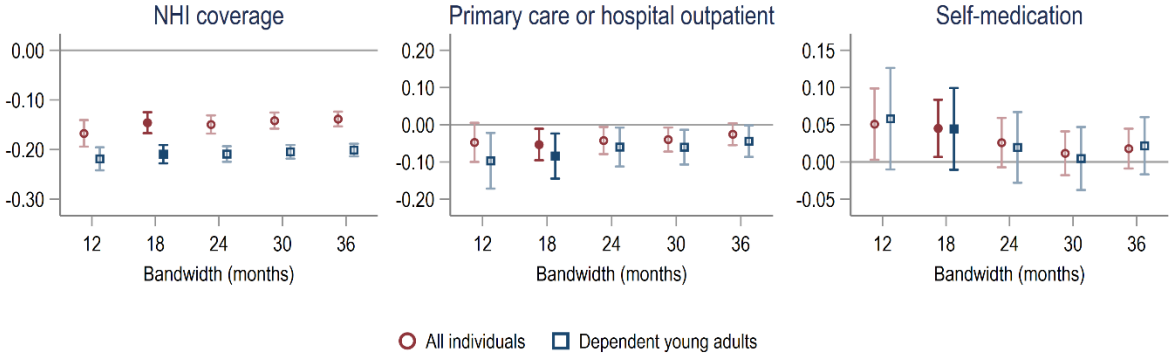
A. Estimates using placebo age cut-offs



B. Estimates using "doughnut" RDD



C. Estimates using alternative bandwidths



Notes: This figure presents the estimated discontinuities in NHI coverage rate, primary care or hospital outpatient use, and self-medication for each robustness test. I measure the coverage rate using the NHI dataset and the other outcomes using Susenas. Panel A compares changes in outcome at age 21 and other selected placebo cut-offs. Panel B shows the estimates excluding several observations very close to the age threshold. Panel B compares the estimates from alternative bandwidths of 12, 24, 30, and 36 months with the preferred bandwidth of 18 months. Shaded circles and squares represent the main estimates.

Table

Table 1. Sample means and covariate balance

	All individuals				Dependent children			
	Mean by age		Discontinuity		Mean by age		Discontinuity	
	18-20	21-23	Coef.	P-value	18-20	21-23	Coef.	P-value
Panel A. Susenas								
Age	19.42	22.51	-0.00	<0.01	19.38	22.47	-0.00	<0.01
Male	0.53	0.50	0.00	0.75	0.56	0.57	0.00	0.72
Household size	4.95	4.79	0.01	0.86	5.13	5.14	0.02	0.66
Reside in Java region	0.29	0.31	-0.01	0.09	0.29	0.31	-0.01	0.42
Reside in urban areas	0.46	0.48	0.00	0.63	0.45	0.50	-0.00	0.83
Some senior high school	0.75	0.65	-0.01	0.41	0.78	0.72	-0.03	0.01
Working	0.35	0.53	-0.01	0.31	0.35	0.56	-0.02	0.21
Never married	0.87	0.67	0.00	0.88	0.94	0.85	-0.01	0.16
Expenditure per capita	13.65	13.70	0.00	0.76	13.60	13.68	0.00	0.91
Poor	0.36	0.35	-0.01	0.21	0.38	0.35	-0.01	0.34
Observations	48,422	44,659			27,515	21,372		
Panel B. NHI								
Age	19.43	22.49	0.00	0.00	19.39	22.41	0.00	0.00
Male	0.52	0.51	-0.00	0.66	0.53	0.53	0.00	0.67
Reside in Java region	0.38	0.41	0.01	0.27	0.36	0.37	0.01	0.49
Observations	104,196	105,471			76,492	61,375		

Notes: This table presents the sample mean of individuals observable characteristics from Susenas and the NHI dataset. Sample of "all individuals" from Susenas represents Indonesian population aged 18-23. In the NHI dataset, this sample represents individuals who have had registered to the NHI as of 31 December 2018. Sample of "dependent young adults" from Susenas represents young adults co-residing with their parents, and their parents have (self-reported) NHI coverage. In the NHI dataset, this sample includes individuals aged 18-23 who are recorded as dependent children, and their parents have active NHI coverage in December 2018. Expenditure per capita is log-transformed. Poor refers to individuals in the first tercile of wealth index distribution. Discontinuities at age 21 are estimated using local linear regression with 18 months bandwidth.

Table 2. Estimated discontinuity in NHI coverage

	All individuals				Dependent young adults			
	Mean	RD	SE	P-value	Mean	RD	SE	P-value
Panel A. NHI dataset								
NHI coverage, overall	0.839	-0.146	(0.011)	<0.001	0.978	-0.209	0.009	<0.001
NHI coverage, decomposed by scheme								
Employment-based	0.218	-0.136	0.009	<0.001	0.231	-0.215	0.009	<0.001
Fully subsidised	0.563	-0.019	0.013	0.153	0.678	-0.003	0.014	0.824
Contributory	0.057	0.009	0.006	0.116	0.069	0.009	0.007	0.224
Observations	101,012				67,353			
Panel B. Susenas								
Self-reported NHI coverage	0.654	-0.020	0.009	0.031	0.937	-0.018	0.007	0.009
Observations	44,686				23,403			

Note: This table presents regression discontinuity estimates of each outcome (in each row) using local linear regression with 18 months bandwidth based on the "all individuals" sample and the "dependent young adults" sample from the NHI dataset (Panel A) and Susenas data (Panel B). Column "Mean" shows the sample mean of outcome variables for individuals aged 20. Columns "RD", "SE", and "P-value" report the magnitude, heteroskedasticity-robust standard errors, and p-values of the regression discontinuity estimates.

Table 3. Estimated discontinuity in self-reported health problems

	All individuals				Dependent young adults			
	Mean	RD	SE	P-value	Mean	RD	SE	P-value
Any health problems	0.181	0.005	0.007	0.539	0.174	0.001	0.010	0.922
Disruptive health problems	0.072	-0.006	0.005	0.240	0.072	-0.010	0.007	0.158
Observations	44,686				23,403			

Note: This table presents regression discontinuity estimates of self-reported health problems using local linear regression with 18 months bandwidth on the "dependent young adults" and the "all individuals" samples based on Susenas data. Column "Mean" shows the sample mean of outcome variables for individuals aged 20. Columns "RD", "SE", and "P-value" report the magnitude, heteroskedasticity-robust standard errors, and p-values of the regression discontinuity estimates.

Table 4. Estimated discontinuity in healthcare utilisation

	All individuals				Dependent young adults			
	Mean	RD	SE	P-value	Mean	RD	SE	P-value
Primary care or hospital outpatient	0.385	-0.053	0.022	0.014	0.422	-0.084	0.031	0.007
Self-medication	0.730	0.045	0.020	0.021	0.716	0.044	0.028	0.113
Traditional healer	0.006	0.009	0.004	0.023	0.005	0.006	0.005	0.207
Primary care								
Any primary care	0.338	-0.051	0.021	0.015	0.362	-0.077	0.030	0.010
Public primary care	0.187	-0.041	0.017	0.014	0.229	-0.066	0.026	0.010
Private primary care	0.161	-0.014	0.016	0.388	0.145	-0.024	0.022	0.283
Hospital outpatient								
Any hospital outpatient	0.055	-0.003	0.010	0.744	0.071	-0.007	0.016	0.671
Public hospital	0.039	0.001	0.008	0.875	0.051	0.004	0.014	0.776
Private hospital	0.017	-0.005	0.005	0.344	0.020	-0.012	0.008	0.165
Observations	8,135				4,073			

Note: This table presents regression discontinuity estimates of healthcare utilisation based on a local linear regression with 18 months bandwidth using the "all individuals" and the "dependent young adults" samples, restricted to those who reported having any health problems in the last month. Column "Mean" shows the sample mean of outcome variables for individuals aged 20 years old. Columns "RD", "SE", and "P-value" report the magnitude, heteroskedasticity-robust standard errors, and p-values of the regression discontinuity estimates. Private primary care consists of private physician offices, private midwife practices, and private polyclinics. Public primary care consists of subdistrict-level health centres (*Puskesmas*) and the village-level satellite health centres (*Pustu*). Self-medication includes taking medication bought in stalls or pharmacies without a doctor's prescription. Medical check-ups, screening, immunisation, and routine pregnancy care are not counted as outpatient visits. See Appendix Table 1 for the sample means and covariate balance of sample used in the analysis presented in this table.

Table 5. Heterogeneous impact of age-eligibility threshold among dependent young adults

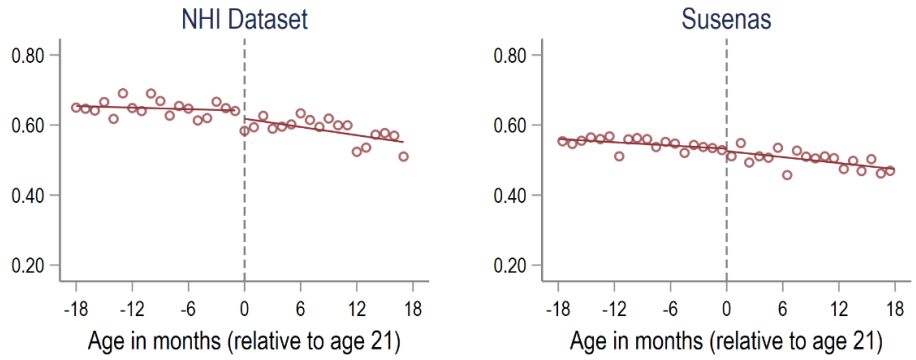
	Any health problems				Primary care or hospital outpatient			
	Mean	RD	SE	P-value	Mean	RD	SE	P-value
Sex								
Female	0.192	0.014	0.016	0.394	0.477	-0.090	0.045	0.045
Male	0.159	-0.008	0.013	0.519	0.372	-0.082	0.042	0.052
Wealth index								
Poor (poorest third)	0.164	0.001	0.016	0.951	0.447	-0.115	0.054	0.033
Non-poor	0.179	<0.001	0.013	0.972	0.409	-0.067	0.038	0.075
Education								
No senior high school	0.188	-0.034	0.020	0.088	0.435	-0.207	0.061	0.001
Some senior high school	0.169	0.012	0.012	0.317	0.420	-0.049	0.036	0.174
Urban/rural								
Rural	0.168	0.005	0.014	0.701	0.404	-0.070	0.044	0.118
Urban	0.179	-0.004	0.015	0.809	0.440	-0.098	0.043	0.023
Province-level average outpatient claims (2018)								
< Median	0.162	0.020	0.014	0.147	0.431	-0.062	0.044	0.167
≥ Median	0.186	-0.020	0.015	0.185	0.414	-0.107	0.043	0.013

Note: This table presents regression discontinuity estimates of each outcome (in columns) based on a local linear regression with 18-month bandwidth using the "dependent young adults" sample from Susenas. Column "Mean" shows the sample mean of outcome variables for individuals aged 20 years old for the respective group. Columns "RD", "SE", and "P-value" report the magnitude, heteroskedasticity-robust standard errors, and p-values of the regression discontinuity estimates. Results for primary care or hospital outpatient are conditional on having any health problems. Average hospital outpatient claims per episode at the province level reported in NHI annual statistics from 2018 (National Social Security Council, 2020).

Appendix

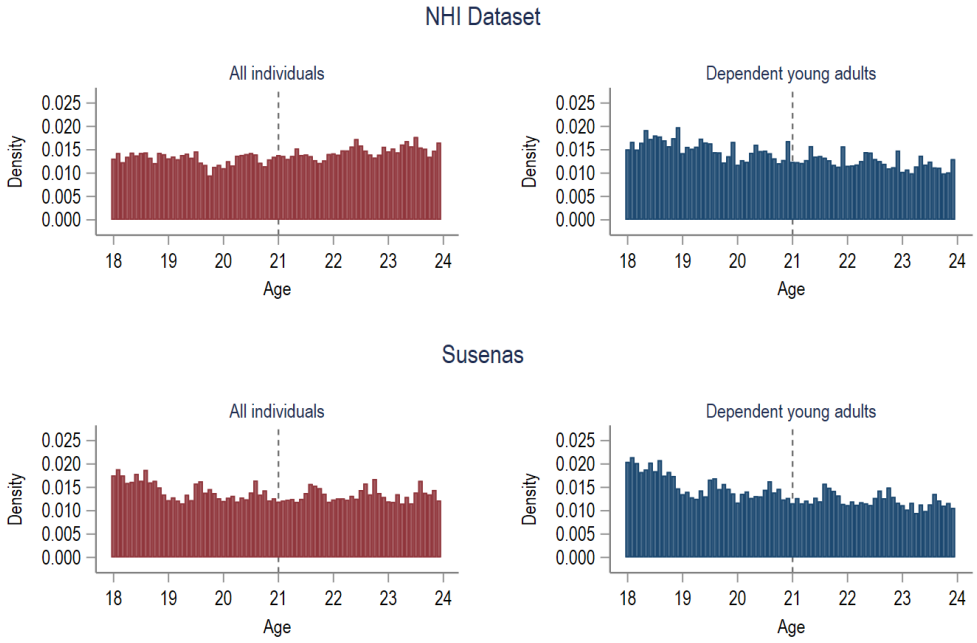
Figure

Figure A1. Selection into the "dependent young adults" sample



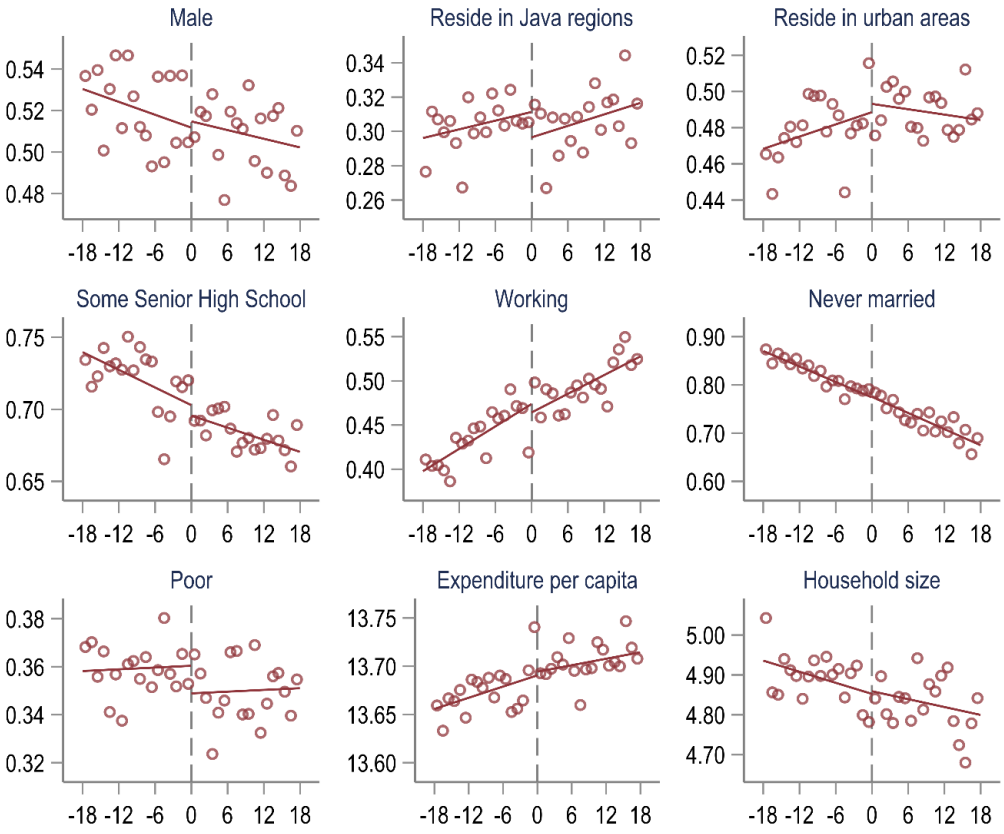
Notes: This figure shows the proportion of individuals selected into the "dependent children" sample by age from Susenas and the NHI and Susenas dataset. Dots show the mean of the outcome variable for each month-age bin. Solid lines depict fitted values from a local linear regression. Regression discontinuity estimates show no statistically significant jump at age 21.

Figure A2. Age distribution around the cut-off



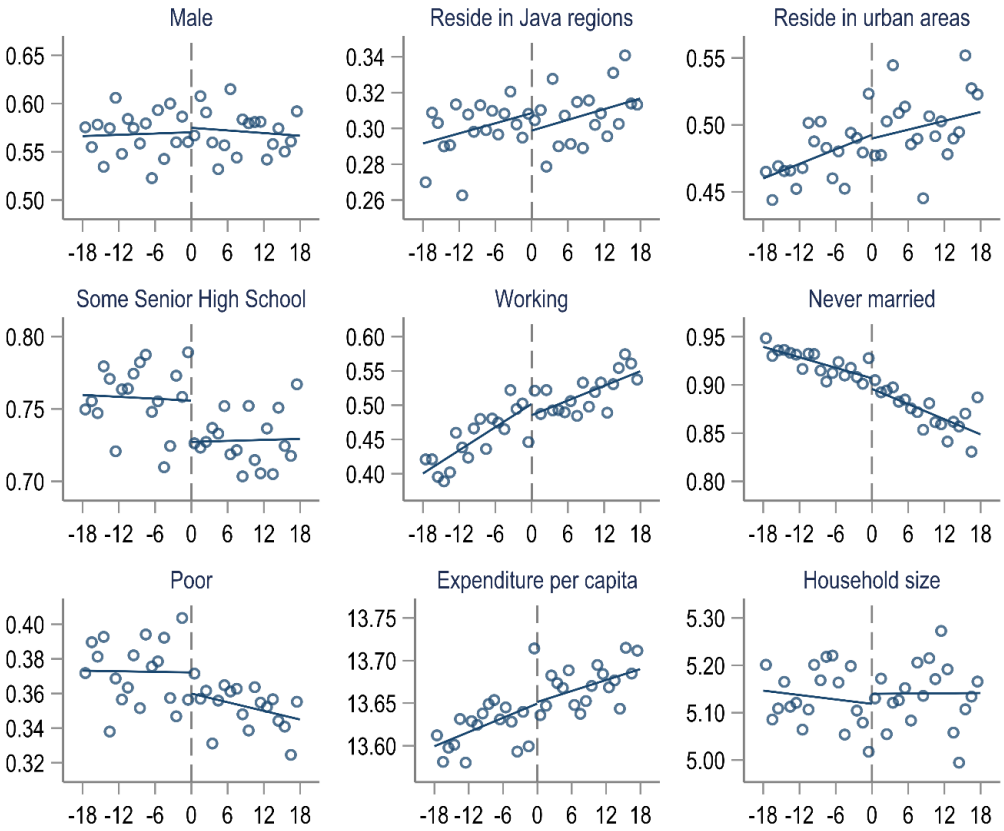
Notes: This figure presents the distribution of age (binned into months) around the cut-off. It shows no notable sorting of individuals just before or after age 21.

Figure A3. Trends in covariates by age in the "all individuals" sample



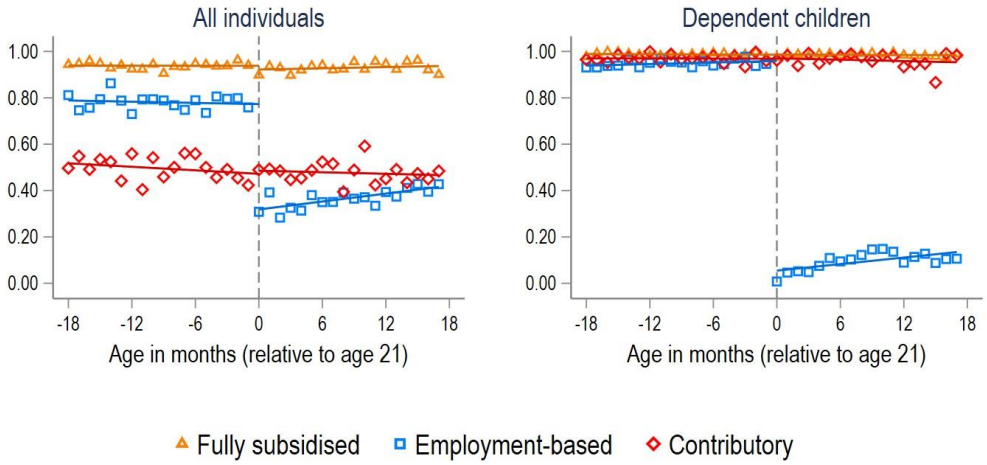
Notes: This figure shows regression discontinuity plots of each covariate using the unrestricted "all individuals" sample from Susenas 2018. Dots show the mean of the outcome variable for each month-age bin. Solid lines depict fitted values from a local linear regression. Regression discontinuity estimates show no statistically significant jump at the cut-off.

Figure A4. Trends in covariates by age in the "dependent young adults" sample



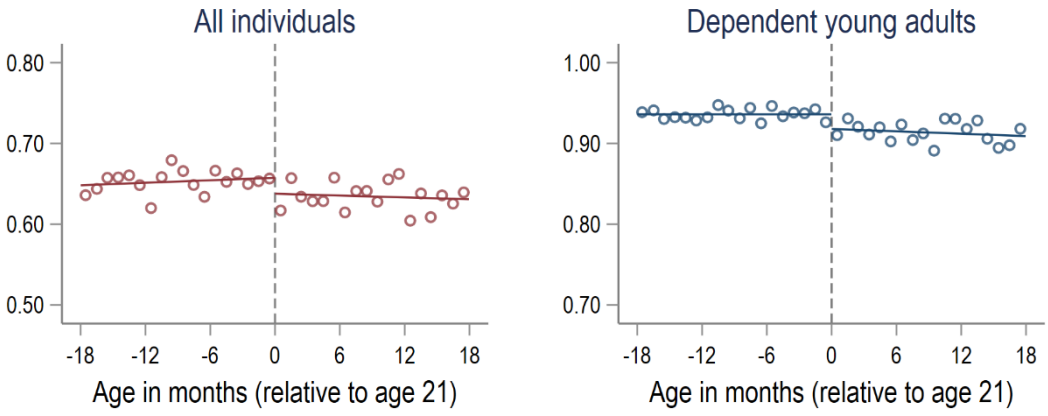
Notes: This figure shows regression discontinuity plots of each covariate using "dependent young adults" sample from Susenas 2018. Dots show the mean of the outcome variable for each month-age bin. Solid lines depict fitted values from a local linear regression. Regression discontinuity estimates show no statistically significant jump at the cut-off.

Figure A5. NHI coverage by age within each scheme



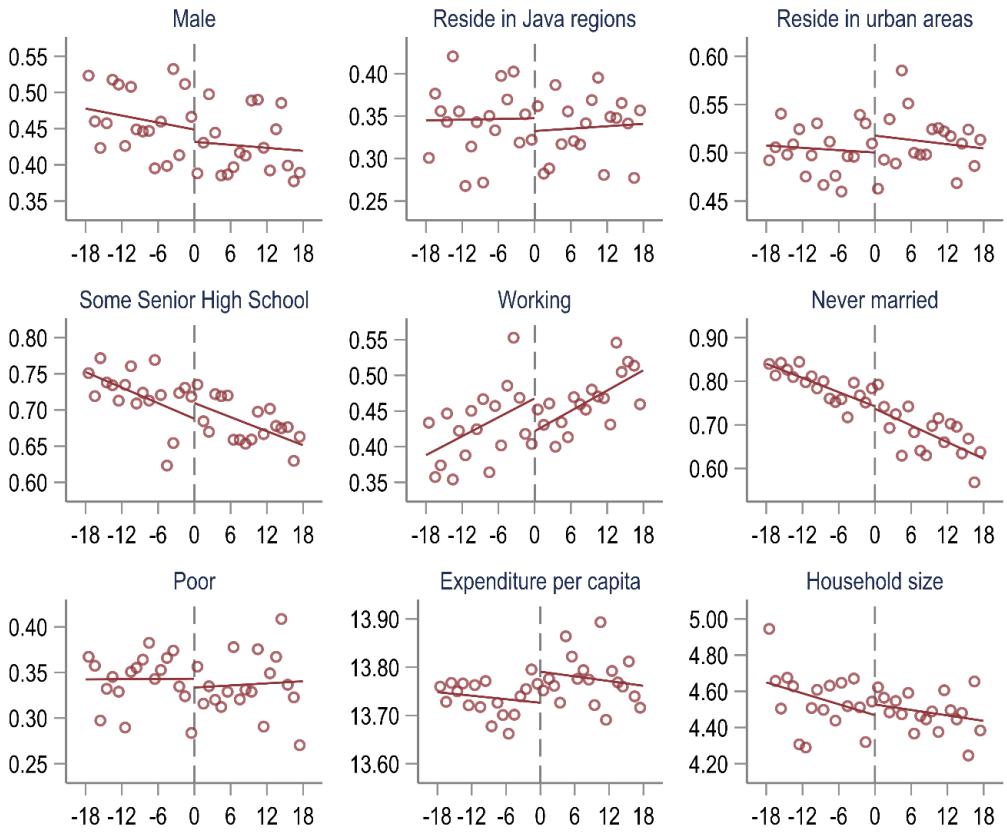
Notes: This figure shows the proportion of enrolees within each scheme who have coverage in December 2018 by age. Dots show the mean of the outcome variable for each month-age bin. Solid lines depict fitted values from a local linear regression. Regression discontinuity estimates show no statistically significant jump at the cut-off.

Figure A6. Self-reported NHI coverage by age from Susenas



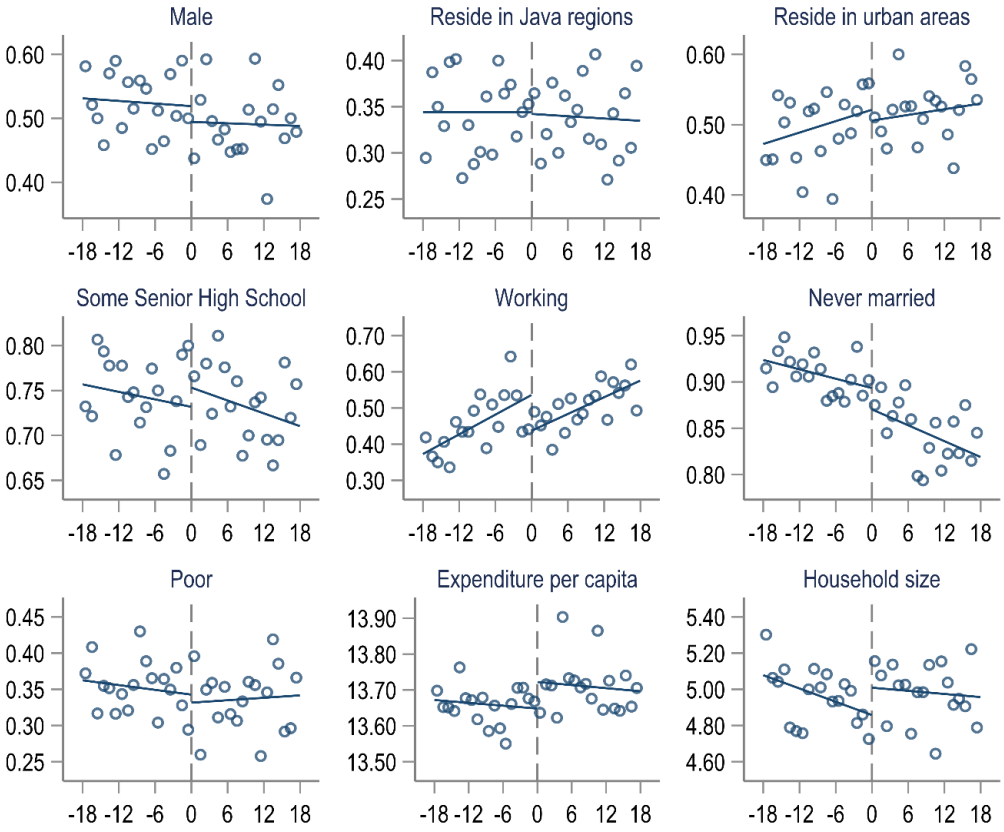
Notes: This figure shows the proportion of individuals who reported having NHI coverage in Susenas by age. Dots show the mean of the outcome variable for each month-age bin. Solid lines depict fitted values from a local linear regression. Regression discontinuity estimates show no statistically significant jump at the cut-off.

Figure A7. Trends in covariates by age in the "all individuals" sample, conditional on having any health problems



Notes: This figure shows regression discontinuity plots of each covariate using "all individual" sample from Susenas 2018. Dots show the mean of the outcome variable for each month-age bin. Solid lines depict fitted values from a local linear regression. Regression discontinuity estimates show no statistically significant jump at the cut-off.

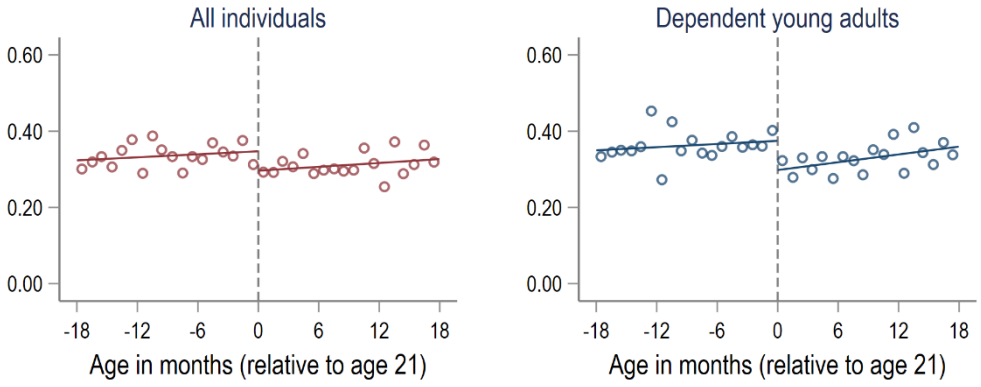
Figure A8. Trends in covariates by age in the "dependent young adults" sample, conditional on having any health problems



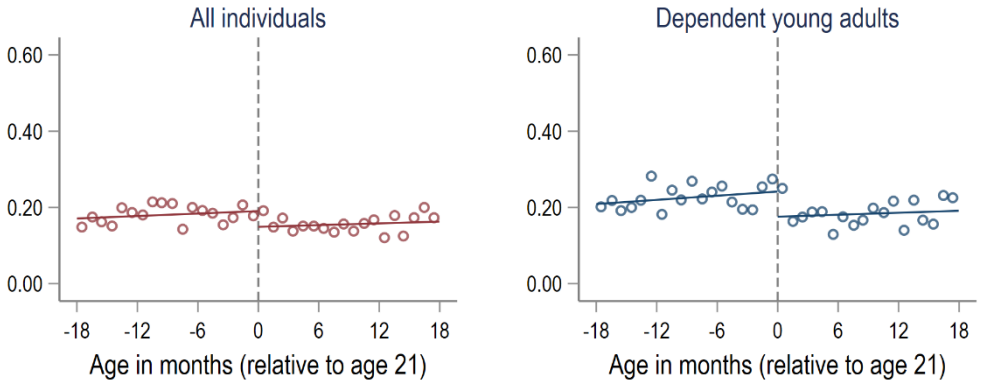
Notes: This figure shows regression discontinuity plots of each covariate using "dependent young adults" sample from Susenas 2018. Dots show the mean of the outcome variable for each month-age bin. Solid lines depict fitted values from a local linear regression. Regression discontinuity estimates show no statistically significant jump at the cut-off.

Figure A9. Primary care utilisation by age, conditional on having any health problems

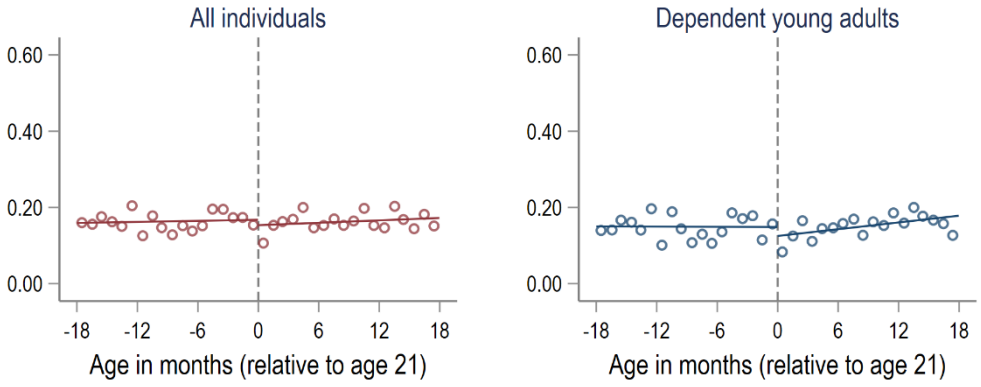
A. Any primary care



B. Public primary care



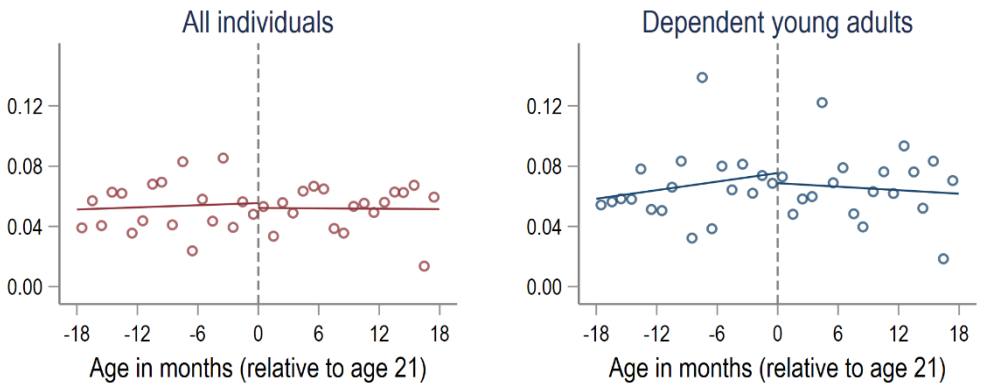
C. Private primary care



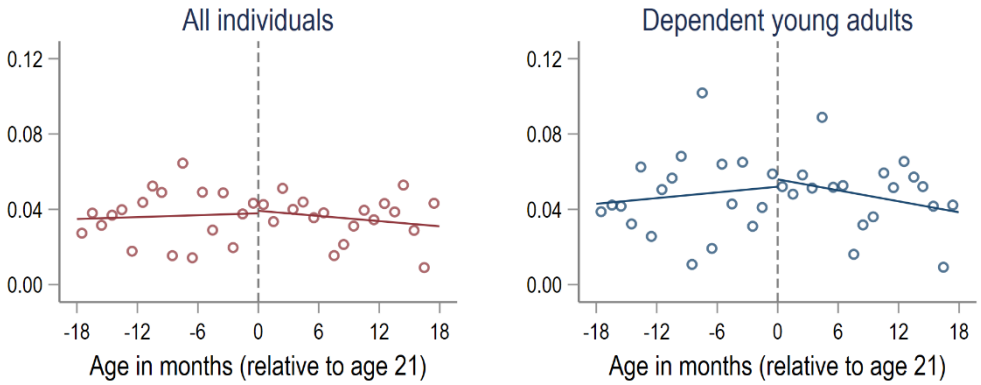
Notes: This figure plots the proportion of individuals with health problems who used outpatient care in any primary care (A), public primary care (B), and private primary care (C), by age (in months relative to age 21). Solid lines depict the linear age trends from each side of the cut-off. Each dot corresponds to sample means of outcomes within the respective age-months bins.

Figure A9. Hospital outpatient services utilisation by age, conditional on having any health problems

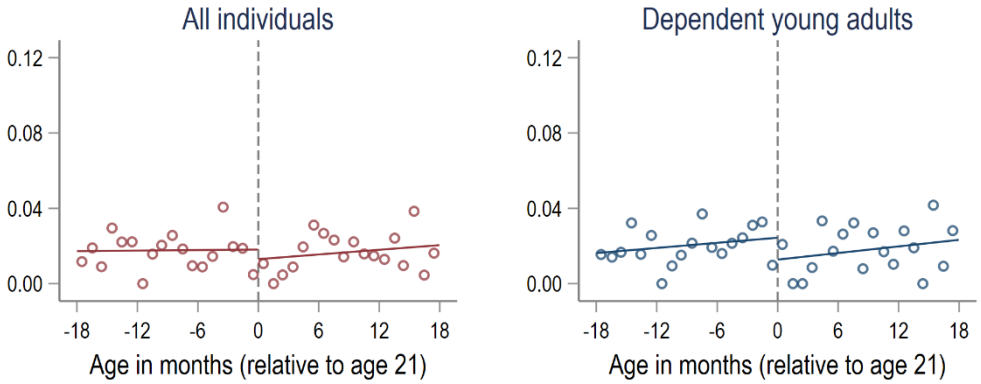
A. Any hospital outpatient services



B. Public hospital



C. Private hospital



Notes: This figure plots the proportion of individuals with health problems who used outpatient care in any hospital outpatient services (A), public hospital outpatient services (B), and private hospital outpatient services (C), by age (in months relative to age 21). Solid lines depict the linear age trends from each side of the cut-off. Each dot corresponds to sample means of outcomes within the respective age-months bins.

Table

Table A1. Sample means and covariate balance, conditional on having any health problems

	All individuals				Dependent young adults			
	Mean by age		Discontinuity		Mean by age		Discontinuity	
	18-20	21-23	Coef.	P-value	18-20	21-23	Coef.	P-value
Male	0.47	0.43	-0.02	0.45	0.51	0.51	-0.02	0.44
Household size	4.66	4.45	0.06	0.53	4.99	4.98	0.15	0.19
Reside in Java region	0.34	0.34	-0.01	0.48	0.33	0.34	-0.00	0.96
Live in urban areas	0.48	0.50	0.02	0.43	0.47	0.52	-0.02	0.63
≥ Senior high school	0.75	0.64	0.02	0.29	0.78	0.71	0.02	0.44
Working	0.34	0.50	-0.05	0.04	0.34	0.54	-0.10	0.00
Never married	0.85	0.61	-0.01	0.78	0.93	0.82	-0.02	0.26
Log Expenditure per capita	13.70	13.77	0.06	0.03	13.63	13.71	0.07	0.06
Poor	0.35	0.35	-0.01	0.65	0.37	0.34	-0.01	0.71
Observations	8,774	8,276			4,899	3,689		

Notes: This table presents the sample mean of individuals characteristics from Susenas and the NHI dataset. Sample of "all individuals" from Susenas represents Indonesian population aged 18-23. In the NHI dataset, this sample represents individuals who have had registered to the NHI as of 31 December 2018. Sample of "dependent young adults" from Susenas represents young adults co-residing with their parents, and their parents have (self-reported) NHI coverage. In the NHI dataset, this sample includes individuals aged 18-23 who are recorded as dependent children, and their parents have active NHI coverage in December 2018. Sample is restricted to individuals who report health problems in the past month. Expenditure per capita is log-transformed. Poor refers to individuals in the first tercile of wealth index distribution. Discontinuities at age 21 are estimated using local linear regression with 18 months bandwidth. Column "Mean" shows the sample mean of outcome variables for individuals aged 20. Columns "RD", "SE", and "P-value" report the magnitude, heteroskedasticity-robust standard errors, and p-values of the regression discontinuity estimates.

Table A2. Heterogeneous impact of age-eligibility threshold among all individuals

	Any health complaints				Primary care or hospital outpatient			
	Mean	RD	SE	P-value	Mean	RD	SE	P-value
Sex								
Female	0.204	0.013	0.011	0.240	0.418	-0.046	0.029	0.115
Male	0.158	-0.003	0.010	0.730	0.345	-0.063	0.032	0.046
Wealth index								
Poor (poorest third)	0.174	0.005	0.012	0.672	0.412	-0.097	0.038	0.010
Non-poor	0.184	0.004	0.009	0.669	0.371	-0.031	0.026	0.235
Education								
< Senior high school	0.184	-0.012	0.014	0.367	0.389	-0.101	0.039	0.010
≥ Senior high school	0.179	0.012	0.009	0.173	0.384	-0.035	0.026	0.179
Urban/rural								
Rural	0.175	<0.001	0.010	0.991	0.395	-0.046	0.031	0.135
Urban	0.186	0.009	0.011	0.380	0.375	-0.059	0.030	0.048
Province-level average outpatient claims (2018)								
< Median	0.169	0.016	0.010	0.111	0.390	-0.032	0.031	0.310
≥ Median	0.193	-0.008	0.011	0.483	0.381	-0.074	0.030	0.013

Note: This table presents regression discontinuity estimates of each outcome using local linear regression with 18 months bandwidth (36 months window) on "Dependent young adults". Column "Mean" shows the sample mean of outcome variables for individuals aged 20 years old for the respective group. Columns "RD", "SE", and "P-value" report the magnitude, heteroskedasticity-robust standard errors, and p-values of the regression discontinuity estimates. Results for primary care or hospital outpatient' are conditional on having any health problems. Average hospital outpatient claims per episode at the province level reported in NHI annual statistics from 2018 (National Social Security Council, 2020).

Table A3. Estimates using data-driven MSE-optimal bandwidth

	All individuals					Dependent young adults				
	RD	P-value	Robust P-value	Bandwidth (months)	Obs.	RD	P-value	Robust P-value	Bandwidth (months)	Obs.
Panel A. Health problems										
Any health problems	0.005	0.426	0.672	29.5	74,161	0.001	0.895	0.953	23.4	30,490
Disruptive health problems	-0.001	0.680	0.803	36.1	93,294	-0.003	0.559	0.621	30.5	40,404
Panel B. Healthcare use										
Primary care or hospital outpatient	-0.044	0.019	0.016	23.1	10,533	-0.053	0.030	0.024	28.1	6,428
Self-medication	0.015	0.340	0.250	26.3	11,982	0.015	0.458	0.408	33.5	7,848
Traditional healer	0.009	0.022	0.014	17.9	8,096	0.003	0.361	0.312	33.0	7,691
Primary care										
Any primary care	-0.025	0.086	0.139	35.2	16,646	-0.051	0.029	0.024	28.8	6,623
Public primary care	-0.032	0.004	0.010	39.3	18,902	-0.044	0.017	0.039	33.8	7,930
Private primary care	0.005	0.679	0.670	40.1	19,384	-0.016	0.381	0.270	25.1	5,686
Hospital outpatient										
Any hospital outpatient	-0.002	0.799	0.600	21.4	9,697	-0.002	0.843	0.798	32.9	7,674
Public hospital	0.001	0.806	0.959	33.6	15,686	0.002	0.818	0.688	35.9	8,569
Private hospital	-0.005	0.334	0.248	18.3	8,288	-0.012	0.134	0.125	21.6	4,884

Note: This table presents regression discontinuity estimates of each outcome based on a local linear regression with uniform kernel weighting using MSE-optimal bandwidth (Calonico et al., 2014). Columns "RD", "P-value", and "Robust P-value" report the magnitude, p-values, and bias-corrected p-values of the regression discontinuity estimates. Column "Obs." report the number of effective observations used in RD estimation for each outcome. Results in Panel B are conditional on having any health problems.

Table A4. Estimates excluding households with non-zero alcohol consumption

	All individuals				Dependent young adults			
	Mean	RD	SE	P-value	Mean	RD	SE	P-value
Panel A. Health problems								
Any health problems	0.181	0.004	0.007	0.587	0.174	0.001	0.010	0.919
Disruptive health problems	0.072	-0.006	0.005	0.244	0.072	-0.010	0.007	0.157
Observations	43,577				22,821			
Panel B. Healthcare use								
Primary care or hospital outpatient	0.385	-0.047	0.022	0.031	0.422	-0.077	0.031	0.014
Self-medication	0.730	0.042	0.020	0.034	0.716	0.036	0.028	0.198
Traditional healer	0.006	0.009	0.004	0.016	0.005	0.007	0.005	0.140
Primary care								
Any primary care	0.338	-0.045	0.021	0.033	0.362	-0.070	0.030	0.021
Public primary care	0.187	-0.038	0.017	0.023	0.229	-0.062	0.026	0.017
Private primary care	0.161	-0.012	0.017	0.490	0.145	-0.021	0.022	0.335
Hospital outpatient								
Any hospital outpatient	0.055	-0.002	0.010	0.823	0.071	-0.006	0.016	0.724
Public hospital	0.039	0.002	0.009	0.822	0.051	0.003	0.014	0.835
Private hospital	0.017	-0.005	0.005	0.384	0.020	-0.010	0.008	0.255
Observations	7,935				3,969			

Note: This table presents regression discontinuity estimates of each outcome using local linear regression with 18 months bandwidth (36 months window) on the "dependent young adults" and the "all individuals" samples, excluding those with non-zero alcohol consumption. Panel B is conditional on having any health problems. Column "Mean" shows the sample mean of outcome variables for individuals aged 20. Columns "RD", "SE", and "P-value" report the magnitude, heteroskedasticity-robust standard errors, and p-values of the regression discontinuity estimates.

Table A5. Estimates including covariates as control variables

	All individuals				Dependent young adults			
	Mean	RD	SE	P-value	Mean	RD	SE	P-value
Panel A. Health problems								
Any health problems	0.181	0.008	0.008	0.333	0.174	-0.002	0.011	0.818
Disruptive health problems	0.072	-0.005	0.005	0.333	0.072	-0.013	0.007	0.075
Observations	44,686				23,403			
Panel B. Healthcare use								
Primary care or hospital outpatient	0.385	-0.043	0.023	0.064	0.422	-0.081	0.034	0.017
Self-medication	0.730	0.038	0.021	0.071	0.716	0.044	0.031	0.156
Traditional healer	0.006	0.010	0.004	0.023	0.005	0.006	0.005	0.283
Primary care								
Any primary care	0.338	-0.037	0.022	0.096	0.362	-0.064	0.033	0.051
Public primary care	0.187	-0.041	0.018	0.021	0.229	-0.066	0.028	0.016
Private primary care	0.161	-0.003	0.018	0.849	0.145	-0.010	0.025	0.676
Hospital outpatient								
Any hospital outpatient	0.055	-0.006	0.011	0.575	0.071	-0.016	0.018	0.380
Public hospital	0.039	-0.003	0.009	0.763	0.051	-0.009	0.015	0.577
Private hospital	0.017	-0.004	0.006	0.565	0.020	-0.008	0.010	0.430
Observations	8,040				4,025			

Note: This table presents regression discontinuity estimates of each outcome using local linear regression with 18 months bandwidth (36 months window) on the "dependent young adults" and the "all individuals" samples, excluding those with non-zero alcohol consumption. Panel B is conditional on having any health problems. Column "Mean" shows the sample mean of outcome variables for individuals aged 20. Columns "RD", "SE", and "P-value" report the magnitude, heteroskedasticity-robust standard errors, and p-values of the regression discontinuity estimates. Control variables include sex, household size, district of residence fixed effects, educational attainment (attended senior high school or not), marital status, wealth tercile, and month of birth dummy.