

The 2019 Health Care Cost of Smoking in Indonesia

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List of Abbreviations

APBN	: <i>Anggaran Pendapatan dan Belanja Negara, State Budget</i>
Bappenas	: <i>Kementerian Perencanaan Pembangunan Nasional, National Development Planning Agency</i>
BPJS-K	: <i>Badan Penyelenggara Jaminan Sosial Kesehatan, Health care Social Security Agency</i>
BPS	: <i>Badan Pusat Statistik, Central Bureau of Statistics</i>
CISDI	: <i>Center for Indonesia's Strategic Development Initiatives</i>
DHE	: <i>Direct health care expenditure</i>
DNHE	: <i>Direct non-health care expenditures</i>
FKTP	: <i>Fasilitas Kesehatan Tingkat Pertama, Primary health care facilities</i>
FKTRL	: <i>Fasilitas Kesehatan Rujukan Tingkat Lanjutan, Referral health facilities</i>
GDP	: <i>Gross Domestic Product</i>
IFLS	: <i>Indonesia Family Life Survey</i>
IHME	: <i>Institute for Health Metrics and Evaluation</i>
JKN	: <i>Jaminan Kesehatan Nasional, National Health Insurance Program</i>
LMICs	: <i>Low-to-Middle-Income Country</i>
NHIP	: <i>National Health Insurance Program</i>
OOP	: <i>out of pocket</i>
PBPU	: <i>Pekerja Bukan Penerima Upah, non-salaried workers</i>
RISKESDAS	: <i>Basic Health Research</i>
RPJMN	: <i>Rencana Pembangunan Jangka Menengah Nasional, National Medium-Term Development Planning</i>
Rp	: <i>Indonesian Rupiah</i>
SAF	: <i>Smoking Attributable Fraction</i>
SDE	: <i>Smoking attributable Direct Expenditure</i>
SHS	: <i>Second-hand smoke</i>
SIDS	: <i>Sudden infant death syndrome</i>
SUSENAS	: <i>Survei Sosial Ekonomi Nasional, Indonesian Socio-economic Survey</i>
THE	: <i>Total Health Expenditure</i>
UIC	: <i>University of Illinois at Chicago</i>
US	: <i>United States</i>
WHO	: <i>World Health Organization</i>

Executive Summary

Key messages

Indonesia's adult ever-smoking prevalence in 2019 was 32.8 percent according to SUSENAS, with smoking prevalence among adolescents aged 10 to 18 years continued to rise from 7.2 percent in 2013 to 9.1 percent in 2018.

Reliable estimates of the economic costs of tobacco use are important to policymakers, particularly in planning health services provisions and other public expenditures. In 2019, the deficit of the National Social Health Insurance Scheme (JKN) was Rp17.0 trillion, with the accumulated deficit reaching Rp51.0 trillion.

This study finds that the increasing smoking prevalence drove the health care cost of smoking for all population in 2019 to between Rp17.9 trillion (0.1 percent of GDP) to Rp27.7 trillion (0.2 percent of GDP). Most of the direct cost of smoking occurred for 20+ population (between Rp17.7 and Rp26.7 trillion).

This estimate is higher than previously estimated by Kosen et al. (2017) at Rp13.7 trillion in 2015, or Rp15.7 trillion in 2019 prices. The main reason behind the difference from the previous estimate is that this study is more comprehensive both in terms of included diseases and levels of care.

This estimate is also significantly higher than the estimated maximum allocation of tobacco revenue for the health system at the total of Rp7.4 trillion. In 2019, the government earmarked Rp5.8 trillion from local cigarette tax for JKN and local government was mandated to allocate Rp1.6 trillion Revenue Sharing Fund of Tobacco Products Excise (DBHCHT) to support supply-side readiness and to cover for JKN contribution for the poor and workers affected by employment termination.

Allowing cigarette consumption to continue unhindered would further increase the deficit of the Social Security Agency for Health (BPJS-K) and impede its capacity for essential health services for other conditions. The deficit will surely grow since the current level of revenues generated from the local tobacco surcharge earmarked for National Health Insurance are insufficient to cover the growing costs of treating tobacco-related diseases.

Significant tax increases with a swift merger of tax tiers and enforcement of non-price measures would result in a significant decline in smoking prevalence, tobacco consumption and, consequently, the health cost of smoking. Moreover, increasing the level of earmarking for health to cover the health costs of smoking-related diseases as projected by this research would be a game changer for the sustainability of JKN. These reforms would also generate additional revenues to help JKN stay afloat during this time of the COVID-19 pandemic.

Motivation and relevance of this research

The COVID-19 pandemic has strained the Indonesian health system and its ability to deliver health care services. To minimize the consequences of disruptions to the delivery of essential health care services, national health authorities will need to ensure delivery arrangements are modified or reconfigured and financial and physical resources are made available accordingly.

However, the health care system in Indonesia is already under massive stress from high smoking prevalence and associated costs of treatment for tobacco-related diseases. The arrival of the pandemic in the country with a high prevalence of non-communicable disease – the comorbid conditions for COVID-19 – and perpetual deficits in its health insurance system only make matters worse.

While the fiscal deficit is expected to remain elevated until 2022, the pandemic continues to increase the need for public funds for health. On the fiscal front, some immediate tax and expenditure actions could help raise resources to finance the crisis response and recovery, contain public debts, and improve fiscal space for priority spending in the medium term.

Avoiding 'preventable waste', or costs of treating tobacco-attributable diseases and earmarking revenues for JKN can turn this burden into an opportunity to invest in healthier generations of Indonesians. The combination of these approaches will eliminate waste and, at the same time, allow more funds to be deployed to health care.

Therefore, this study estimates the direct cost of smoking in Indonesia and secondly, estimates the burden of this cost to JKN.

Approach

The study follows the standard approach of the World Health Organization (WHO, 2011) to calculate Smoking Attributable Direct Expenditure (SDE) by multiplying the sum of direct health care cost of smoking with smoking attributable fraction (SAF). SDE includes the expenses of medical treatment incurred by individuals (out-of-pocket, OOP) and health insurance providers to access the cost of inpatient treatment, outpatient visits, medical, and non-medical cost.

The health care cost of smoking is estimated for all the population (to compare the estimate with the previous study) and the population aged 20+ using data from Indonesia Basic Health Research (RISKESDAS) 2018, National Socio-Economic Survey (SUSENAS) 2018-2019, and BPJS-K administrative data 2019.

In addition, this study employs two estimates of relative risk of mortality from smoking (RR), as the estimate for Indonesia is not available. Firstly, it uses the RR for the US, to compare the results with the previous estimates of SDE from Kosen et al. (2017). Secondly, the study uses the RR for India due to a similarity in lifestyle, quality of health care, etc., between India and Indonesia. Using two RRs is helpful in providing a range of the likely costs, given the lack of RRs for Indonesia.

Key findings

Replicating the approach in Kosen et al. (2017) that uses the US RR to calculate SDE for all the population produced an estimated SDE of Rp27.7 trillion, which is higher than Kosen et al. (2017) estimate for 2015 of Rp13.7 trillion, or Rp. 15.7 trillion in 2019 prices. The estimate for population 20+ is very similar at Rp26.7 trillion.

Using India's RR, SDE for all population and population aged 20+ are Rp17.9 trillion (1.3 billion USD, 0.1 percent of GDP) and Rp17.7 trillions (1.3 billion USD), respectively. These figures are significantly higher than the estimated maximum allocation of the 2019 local cigarette tax and Revenue Sharing Fund of Tobacco Products Excise (DBHCHT) for Indonesia's health system at only Rp7.4 trillion, that is only covering 27 percent of SDE.

The burden to BPJS-K to cover SDE for all population is high, accounting for between 56.3 and 58.6 percent, with the inpatient and referral treatment cost being responsible for between 86.3 and 87.6 percent of BPJS-K cost. Similarly, for population 20+ the estimated burden to BPJS-K is between 56.9 and 58.9 percent of total direct health care cost, where the inpatient and referral treatments represent between 95.4 and 96.0 percent of BPJS-K cost. The direct health care expenditure increases with the age of smokers, reaching the maximum level in the age group 50-59. The average annual health care cost of ever-smokers per person per year is between Rp299,335 and Rp462,145.

The bottom line for policy

This study confirms that smoking places a substantial economic burden on Indonesian society. Reducing costs from smoking-attributable diseases would be a game changer for dedicating more resources to fight the COVID-19 pandemic in short term and ensuring the sustainability of JKN in the long run.

As evidence from many countries shows, making cigarettes less affordable decreases demand for tobacco products: it discourages non-users from taking up tobacco use, encourages existing users to reduce consumption or even quit, helps former users maintain cessation, and prevents occasional smokers from turning into regular smokers^{1,2}. Non-smokers are less likely than smokers to develop heart disease, stroke, and lung cancer, and smokers who successfully quit before age 40 avoid nearly all increase mortality risk of continued smoking³.

This study provides evidence for a stronger government role in reducing negative externalities from smoking.

Key policy recommendations in line with this are the following:

1. Set substantial increases in tobacco tax rates with a swift merger of tax tiers. Smoking cessation is made more difficult by the multi-tiered excise tax structure. This encourages smokers to switch to cheaper brands rather than quitting altogether. The Ministry of Finance should reissue the tobacco excise simplification roadmap to allow swift merger of the tax tiers.
2. Earmark tobacco excise revenue for the JKN program. A modest proposal for supporting the sustainability of JKN is soft earmarking of funds after raising the tobacco tax to cover the health costs of smoking-related diseases as projected by this research.
3. Tackle non-price factors at the same time to prevent early introduction to smoking. Aggressively restrict tobacco advertising, enforce smoke-free areas in public spaces and workplaces, and expand the use of pictorial health warnings.

Introduction

Strengthening the health care financing system in light of the COVID-19 pandemic

Indonesia still finds itself amid the COVID-19 pandemic, struggling to contain case numbers. Infections are spread more evenly across age groups than fatalities, with the bulk occurring among 20–59-year-olds, the most economically productive age group.

Health care services, especially in high-risk zones, are being confronted with increased demand generated by the outbreak. When health systems are overwhelmed, morbidity is exacerbated, disability intensifies, and both mortality from the outbreak and mortality from preventable and treatable conditions increases⁴. The arrival of the pandemic in a country with a high prevalence of non-communicable disease – the comorbid conditions for COVID-19 – and perpetual deficits in its health insurance system, can only make matters much worse.

When there is a sudden and drastic increase in demand for medical services, there are simply no easy solutions. The COVID-19 responses require just-in-time responsive policy to prevent a public health emergency from turning into an operational crisis: more staff, treatment equipment and facilities, drugs, and protective equipment for a sustained period. National health authorities are struggling to reconfigure delivery arrangements and to finance the country's efforts to combat the health crisis.

Meanwhile, COVID-19 has also caused economic turmoil and had a severe impact on economic growth. Growth contracted by 5.3 percent year-over-year (YOY) in the second quarter of 2020 against a 3.5 percent YOY and 2.2 percent YOY contraction in the third and fourth quarter. The recession is leading to a significant decline in fiscal revenues which have contracted by 17 percent in 2020 relative to 2019, mostly due to weak tax revenues. Indonesia has not seen such an economic contraction since 1998, during the Asian financial crisis.

Amidst the health and economic crises, mitigating the impact on public financing for health will be necessary to not lose years of gains made in improving health outputs and outcomes. President Joko Widodo's introductory remarks at the Limited Meeting on BPJS-K underlined several points to ensure all Indonesian have access to health services through the JKN system, particularly in the mitigation of COVID-19 pandemic^{5,6}. Reprioritizing public spending towards bolstering the health system requires timely action from government leaders and a supportive public finance environment. Adjustments are required on the revenue side of budgets to account for these new fiscal constraints. Quick decision-making on the expenditure side is also needed.

Without additional public funding, the health system will not only struggle to control the pandemic, but also fail to maintain essential health services for other conditions. Simply reallocating the existing health budget is not a viable way of addressing the pandemic for two reasons. First, it will not be sufficient to meet the greater demand for health services, including new infrastructure, staff, and supplies; outreach to ensure access to testing and treatment for all those who need it; and overtime and supplementary payments for health care workers. Second, many countries have postponed and cancelled the delivery of essential health services for other conditions to release capacity to respond to the outbreak in the short run. This is likely to result in unmet need and adverse effects on health and will require immediate attention once the most urgent phase of the pandemic has passed.

As stated in 2019 BPJS-K Audited Report, JKN incurred a deficit of Rp17.0 trillion, hence the accumulated deficit had reached Rp51 trillion. The Ministry of Finance projected the deficit for the BPJS-K financing scheme—designed for average patient loads, not epidemics—would continue to increase and reach Rp72.6 trillion by 2024⁷. The Supreme Court decision to roll back the contributions increase will only increase this deficit. Starting from the month of May 2020, BPJS-K contributions for non-salaried workers (*Pekerja Bukan Penerima Upah*, PBPJ) and non-workers (*Bukan Pekerja*) has reverted to their original prices.

President Jokowi is deemed to have disobeyed the decision of Supreme Court by signing Presidential Regulation No.64 of 2020 to further increase the contributions of BPJS-K. However, many people are not able to afford to pay contributions as COVID-19 has substantially decreased worker hours and earnings. It was predicted that 2.9-5.2 million people would lose their jobs (combined formal and informal sector impact), equivalent to 6.5-11.6 million reduction in JKN members. Those working in the informal economy, the self-employed, and part-time workers which constitute a large part of Indonesian workforce, are not able to pay the contributions. The figure from BPJS-K confirms this concern by stating that almost 4 million dropped out of JKN membership between end-Dec 2019 and end-June 2020. Potential decrease in revenues from JKN program contributions is estimated between Rp 4.3 and 6.5 trillion.

Extending benefits to these people as well as the unemployed will require additional public funds that can be deployed quickly and transparently. While there is considerable decrease in service utilization through JKN in the first quarter of 2020, the possibility of even higher expenditures due to catch-up utilization after the situation stabilizes and complications resulting from postponement of health services will lead to a rise in future deficits.

Therefore, options available for channeling additional public funds to BPJS-K are limited. The draft of co-payments policy currently under consideration may not be realized in the near future⁸. Budget relocation amidst the COVID-19 pandemic might leave no room for another bailout package for BPJS-K at the end of fiscal year.

At a time when additional funding is scarce, the current pressures can be a powerful incentive for making critical policy decisions that enable BPJS-K to control its expenditure. Therefore, this report will continue to look at the extent to which BPJS-K money is wasted by scrutinizing tobacco-attributable disease as Indonesia's most significant and preventable cause of disease and death.

Global trends in tobacco use

The global health and economic burden of tobacco use is enormous and is increasingly borne by low- and middle-income countries (LMICs). While smoking prevalence is falling at the global level, the total number of smokers worldwide is not decreasing, largely due to population growth⁹. There are about 1.1 billion people aged 15 and over who smoke, with 80 percent of smokers living in LMICs¹⁰. There is a strong possibility that the global target of a 30 percent relative reduction in tobacco use by 2025 set by WHO will not be met¹¹.

Tobacco is the only legal product that kills a large proportion of its consumers when used as intended by its manufacturers¹². WHO has estimated that around 8 million people die each year from tobacco use, including 1.2 million who die from exposure to second-hand smoke (SHS)¹³. By 2030, tobacco use is forecast to produce the largest burden of premature mortality and disability in the world compared with other health risk factors¹⁴.

Cigarette smoking has been causally linked to diseases of nearly all organs of the body, diminished health status, and harm to the fetus¹⁵. Decades of research have conclusively established that tobacco use, and cigarette smoking in particular, causes numerous serious illnesses, including multiple cancers, cardiovascular disease and stroke, and pulmonary disease¹⁶. Research continues to identify diseases caused by smoking, such as diabetes mellitus and rheumatoid arthritis.

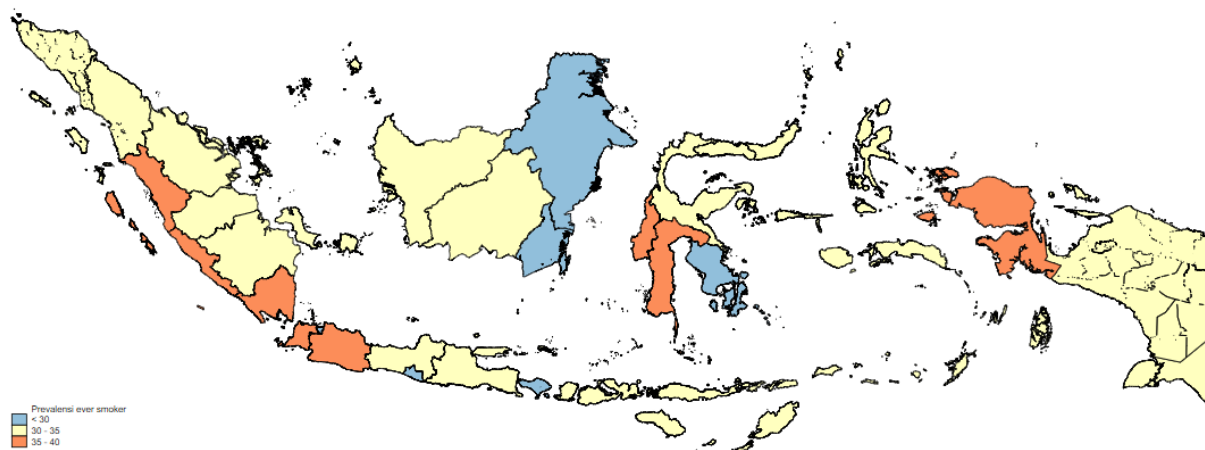
The health hazards of SHS exposure are also now well established, including cancer, respiratory and cardiovascular diseases in adults, as well as disease and death in infants and children¹⁷. Both tobacco use and SHS exposure during pregnancy have been conclusively linked to harm to the developing fetus. Active cigarette smoking by the mother increases the risk for ectopic pregnancy, premature rupture of membranes, abruptio placentae, placenta previa, miscarriage, stillbirth, preterm birth, low birth weight, small for gestational age, some congenital anomalies, and sudden infant death syndrome (SIDS). Women who are exposed to SHS while pregnant are also at increased risk for having babies with low birth weight – a leading cause of infant death¹⁸.

Smoking trends in Indonesia

Contrary to the global trends of declining tobacco use, Indonesia's tobacco epidemic remains one of the world's most serious. In 2019, 32.8 percent of adults were ever-smokers (SUSENAS 2019). The average age of smoking initiation has slightly fallen from 18.8 in 1995¹⁹ to 17.6 in 2011²⁰ to 17.4 years of age in 2018²¹, however caution should be given as the methodology for obtaining the number were different thus, they are non-comparable. RISKESDAS 2018 shows that 59.7 percent of current smokers initiate smoking before 19 years of age and children aged 10-14 smoke six cigarette sticks per day²². While the Indonesian government aimed to reduce child smoking prevalence to 5.4 percent in 2019²³ smoking among adolescents aged 10 to 18 years continued to rise from 7.2 percent in 2013²⁴ to 9.1 percent in 2018²⁵, which is approximately a 20 percent increase.

Fifteen out of 34 Indonesian provinces record higher incidence than the national average, while only five provinces report less than 30 percent smoking incidence among adults aged 20 years or older (Figure 1). Lampung has the highest incidence of 38.9 percent, while Bali has the lowest at 24.2 percent. West Java, the most populous and a tobacco growing province, records incidence of 36.6, which is the fourth highest of all 34 provinces.

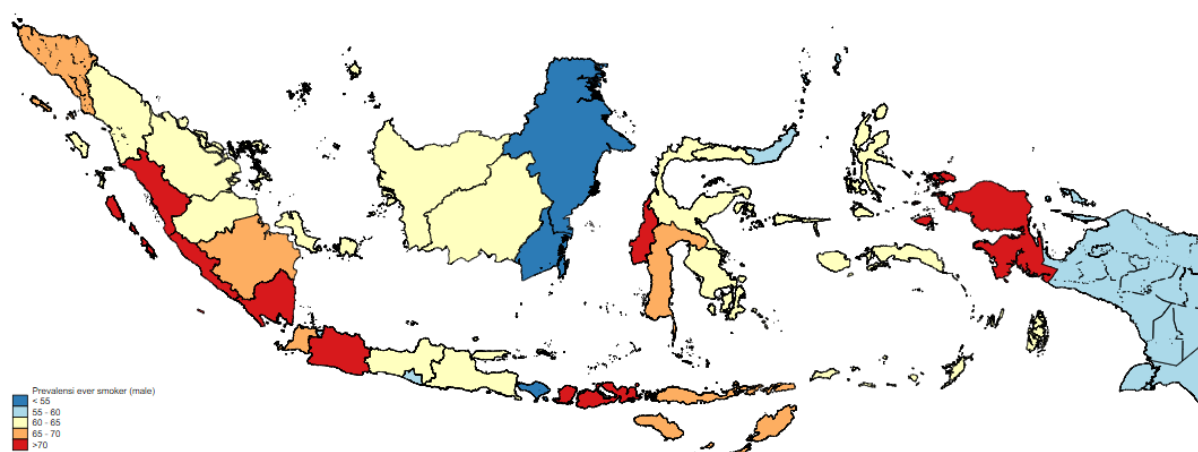
Figure 1. Smoking prevalence in Indonesia



Source: SUSENAS 2019, authors' calculation

Smoking prevalence among adult men in Indonesia is staggering, reaching 64.5 percent in 2019. Seven provinces have alarmingly high smoking incidence among men at more than 70 percent; two of these provinces are tobacco growing, West Java and West Nusa Tenggara (Figure 2). Smoking prevalence among adult men in Lampung is the highest at 74.8 percent, followed by Bengkulu and Gorontalo at 72.0 percent and 71.8 percent, respectively. Bali and East Kalimantan are two provinces with the lowest prevalence among men, accounting for 47.2 percent and 53.8 percent, respectively.

Figure 2. Smoking Prevalence Among Men in Indonesia



Source: SUSENAS 2019, authors' calculation

The majority (30.9 million) of ever-smoking individuals live in urban areas. However, even though the number of ever smokers in urban areas is higher than in rural areas, smoking prevalence in rural area is higher (Table 1). The highest prevalence of ever smokers is among adults with a lower level of education.

Table 1. Smoking prevalence in Indonesia, 2019

	Never smokers	Ever smokers	Prevalence of ever smokers (%)
Type of residence			
Urban	67,678,269	30,921,239	31.4
Rural	49,450,408	26,373,322	34.8
Gender			
Female	86,277,040	1,312,396	1.5
Male	30,851,638	55,982,165	64.5
Education level			
No education	22,509,312	9,370,168	29.4
Primary	28,083,072	15,989,156	36.3
Junior secondary school	20,068,348	11,576,100	36.6
Senior secondary school	31,878,251	16,763,081	34.5
University	14,589,694	3,596,057	19.8
Total	117,128,678	57,294,561	32.8

Source: SUSENAS 2019, authors' calculation

Tobacco use imposes a risk on the country's health, human capital, and economic development. The country's five leading causes of death are tobacco-related²⁶. Morbidity from smoking-related diseases accounts for more than 21 percent of all cases of chronic disease in Indonesia²⁷. The potential health harms to children and youth from smoking and second-hand smoke exposure are especially concerning.

In addition, the economic harm is also staggering. In households with a father who is a smoker, on average, 22 percent of weekly per capita household expenditure is spent on tobacco, while the share spent on food is less compared to non-smoking households²⁸. Household heads in rural areas or in high-stunted districts were more likely to smoke than those in urban areas or in low-stunted districts²⁹.

The affordability of tobacco products in Indonesia is one of the main drivers of the country's tobacco epidemic. During the period of 2002-2016, cigarette affordability in Indonesia increased by 50 percent, while aggregate cigarette consumption increased by 50.6 percent³⁰. This increase in affordability followed a rise of similar magnitude from the early 1980s to 2000. Thus, in 2016, cigarettes were twice as affordable for Indonesian consumers as they had been in the early 1980s.

Cheaper brands are available at prices that are very low by comparison because of the wide range of retail prices³¹. Despite regular tax increases, a standard pack of 20 sticks costs only around US\$ 1 with many street stalls selling single sticks for as little as Rp1,000 (around US\$ 0.07) per stick³². On the other hand, expensive brands maintain a large market share, suggesting that many Indonesian consumers still find these products affordable³³.

Indonesia's National Health Insurance System

Indonesia is the fourth most populous country in the world, with about 260 million people and the world's largest archipelago, consisting of 17,000 islands. Most of Indonesia's population lives on Java island while others are spread unevenly across the country, presenting an uneven distribution of infrastructure, and disparate levels of access to education and basic health care. Indonesia, with Gini coefficient of 0.38³⁴, is facing serious challenges of inequality that slow poverty reduction, dampen economic growth, and threaten social cohesion.

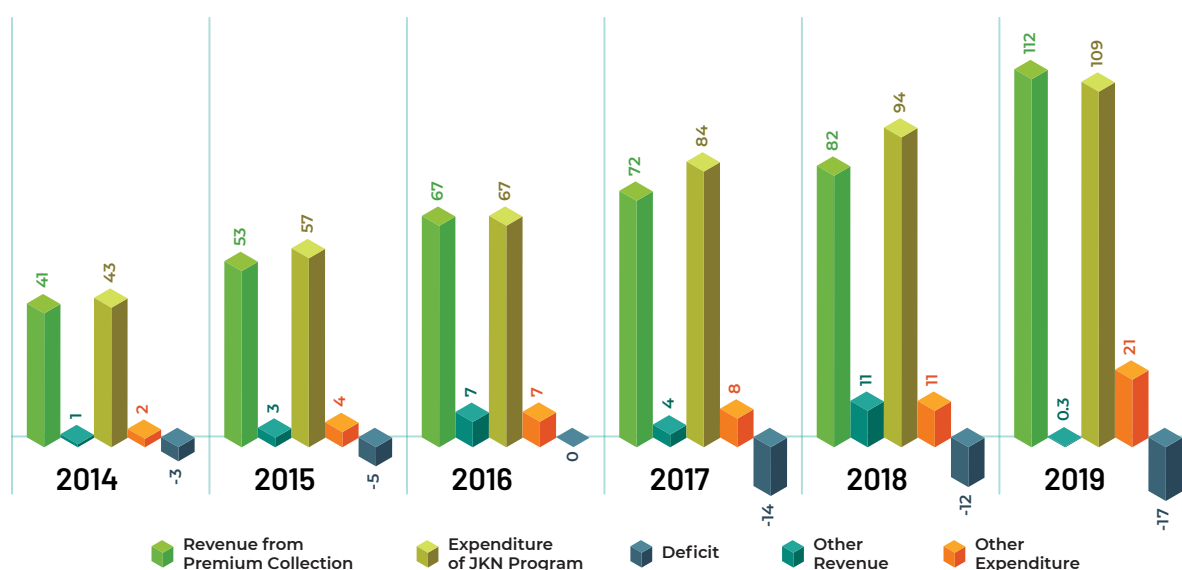
With growing concerns of inequality³⁵ and high levels of OOP³⁶, the government is increasing spending on public services and has adopted a comprehensive social security system³⁷. The first health insurance scheme was *Askes*, established in 1968³⁸. The scheme covered all civil servants, military personnel, the police force, retired government workers, and veterans and their families. By 2013, *Askes* covered about seven percent of the population and reimbursed for most hospital-based services with members sharing the cost only for selected expensive procedures. The second largest health insurance scheme was *Jamsostek*, a social security scheme set up in 1992 for private sector workers. Coverage under the scheme was consistently low, reporting coverage of about 2.5 percent of the population in 2013. *Jamkesmas* was established in 2005 as a national scheme to cover the poor and was managed and financed by the Ministry of Health. It covered more than 76 million people at the end of 2013 and was the largest population subsumed into JKN, which was launched in 2014 to provide health coverage for all Indonesians³⁹.

JKN is one of the most ambitious and largest single payer programs with the main objectives to address widespread socio-economic disparities in the supply and demand sides of the health system, to improve health outcomes, and to keep health care costs down.

In the JKN scheme, the government pays a modest premium for the poor and the near poor that covers about 82.9 million people. With a target of 95 percent enrolment in 2019, only 222 million people (81 percent of the total population) had enrolled in JKN by March 2021⁴⁰.

The government is committed to ensuring JKN's ongoing sustainability as well as its positive impact on health outcomes, financial protection, health equity, and the economy in general. Nonetheless, inequalities persist across the country, both in access and quality of services, and the funding of JKN has been drawn into focus as annual deficits have continued to increase.

Figure 3. BPJS-K Annual Deficits (in Rp trillion)



Source: BPJS-K Audited Report 2014-2019

The continued increase in JKN's annual deficits has been receiving increased attention. A closer look reveals that tobacco-related diseases create a funding black hole in the BPJS-K financing system. Experts correlate the deficit with the fact that Indonesia's three leading causes of death and disability combined are all tobacco-related: stroke, ischemic heart disease, and diabetes⁴¹. The treatment of tobacco-related diseases has significantly increased the claims ratio⁴² while tobacco consumption is associated with low contributions compliance among smokers⁴³ which in turn drives an incurable increase in JKN deficits. Therefore, the National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional*, RPJMN) 2020-2024 recognizes smoking as a threat to the development agenda⁴⁴. Smoking lowers the effectiveness of social protection programs⁴⁵ and overburdens the health system⁴⁶.

Presidential Regulation No.82 of 2018, Article 100 requires the use of cigarette tax revenues collected by local governments for JKN, yet it has a limited effect on the deficit. Decree of the Director General of Fiscal Balance Number KEP-47/PK/2018 determined the estimate of cigarette tax revenues at Rp15.6 trillion in 2019. With the full implementation of the Presidential Regulation, the government is mandated to allocate Rp5.8 trillion from local cigarette tax for JKN (which is 75 percent of the 50 percent of the revenue). However, tracking the actual amount of funds allocated for JKN in 2019 through BPJS-K Audited Report is challenging as the cigarette tax revenue was recorded in 'other liability' account and thus mixed with other revenues.

Law No.39 of 2007 also mandates that two percent of total tobacco excise taxes is annually allocated to DBHCHT, which primarily distributes the funds (70 percent) across the provinces and districts where excise tax has been collected (30 percent of revenues for provinces and 40 percent for districts)⁴⁷, and the remaining 30 percent to other districts.

The Ministry of Finance regulation No.222/PMK/07/2017 states that 50 percent of the DBHCHT is available for use by local governments to fund five main activities: improving the quality of raw materials, developing industry, fostering the social environment (including health), socialization of provisions in the field of excise, and/or eradicating illegal excisable goods, and the rest are for their own priorities⁴⁸.

The new treatment for DBHCHT allocation is stipulated in the Minister of Finance Regulation (PMK) No. 7/2020 which has been promulgated since 23 January 2020. In this latest provision, 50 percent of the DBHCHT received in the current year and the remaining funds from 2019 received by the local governments must be used to support the JKN program. In 2020, total DBHCHT funds were Rp3.5 trillion, of which the share for JKN would be about Rp1.7 trillion if such rules were followed fully to support supply-side readiness, to cover for JKN contribution for the poor and workers affected by employment termination, as well as to provide health care services for the poor⁴⁹. However, as mentioned above, there is no system in place for budget tagging to track performance for this spending⁵⁰. Moreover, the DBHCHT sharing is weighted toward tobacco excise tax generating areas, estimated to cover 342 districts within 19 provinces, primarily in Java, with East Java receiving 51.3 percent of the total sharing amount in 2019.

Although JKN deficit seems likely to persist in the near term, the goal should still be to eliminate deficits in the long term, whether through increase in revenues, or through expenditure cuts. The long-term goal should be to reduce the claims ratio, such that the scheme can generate an operating surplus. This would allow the buildup of reserves for any unexpected spikes in expenditure due to outbreaks, natural disasters, or other catastrophic events. An operating surplus would create sustainability and allow BPJS-K to invest in providing better access to quality health care for all members.

Therefore, reducing cost from smoking-attributable diseases would be a game changer for the sustainability of JKN. Reducing 'preventable waste' from treating tobacco-attributable diseases through further tax increases, swift merger of tax tiers, and earmarking of the revenues for JKN can shift a burden into an opportunity. The combination of these approaches would allow more funds to be deployed quickly. It could also facilitate the transformation of urgent spending of supplementary expenditures for the pandemic into a budgetary category earmarked for short term response and to sustain JKN in the long term.

Dedicating the revenue derived from tobacco excise taxes for a special purpose allows more transparency in how tax revenues are used; in this case, for COVID-19 responses and sustainability of the national health insurance program. These earmarked funds can be viewed as a "strategic investment". Indeed, when revenue is used to improve health—directly via health care or indirectly via prevention programs and research—it is, in effect, a form of investment to facilitate healthy behavior, better population health, and a more productive workforce.

Many countries have allocated revenues from the tobacco excise tax to assure the sustainability of health insurance programs. The Philippines allotted 85 percent of the incremental revenues from the tobacco excise tax to finance universal health coverage, and

as a result, 10.8 million poor families were covered by the National Health Insurance Program or NHIP⁵¹. Egypt adopted a different policy of disbursing tobacco excise tax revenues for student health insurance, while the Congo expends half of the excise tax revenues on health insurance⁵².

What this study adds

There have been a few attempts to quantify the health and economic burden of smoking related diseases in Indonesia. A search of the literature was conducted using the search terms 'cost' 'smoking' 'cigarettes' 'Indonesia' in Google Scholar. Studies were included in the review if they related to the cost of smoking in Indonesia and were published in English or Indonesian between 2016 and 2019. The time limits were applied to ensure that only recent cost estimates were considered. The search strategy generated 2,350 results of possible relevance. After screened the search results by title and abstract, 2,345 studies were excluded because they did not report any calculation of smoking related diseases. Hence, only five studies quantified the cost and reported the cost estimate.

Furthermore, since this study estimates the direct cost for all diseases, two studies were excluded from the review because they focused on the costs of only a particular disease or intervention, or only the indirect cost of smoking. Specifically, Kristina et al. (2018)⁵³ calculated the morbidity and treatment cost of 19 diseases in 2015 and found that the morbidity of smoking-related diseases accounted for 991,330 cases, about 21.1 percent of total cases of chronic diseases in Indonesia. They argued that total treatment cost for 19 chronic diseases related to smoking was accounted for US\$2.2 billion (Rp30.5 trillion), approximately 2.5 percent of the 2015 GDP. Moreover, Kristina et al. (2019)⁵⁴ estimated the future value of premature mortality cost (PMC) from cancer for secondhand smokers in Indonesia. After discounting the future value by three percent, they found that the PMC in Indonesia is Rp2.5 trillion in 2018.

Three full articles further assessed for eligibility. A brief from David (2018) was excluded because it only reported a calculation for the global basic economic gap between tobacco tax receipts and the economic costs of smoking-attributable diseases without detailing how Indonesia's figures were derived⁵⁵. A study from Rasyid and Ahsan (2020) was also excluded because it used SEATCA's estimation on health costs in 2013 of US\$13,900⁵⁶.

The most eligible and most cited estimate of the direct cost of smoking is by Kosen et al. (2017)⁵⁷. They estimated the total cost of smoking in 2015 was Rp596.6 trillion, comprised of Rp13.7 trillion for direct health care costs, Rp374.0 trillion for indirect cost of smoking, and Rp208.8 trillion expenditure on cigarette consumption. Kosen et al. used the proportion of attributable risks from the US Surgeon General data, 1,997,385 cases for 33 smoking-related diseases in *Riset Kesehatan Dasar (RISKESDAS)* 2013 prevalence data and multiplied them with Indonesia Case Base Groups (INA-CBGs) rates per episode per case. They calculated only the cost to treat the primary diagnosis at the secondary and tertiary care levels (advance care). Hence, they excluded costs for treating smoking attributable disease at the primary care level and secondary diagnoses related to smoking treated in the advance care facilities.

The objective of this study is two-fold. First, it intends to re-estimate the total direct cost of smoking in Indonesia, and second, to estimate the burden of this cost to the national health insurance scheme (JKN).

This study differs from the previous one in four main areas, which should make the estimate from this study more realistic.

Firstly, this study estimates the direct cost at all three levels of care, primary, secondary, and tertiary.

Secondly, this study uses two different RRs: the RR from the US and India's as an upper and lower bound (respectively) of the direct cost of smoking in Indonesia. This decision was driven by three factors: (1) There is no available comprehensive data that would allow robust estimates of Indonesia's RR. (2) Using the RR from India, as opposed to the US, is suggested as it would lead to a more realistic estimated cost given the similarity in demographic characteristics, lifestyle, and smoking intensity between Indonesia and India. This may reflect the similar pattern in accessing health care and RR of dying. (3) The approach used in Kosen et al. (2017) that uses the RR from US is replicated to compare the results.

Thirdly, this study estimates the cost for both all population (as in Kosen et al. 2017) and for only population 20+, as it is assumed that health implications of smoking start around 10 years after the smoking initiation.

Finally, this study includes all types of diseases rather than only the selected tobacco-related diseases⁵⁸.

Methodology

Data and Variables

The analysis uses data from two main sources: Statistics Indonesia (BPS) and BPJS-K. Table 2 summarizes the multiple data sources used to estimate the health care cost of smoking in Indonesia, while Annex explains characteristics from each that influence the analysis in more detail.

Table 2. Data and Sources

Data and sources	How the data is used
SUSENAS (The National Socioeconomic Survey) 2019 Source: BPS	To estimate smoking prevalence 2019, health expenditure not covered by BPJS-K ⁵⁹ , and OOP spending.
Health insurance claim data 2019 Source: BPJS-K	Capitation data for calculating outpatient primary treatment and direct health care cost for inpatient and outpatient advanced medical treatment.
Riskesmas 2018 (National Health Survey) Source: MOH	Information on smoking age initiation
Consumer price index (CPI) and population. Source: BPS	To estimate economic cost of smoking: <ul style="list-style-type: none"> CPI was utilized to convert the estimated cost from Kosen et al (2017) from 2015 to 2019 prices Population at the national level⁶⁰

Estimating SDE based on a Cost of Illness Approach

This study focuses on estimating SDE based on cost of illness approach. This study estimates the cost for all population, for a comparison with the previous study, and the cost of all individuals aged 20+ years old. While various studies have suggested that smoking hazards may only be detected in the long-term⁶¹, this study assumes a ten-year latency period (NCI/WHO, 2016)⁶².

SDE represents the medical expenses incurred by both individuals and health insurance providers to access health treatment. SDE includes direct health care expenditures (DHE) and direct non-health care expenditures (DNHE). DHE includes both OOP and health insurance provider expenditures for inpatient care at public and private hospitals, outpatient care at primary health facilities, payments of fees to private general practitioners and traditional healers, and medical expenditures for medicine that patients purchase themselves, including prescriptions and over-the-counter drugs. DNHE also includes transportation costs paid by individuals to access health care⁶³.

Data required to estimate DHE and DNHE are extracted from SUSENAS 2018 and 2019. Since SUSENAS does not distinguish the household spending on health care services by type of illness, the estimated DHE and DNHE includes all illnesses. In addition, SUSENAS could only provide data on OOP for individuals who received health treatments by type of facilities and

the type of treatment (i.e., inpatient versus outpatient). Furthermore, administrative data on annual claims for inpatient treatment and outpatient visits are directly obtained from BPJS-K data. The administrative data on claims paid by BPJS-K is representative for 2019 fiscal year.

Next, the Smoking Attributable Fraction (SAF) is calculated and used for estimating SDE as:

$$SDE = (DHE + DNHE) \times SAF \tag{1}$$

DHE = Smoking direct health care expenditures

DNHE = Direct non-health care expenditures

Because the RR for Indonesia is not available and the available data do not allow robust estimation of an RR for Indonesia, this study uses RRs from other countries to calculate the SAF for Indonesia. Firstly, as the previous widely cited study used the RR from the US, this study also uses the US RR for comparison. In addition, this study also uses RR from India as it is expected to lead to a more realistic estimated cost given the similarity in demographic characteristics, lifestyle, and smoking intensity between Indonesia and India. This may reflect similar patterns in accessing health care and RR of dying. It is important to note that the RR does not depend on smoking prevalence. As a result, this study offers a range of estimates of direct cost of smoking in Indonesia.

The RR for the US is adopted from the U.S. Department of Health and Human Services (2014, p. 772) which is for individuals aged 35 and above and disaggregated by gender and age groups. Moreover, it is estimated separately for current smokers and former smokers. Since this study estimates the economic cost of smoking for ever-smokers, the average RR for current and former smokers is applied. In addition, for individuals younger than 35, the RR for age group 35-54 is applied. The SAF for Indonesia is then estimated by multiplying the RR with the ever-smoking prevalence for each type of age group and gender.

The RR for India was adopted from Jha et al. (2008). It was estimated for individuals 30 to 69 years of age, comparing ever-smokers versus never-smokers within the last five years⁶⁴, separately for male and female. Given that this study estimates the cost of all population and population aged 20+, the same RR is assumed for the age group below 30 years old.

Results

The estimated direct cost of smoking in Indonesia for the total population ranges between Rp.17.9 and Rp27.7 trillion, depending on the assumed RR (Table 3 and Table 4). The largest component of this cost (between 56.3 and 58.6 percent) is covered by BPJS-K, with the inpatient and referral treatments being its major component, representing between 86.3 and 87.6 percent of BPJS-K cost. The estimated cost for the 20+ population is very similar, between Rp17.7 and Rp26.7 trillion. Similarly, the estimated burden to BPJS-K is between 56.9 and 58.9 percent of total direct health care expenditure, with the inpatient and referral treatments representing between 95.4 and 96.0 percent of BPJS-K cost. In other words, BPJS-K allocated between Rp10.4 trillion and Rp15.6 trillion to cover the health care cost of smoking, which represents between 61.2 and 91.8 percent of the 2019 deficit.

Table 3. Direct Cost of Smoking Attributable Diseases in Indonesia in 2019 (Rp billion), by using different RR

Description	Total Population				Population 20+			
	RR India		RR US		RR India		RR US	
	Rp Billion	%	Rp Billion	%	Rp Billion	%	Rp Billion	%
Medical Treatment covered by BPJS-K	10,510	59%	15,582	56%	10,409	59%	15,165	57%
Inpatient and Outpatient	9,206	51%	13,446	49%	9,128	52%	13,123	49%
Outpatient Primary Care	1,303	7%	2,136	8%	1,281	7%	2,042	8%
Uncovered Cost	7,412	41%	12,087	44%	7,268	41%	11,490	43%
Medical Treatment of Non-BPJS-K	434	2%	749	3%	421	2%	694	3%
OOP Cost (SUSENAS)	4,733	26%	7,664	28%	4,652	26%	7,327	27%
Transportation Cost (SUSENAS)**	2,245	13%	3,674	13%	2,195	12%	3,469	13%
Total Direct Health Cost	17,922	100%	27,670	100%	17,678	100%	26,655	100%

Notes:

* Medical treatment of non-BPJS Kesehatan defined as medical expenditure financed by private insurance.

**Data from SUSENAS 2018 was used to estimate the expenditures in 2019 due to a revision of questions in 2019 SUSENAS

Source: Authors' calculations

Table 4. Direct Cost of Smoking Attributable Diseases in Indonesia in 2019 (Rp billion) for total population, by using different RR

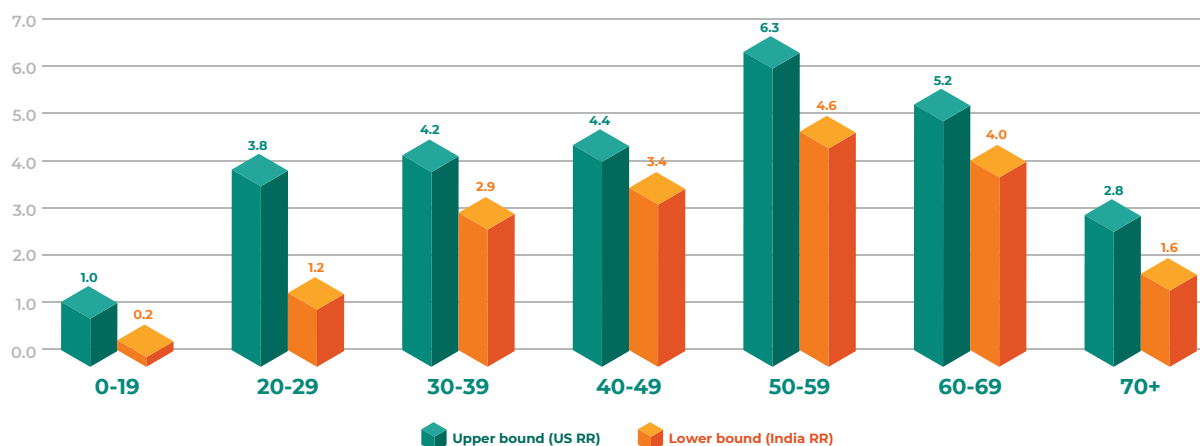
Age Group	BPJS Kesehatan				OOP						Total			
	Inpatient and Referral Treatment		Outpatient		Uncovered Medical Cost by BPJS		Health Treatment*		Transportation		Rp. Billion		Percentage	
	RR India	RR US	RR India	RR US	RR India	RR US	RR India	RR US	RR India	RR US	RR India	RR US	RR India	RR US
0-19	78	323	23	94	13	55	81	337	50	206	244	1,014	1.4%	3.7%
20-29	313	962	136	441	56	181	450	1,456	237	766	1,192	3,086	6.7%	11.2%
30-39	904	1,291	314	466	140	209	1,010	1,501	494	733	2,862	4,200	16.0%	15.2%
40-49	1,532	1,945	316	408	86	110	919	1,181	566	728	3,419	4,372	19.1%	15.8%
50-59	2,688	3,658	263	359	80	110	1,065	1,446	513	699	4,609	6,272	25.7%	22.7%
60-69	2,670	3,455	163	211	44	57	838	1,082	299	387	4,013	5,191	22.4%	18.8%
70+	1,021	1,813	89	158	15	27	371	661	86	157	1,582	2,816	8.8%	10.2%
Total	9,206	13,446	1,303	2,136	434	749	4,733	7,664	2,245	3,674	17,922	27,670	100%	100%

Note: * included inpatient, outpatient and medicine additional expenditure

Source: Authors' calculation

Direct health care cost increases with the age of smokers and reaches the maximum in the age group 50-59 (Figure 4), with the estimated cost between Rp4.6 trillion and Rp6.3 trillion.

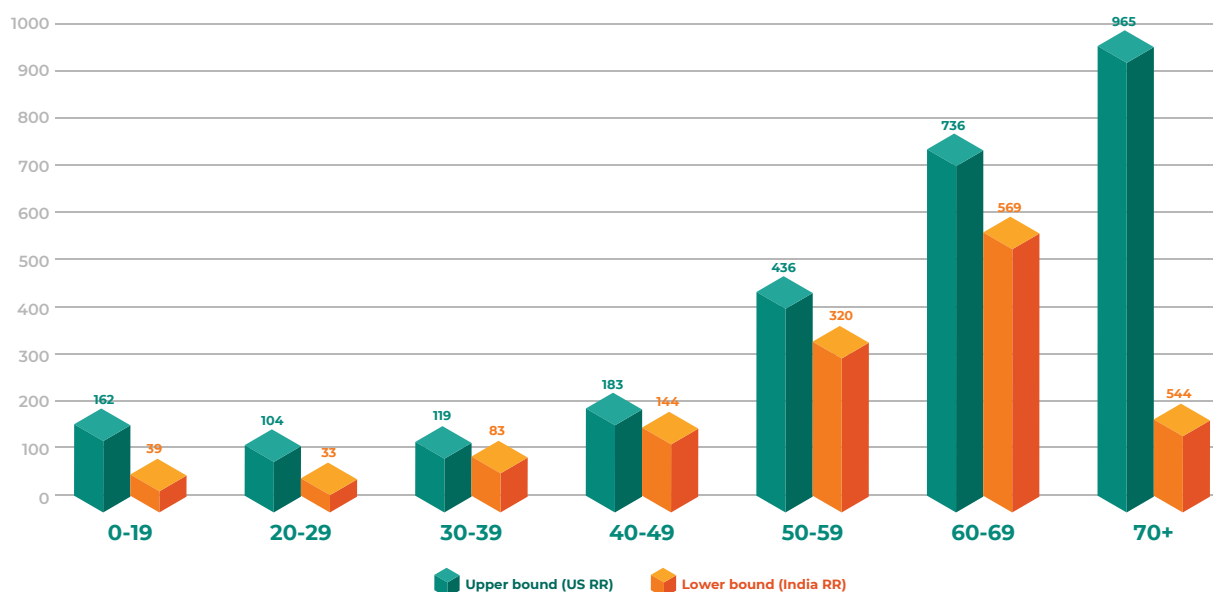
Figure 4. Direct health care expenditure by age group (in Rp trillion)



Source: Authors' calculation

The direct health care expenditure per ever-smoker that should be covered by BPJS-K increases by between 122 and 138 percent for individuals who enter age group 50-59 (Figure 4) relative to the younger age group. The estimates based on US RR continue an increasing trend, while the cost based on India RR remains stable after age 60. This finding is consistent with the notion that the hazardous substances of nicotine will accumulate in the longer term and will affect ever-smokers' health status when they enter old age group. This finding also suggests that preventing early introduction to smoking at early age will benefit the economy as it could avoid a significant burden from future health care expenditure.

Figure 5. Direct health care expenditure (in Rp thousand) from BPJS-K per ever-smoking individual by age group



Source: Authors' calculation

The average per person BPJS-K cost increases with the age of ever-smokers (Table 5). Using US RR, the average BPJS-K cost per ever-smoker continues to increase with age. However, using RR from India shows a slight reduction of direct health cost per ever-smokers for individuals in the age group 70+. A similar pattern also shown in the cost for Non-BPJS-K per ever-smokers where using US RR continue to increase until the end of age group, while RR India shows a declining cost in the age group 70+.

Table 5. Average per ever-smokers cost, 2019 (Rp), by using different RR

Age group	India RR			US RR		
	BPJS-K	Non-BPJS-K	Total	BPJS-K	Non-BPJS-K	Total
0-19	39,076	55,617	94,692	161,675	231,763	393,439
20-29	33,475	55,243	88,718	104,461	178,886	283,347
30-39	82,540	111,353	193,893	119,043	165,452	284,494
40-49	143,727	122,154	265,881	182,980	156,996	339,976
50-59	319,972	179,882	499,854	435,582	244,590	680,172
60-69	568,837	237,164	806,002	736,071	306,436	1,042,507
70+	543,530	231,368	774,898	964,950	413,812	1,378,762
Total	175,538	123,797	299,335	260,258	201,888	462,145

Source: Authors' calculation based on database of BPJS-K and SUSENAS 2019

Discussion and Conclusion

Replicating the approach from Kosen et al. (2017) that estimates SDE for total population using the US RR produced an estimated cost of Rp27.7 trillion. This estimate is higher than Kosen et al. (2017) estimate for 2015 of Rp13.7 trillion, or Rp. 15.7 trillion in 2019 prices. The estimated cost for population 20+ is very similar at Rp26.7 trillion. Furthermore, the estimates based on India RR for all population and population aged 20+ are Rp17.9 trillion (1.3 billion USD, 0.1 percent of GDP) and Rp17.7 trillions (1.3 billion USD), respectively.

The burden to BPJS-K to cover SDE for all population is significantly higher than the estimated maximum allocation of the 2019 local cigarette tax and DBHCHT for Indonesia's health care system at only Rp7.4 trillion (26.7 percent of the SDE). Hence, the tobacco industry's claim that the cigarette excise has been a helping hand for JKN is false and the manipulation of public opinion.

The 2020 tobacco excise tax policy was also not sufficient to cover the costs of smoking as the government only allocated a fraction of it for JKN. Adjusted for inflation, the 2019 cost estimates translate to approximately Rp18.2 to 28.2 trillion in 2020 (between 0.1 and 0.2 percent of GDP). While in 2020 the government received Rp170.2 trillion in tobacco tax revenues (YOY growth at 3.3 percent), the allocation earmarked for JKN was only at the maximum of Rp8.1 trillion (comprised of Rp6.4 trillion from local cigarette tax⁶⁵ and Rp1.7 from DBHCHT⁶⁶).

The direct health care expenditure per ever-smoker covered by BPJS-K increases exponentially as ever-smokers enter higher age group. As the prevalence of young smokers continue to rise, the Indonesia will carry the burden of SDE in the long-term.

Limitations of this Study

This study has three limitations. Firstly, the study does not use RR from Indonesia since it is not available. Therefore, it employs the RRs from the US and India. Moreover, both RRs are for mortality and are used to also estimate the attributable morbidity for the Indonesian population. While studies show no significant impact on the estimates, this may be problematic if the risks of morbidity and mortality from tobacco use are significantly different. However, this approach has been widely used in the literature^{67,68,69} and the use of RR of mortality as a proxy for RR of health care utilization is expected to yield an underestimated and conservative SAF for medical costs⁷⁰.

Secondly, the RR for the US was estimated for the population aged 35 years or older, while the RR for India was for population 30-69 years of age, while this study estimates the cost for total population and 20+. For that reason, when the US RR is used, the same RR for age group 35-54 is assumed for the population younger than 35, and in case of India RR, the same RR is used for the population younger than 30. This is based on a strong assumption for these individuals and may be overestimating the cost for these age groups.

The refinement of the calculation would benefit from the improvements in the data. For example, information on smoking status in SUSENAS and BPJS-K data would be useful and would improve the data quality. Moreover, improvements in the sampling method, either in SUSENAS or in the BPJS-K administrative data are warranted. Adding characteristics of members who access health care would also be beneficial. It would allow researchers to

match another database to BPJS-K data based on characteristics. This would allow the analysis by type of disease.

Lastly, while preventing introduction to smoking at an early age could be beneficial for the economy to avoid significant burden in the future, due to a lack of data, this study does not measure the impact of specific prevention policy, for example, the effectiveness of a policy to increase cigarette tax to reduce consumption by younger individuals or the effectiveness of cigarette campaigns on the threat of smoking for health system.

Policy Implications

The Government of Indonesia must ensure that JKN is strong and financially sustainable. This study confirms that tobacco-related diseases place a huge burden not only on the population, but also puts JKN at risk of becoming an ever-larger strain on public finances as coverage grows.

Reducing the cost of smoking-attributable diseases would be a game changer for the sustainability of JKN. As evidence from many countries shows, making cigarettes less affordable decreases demand for tobacco products in two ways^{71,72}. Price increases reduce the prevalence of tobacco use by discouraging non-users from taking up tobacco use, encouraging existing users to reduce consumption or even quit, helping former users maintain cessation, and preventing occasional smokers from turning into regular smokers.

Non-smokers are less likely than smokers to develop heart disease, stroke, and lung cancer—all of which are expensive to treat. After cessation, the associated health risks diminish substantially, eventually returning to the level of non-smoker rates in some instances^{73,74}.

Increasing cigarette taxes reduces consumption. The impact of cigarette taxation on the reduction of consumption depends on: (i) the magnitude of the price increase resulting from a tax increase; and (ii) the reaction of consumers to price changes, that is the price elasticity of demand⁷⁵, which is related to smoking behaviour (initiating, reducing/increasing intensity, or quitting). The price of cigarettes in relation to income, that is, affordability, also influences the initiation decision, intensity, or quitting⁷⁶.

Cigarette excise taxation is a source of additional public revenue. Given that tobacco demand is relatively inelastic, due to consumer addiction and the lack of close substitutes, tobacco taxes can generate considerable amounts of tax revenues, particularly if sales are large. Tobacco taxes also create fewer distortions in the market than would result from taxes on goods and services with more elastic demand. Also, given the small number of producers, tobacco taxes are relatively easy to collect with lower administration and enforcement costs, compared to general consumption and income taxes. Experiences in numerous countries indicate that an increase in tobacco taxes will increase nominal (as well as real) tax revenues in the short to medium term.

However, making cigarettes more expensive in Indonesia is challenging. The multi-tiered excise tax structure in Indonesia is one of the most complicated in the world. In 2009, there were 19 tiers of excise tariffs on tobacco products. The government simplified the structure and merged the tiers into 15 in 2012 and 13 in 2013. In 2017 the Ministry of Finance passed a simplification roadmap, aiming to simplify the tiers further to five in 2021. However, the roadmap was cancelled in 2018, leaving Indonesia with 10 remaining tiers.

Based on the findings of this study, below are the **policy recommendations** offered to the policymakers:

1. Set large, rapid increases in tobacco tax rates with swift merger of the tax tiers

The rise of cigarette excise tax by only 12.5 percent in 2021 risks losing the gains made in improving health outcomes from higher tax increases as was done in 2020 (by 23.8 percent). MOF data show that the production of cigarette declined by 9.7 percent in 2020 relative to 2019, in line with RPJMN mandate to decrease consumption. However, expensive cigarette brands still maintain a large market share, suggesting many Indonesian consumers still find these products affordable. This study provides evidence for a stronger government role in reducing negative externalities from smoking.

Smoking cessation is made more difficult by the multi-tiered excise tax structure. This encourages smokers to switch to cheaper brands rather than quitting altogether. The Ministry of Finance should reissue the tobacco excise simplification roadmap to allow swift merger of the tax tiers.

2. Earmark tobacco excise revenue for JKN

The level of earmarked tobacco tax for universal health coverage is far behind the cost needed for treatment of smoking attributable diseases. Price measures for tobacco control could be an effective and important means to reduce tobacco consumption and its associated health care costs as well as provide a revenue stream to finance JKN.

A modest proposal for the future of JKN is soft earmarking of the additional tax revenues to cover the health costs of smoking-related diseases. This requires the amendment of the DBHCHT allocation policy in the Excise Law and JKN earmarking policy in the Presidential Regulation for JKN and MOF Regulation for DBHCHT.

Giving BPJS-K greater control over the use of funds should be accompanied by processes to track and report spending for transparency and accountability.

3. Tackle non-price factors at the same time

While continuing to reduce affordability, tobacco control policy in Indonesia can further improve results by aggressively restricting tobacco advertising, enforcing smoke-free areas in public spaces, expanding the use of pictorial health warnings, and related tobacco control measures. The pervasive cultural perception of smoking as normal for adult men can and must be changed.

Annex

Socio-economic Data

Indonesia has only one nationally representative data set on socio-economic conditions called the SUSENAS. It is a series of large-scale multipurpose socio-economic surveys initiated in 1963-1964. SUSENAS is a repeated cross-section survey conducted by BPS every year, which nationally representative, down to the district level. The survey records 300,000 households as the respondents, which equals to around 1.2 million individuals. The sample is drawn based on census blocs using two-stage stratified sampling. Frequency weights are provided which give counts that reflect the country's true population.

Each SUSENAS survey contains a core questionnaire which consists of a household roster listing the socio-economic characteristics at the household and individual levels. The core questionnaire is supplemented by modules capturing information on household's expenditure on food and non-food items including health, education, and transportation.

Individual information in SUSENAS

This study employs SUSENAS 2019 which enumerated individuals for: (1) smoking status (current smokers, former, and never smokers); (2) health status (self-perceived health status and self-reported illness); and (3) health care utilization (visits, admission, type of providers sought). While outpatient visits were recorded in monthly basis, inpatient treatment was asked to capture information in the past twelve months. Thus, to make the number consistent, the outpatient visits were transformed into annual basis by multiplying the number by twelve.

Table 6. List of Questions in SUSENAS 2019 Core

Code	Questions
R405	Gender (1=Male; 2=Female)
R407	Age
R1102	Does (individual) experience illness in the past month
R1103	Does the illness affect daily activity
R1104	Does (individual) seek for self-treatment
R1105	Does (individual) seek for outpatient visit in the past month
R1203	How many days does (individual) in the past twelve months receive inpatient treatment
R1206	In the past month does (individual) smoke tobacco cigarette
R1208	Does (individual) consume tobacco cigarette prior to the past month

Source: Statistics Indonesia

Health Expenditure Data in SUSENAS

SUSENAS 2019 extends the benefit over the previous SUSENAS. Since 2018, SUSENAS has undergone significant changes to capture detail information on the health spending. It not only captures information on total spending for curative and medicine expenditure by type of health facilities, but also probing the information down to the actual spending paid by the households (out-of-pocket spending). Consequently, SUSENAS 2019 eliminates the imputed values to the health care spending when the respondents answered that they did not spend money for health care treatment as it is covered by an insurance provider (Johar et al., 2017).

Table 7. List of Questions in SUSENAS 2019 used in this study

Household health care expenditure (by code)	
Curative health care expenditure	
239	Total health care spending in public hospital
239a	Outpatient out of pocket expenditure in the past year in public hospital
239b	Inpatient out of pocket expenditure in the past year in public hospital
240	Total health care spending in private hospital
240a	Outpatient out of pocket expenditure in the past year in private hospital
240b	Inpatient out of pocket expenditure in the past year in private hospital
241	Health care expenditure at primary health care facilities
241a	Outpatient out of pocket spending at Puskesmas in the past year
241b	Inpatient out of pocket spending at Puskesmas in the past year
241c	Health care out of pocket spending at Pustu
241d	Health care out of pocket spending at Polindes
241e	Health care out of pocket spending at Posyandu
242	Health care spending on Doctor or Clinic visit
242a	Health care out of pocket spending on Doctor or Clinic visit
243	Health care spending on medical staff (midwife, nurse, other medical staff) consultation
244	Health care spending on traditional treatment
244a	Health care out of pocket spending on traditional treatment
245	Health care spending on traditional midwife consultation
245a	Health care out of pocket spending on traditional midwife consultation

Medical Expenses	
246	Medical expense for medical receipt from Doctor, Midwife, or Nurse
246a	Medical out of pocket spending for medical receipt from Doctor, Midwife, or
247	Medical expense for modern drugs without receipt
247a	Medical out of pocket spending for modern drugs without receipt
248	Medical expense for traditional drugs
248a	Medical out of pocket spending for traditional drugs
Transportation Expenses	
261a	Transportation cost to health facility in the past year
261b	Ambulance cost in the past year
262a	Air transportation cost to health facility in the past year
263a	Sea transportation to health facility in the past year

Source: Statistics Indonesia

Administrative Data from BPJS-K

Information on administrative spending for inpatient and outpatient paid by BPJS-K were directly request from BPJS-K. The data captures aggregate information on both inpatient and outpatient cost by age group and gender.

Macroeconomic Data

The final indicators used to estimate the economic costs of smoking are the consumer price index, growth rate and the population published by BPS.

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7. R Sianturi, Equitable and Sustainable JKN Program, Webinar BKF May 29th 2020, <https://youtu.be/KfEiZcnqlao>
8. In 2018, under Perpres 82/2018, the Government introduced potential cost sharing arrangements for services that are prone to misuse. Cost sharing may apply to services that are influenced by patient preference or behavior in order to curb unnecessary overuse. The specific services that fall under this category are to be defined by BPJS-K or provider associations, and ultimately approved by the Ministry of Health. No final decision has been taken on which services are subject to cost sharing. Patients must agree to these fees in advance of receiving treatment, though fees are not applicable to PBI members. Perpres 82/2018 established that these fees may be set at a certain nominal value for outpatient services and 10 percent (up to a certain value) of inpatient fees. Permenkes 51/2018 has set the patient copay rates based on the level of facility. Implementation of cost sharing arrangements should not be taken lightly, especially at the time of the pandemic, due to the significant risks they introduce. Even when these are below market prices, copays can be bureaucratically complex, and (if poorly designed) can frustrate universal health coverage objectives.

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63. Direct non-health care expenditures might include transportation for caregivers and lodging and food expenditures for >1 caregiver. In the absence of reliable data for those elements, our calculation might be underestimated.

64. The field teams asked a respondent (typically a household member) if the dead person had been a smoker within the last 5 years and, if so, the usual number of bidis and/or cigarettes per day. Cessation of smoking is uncommon in India, except when illness leads to quitting. Thus, the key comparisons are of ever versus never smoking within the last 5 years. Questions were also asked about other tobacco smoked, quid chewing, alcohol drinking and years of education. Adult respondents were asked similar questions about themselves.
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75. Technically, the price elasticity of demand is the percentage change in the consumption of a product responsive to a 1% change in the price of the product, with all else remaining constant.
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