



Analysis The Application Of Health Information Systems To Health Insurance Payments: *A Systematic Review*

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Abstract. *Medical informatics as a basic medical science that participates in formal medical decision-making processes is integrated with the formation of medical databases and administrative data with features of automating work process technology in health care institutions. This study aims to analyze and find out the analysis of the application of health information systems to health insurance payments. This research is a literature review sourced from several online sites such as Google Scholar, Pubmed, and Refseek by including keywords “Pharmaceutical Preparations”, “Support”, “National Health System”. The inclusion criterion used was the implementation of a health information system for payment of health insurance using the PRISMA plot diagram. The results of this study found that the implementation of health information systems for health insurance payments in health facilities is still not optimal. Many factors have affected the overall operation of the system, where the quality and quantity of human resources in handling health information systems is still lacking, the lack of facilitating facilities and infrastructure sometimes still causes disruptions and requires improvement.*

Keywords: *Pharmaceutical Preparations, Support, National Health System*

Abstrak. Informatika medis sebagai ilmu kedokteran dasar yang berpartisipasi dalam proses pengambilan keputusan medis formal terintegrasi dengan pembentukan database medis dan data administrasi dengan fitur teknologi proses kerja otomatisasi di institusi perawatan kesehatan. Penelitian ini bertujuan untuk menganalisis dan mengetahui analisis penerapan sistem informasi kesehatan terhadap pembayaran jaminan kesehatan. Penelitian ini merupakan kajian literatur yang bersumber dari beberapa situs online seperti Google Scholar, Pubmed, dan Refseek dengan mencantumkan kata kunci “Sediaan Farmasi”, “Support”, “Sistem Kesehatan Nasional”. Kriteria inklusi yang digunakan adalah penerapan sistem informasi kesehatan untuk pembayaran jaminan kesehatan menggunakan diagram alur PRISMA. Hasil penelitian ini menemukan bahwa penerapan sistem informasi kesehatan untuk pembayaran jaminan kesehatan di fasilitas kesehatan masih belum optimal. Banyak faktor yang mempengaruhi berjalannya sistem secara keseluruhan, dimana kualitas dan kuantitas sumber daya manusia dalam penanganan sistem informasi kesehatan masih kurang, kurangnya sarana dan prasarana yang memfasilitasi terkadang masih menimbulkan gangguan dan memerlukan perbaikan.

Kata kunci: Persediaan Farmasi, Pendukung, Sistem Kesehatan Nasional

INTRODUCTION

In the increasingly advanced digital era, health information systems (SIK) have become an integral part of managing health services. CIS enables efficient storage, management and exchange of medical data, and supports better decision making in healthcare. One important aspect of SIK is integration with health insurance payments.

Health insurance payment is a process involving claims, processing, and payment of health costs to service providers by insurance companies or health insurance institutions. This process involves a number of complex documents and information, including medical records, invoices, insurance policies, and claim requirements.

In this context, the implementation of an effective health information system can provide significant benefits in the process of paying for health insurance. The following are some of the backgrounds that can be put forward for an analysis of the application of health information systems (SIK) to health insurance payments:

Administrative Efficiency: Using SIK, claims and payment administration processes can be automated and computerized. This reduces the need for time-consuming manual tasks, such as filling out claim forms and manual processing. In the long run, this can reduce administrative costs and speed up claim processing time.

Data Accuracy: CIS enables centralized storage of medical and financial data. With the integration between the health information system and the health insurance payment system, the information needed for claim processing can be accessed quickly and accurately. This reduces the risk of human error and improves the accuracy of claims processing.

Transparency and Tracking: SIK enables better monitoring of claim and payment status. Through this system, health insurance participants can easily track the progress of their claims, find out how much has been paid by insurance, and view billing details. This provides transparency for participants and healthcare providers.

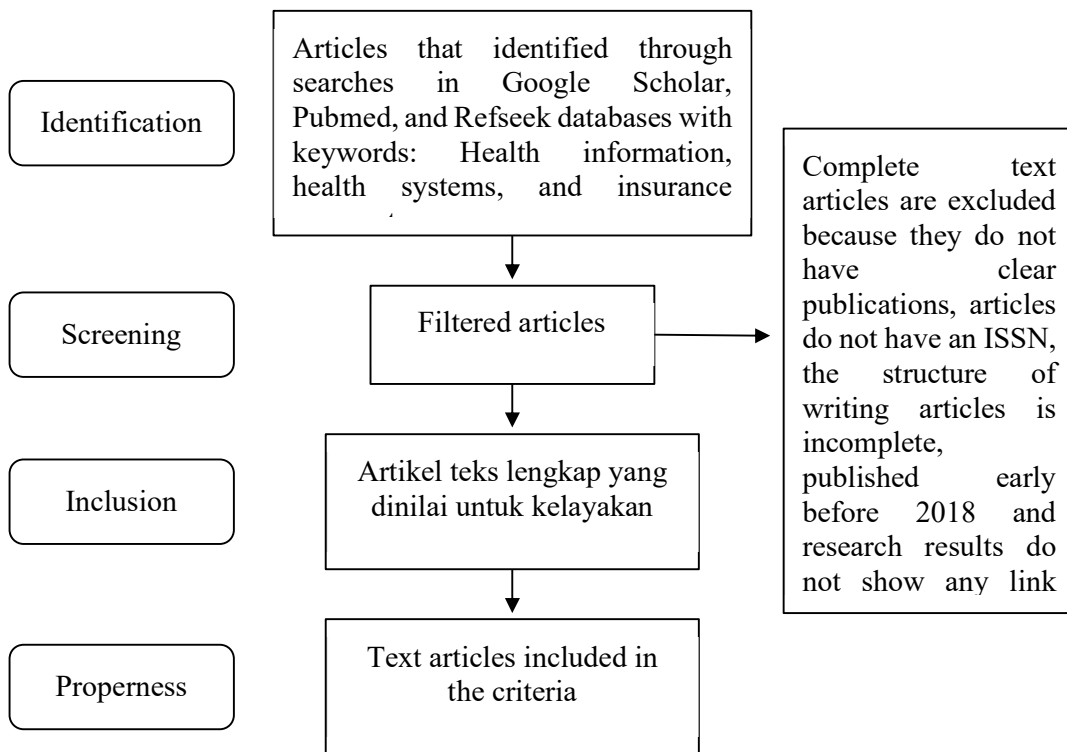
Fraud Reduction: CIS can assist in detecting and preventing fraud in health insurance payments. Using data analysis and intelligent algorithms, the system can identify suspicious patterns or inappropriate claims. This helps minimize the risk of fraud and abuse in payment systems.

Quality of Service: With the integration between CIS and health insurance payments, relevant information about patients and their claims can be obtained

METHOD

This research uses a Literature Review Method, which can be an effective way of synthesizing research by finding perspectives from many empirical data to show evidence on a meta-level at once to uncover areas in which more research is needed. The research was written from three databases that were used for search literature reviews on various articles and scientific journals obtained from Google Scholar, Pubmed, and Refseek. The criteria used in this research are from articles or journals that have been published from the year 2018-2023, which is related to the Application of Health Information Systems to Health Insurance Payments.

From keyword searches on the three online databases, 264.130 articles were found. Based on the plot of the PRISMA diagram, 97.965 studies were obtained when identifying new research. Then, the articles with full text were obtained from 16 studies. Furthermore, it also obtained articles with full text according to the inclusion and exclusion criteria and were appropriate criteria as many as 8 studies.



Scheme 1. Flow of the Article Selection Process with the PRISMA Method

RESULTS

Based on searches of scientific articles and journals related to the design of CIS, the implementation of CIS and the evaluation of the implementation of CIS in health care facilities in Indonesia, there have been more than ten studies that have been conducted before. However, based on the criteria applied in this study, 7 research journals were selected that met the required criteria. The results of the review of the research journals have been described in the following table.

Table 2. Explanation of Application of Health Information Systems to Health Insurance Payments

Author	Research Title	Publication Year	Research Focus
Timothy J. Layton, Randall P. Ellis, et al	Measuring efficiency of health plan payment systems in managed competition health insurance markets	2018	Adverse selection in health insurance markets leads to two types of inefficiency. On the demand side, adverse selection leads to plan price distortions resulting in inefficient sorting of consumers across health plans. On the supply side, adverse selection creates incentives for plans to inefficiently distort benefits to attract profitable enrollees. Reinsurance, risk adjustment, and premium categories address these problems (Layton & Ellis, 2018)
Patricia Akweongo, Moses Aikins, et al	Insured Clients Out-Of-Pocket Payments For Health Care Under The National Insurance Scheme In Ghana	2021	In 2003, Ghana implemented a National Health Insurance Scheme (NHIS) designed to promote universal health coverage and equitable access to health care. The scheme has largely been successful, yet it is confronted with many challenges threatening its sustainability. Out-of-pocket payments (OOP) by insured clients is one of such challenges of the scheme. This study sought to examine the types of services OOP charges are made for by insured clients and how much insured clients pay out-of-pocket (Akweongo et al., 2021).

Shifa Salmaan Habib, Shehla Zaidi	Exploring Willingness To Pay For Health Insurance And Preferences For A Benefits Package From The Perspective Of Women From Low-Income Households Of Karachi, Pakistan	2021	Achieving universal health coverage (UHC) and reduction in out of pocket (OOP) expenditures on health, is a critical target of the Sustainable Development Goals (SDG). In low-middle income countries, micro-health insurance (MHI) schemes have emerged as a useful financing tool for laying grounds for Universal Health Coverage. The aim of this study was to provide evidence for designing a feasible health insurance scheme targeted at urban poor, by exploring preferences for an insurance benefits package and co-payments among women from low-income households in Karachi, Pakistan (Habib & Zaidi, 2021).
Muttaqi en Muttaqi e, Herma wati Setiyan ingi, Vini Aristia nti, et al	Why did informal sector workers stop paying for health insurance in Indonesia? Exploring enrollees' ability and willingness to pay	2021	This study aims to assess the ability- and willingness-to-pay of informal sector workers who have stopped paying the JKN premium for at least six months, across districts of different fiscal capacity, and explore which factors shaped their willingness and ability to pay using qualitative interviews (Muttaqien et al., 2021)
Siti Noor Chotimah	Implementasi Sistem Informasi Kesehatan di Fasilitas Pelayanan Kesehatan Indonesia: Literature Review	2022	This research observes the implementation of CIS and the factors that can affect the overall operation of information systems in health care facilities. It was explained that many factors were the focus of research and these had in common, namely the lack of quality and quantity of human resources who handle SIK directly. This research requires support from many interested parties in the health sector (Chotimah, 2022).

Ni Putu Intan Nilawati, Putu Ika Farmani, et al	Evaluasi Sistem Informasi Kesehatan Kabupaten/Kota di Puskesmas II Denpasar Barat Menggunakan Metode HOT Fit	2022	This study has a focus on human evaluation with system user components and user satisfaction with periodic systems. Where in the operation of SIK, the results of reports are carried out by officers, the puskesmas can run the program and the puskesmas leadership can make decisions quickly. This was obtained from the "good" and "moderate" assessment categories, and judging from its utilization, the system has been running well at the puskesmas (Nilawati, 2022).
Fajar Kurniawan, Romawati Ibrahim, Ira Nurmalia, Marheni Fadillah Harun	The Relationship between Organization and the Success of the Health Information System at the Health Center in the Kolaka District, Southeast Sulawesi Province	2022	This study discusses the strong relationship between organizing and the success of the Health Information System at the Kolaka District Health Center. In this study it was found that policy makers at both the provincial and regional levels had to be even more optimal by monitoring and evaluating the readiness of the puskesmas in implementing a more optimal Health Information System based on the completeness of the infrastructure, adding human resources according to their fields. (Kurniawan et al., 2022).
Hanxu Hu, Liying Zhao, Yang Yong, et al	Medical insurance payment schemes and patient medical expenses: a cross-sectional study of lung cancer patients in urban China	2023	This paper aims to investigate the characteristics and cost of hospitalized lung cancer patient, to examine the differences in hospital expenses and patient out-of-pocket (OOP) expenses under four medical insurance payment methods: fee-for-service (FFS), per-diem payments, capitation payments (CAP) and case-based payments, and to explore the medical insurance payment method that can be conducive to controlling the cost of lung cancer (Hu et al., 2023).

DISCUSSION

1. Insurance Payment

Insurance is a crucial aspect of our lives, providing financial protection and peace of mind in the face of unexpected events. However, understanding and

managing insurance payments can often be a complex and confusing process. Moreover, Insurance is an essential financial tool that provides individuals and businesses with protection against unforeseen events. However, managing insurance payments can often be a complex process.

The medical insurance system in China has progressively increased, the degree of security has been strengthened, and the strong pressure of medical insurance fund development has prompted a new cycle of medical insurance reform. With the implementation of different medical insurance reform programs in China, several provinces and cities have begun to manage medical insurance expenditures from the level of medical insurance payment, therefore decreasing the payment pressure on medical insurance funds. Controlling medical insurance expenses, on the other hand, does not happen overnight and needs a coordinated effort on the part of stakeholders. Furthermore, utions. The control of medical insurance funds focuses on reducing the moral hazard of insured persons, and the interaction effect between medical insurance and medical institutions is more obvious.

Medical insurance institutions, in particular, expect that medical insurance funds may increase the efficiency of fund usage and lessen the strain on medical insurance funds, while medical institutions hope to get adequate subsidies to expand service capacity and medical project operation. As a result, the reform of medical insurance payment methods can be utilized to limit costs.

a. Types of Insurance Payments

Insurance payments come in various forms, depending on the type of coverage you have. The most common types of insurance payments include:

1) Premiums

Premiums are regular payments made to an insurance company to maintain coverage. They can be paid monthly, quarterly, semi-annually, or annually, depending on the policy and the insurer's options.

2) Deductibles

Deductibles are the amount of money you must pay out of pocket before your insurance coverage kicks in. For example, if you have a \$500 deductible on your auto insurance policy and file a claim for \$2,000, you

will pay the first \$500, and the insurance company will cover the remaining \$1,500.

3) Co-payments and Co-insurance

Co-payments and co-insurance are common in health insurance. A co-payment is a fixed amount you pay for certain services or medications, while co-insurance is a percentage of the total cost you must pay. For instance, if you have a 20% co-insurance requirement for a medical procedure costing \$1,000, you would pay \$200, and the insurance company would cover the remaining \$800.

b. Understanding Your Insurance Policy

To navigate insurance payments effectively, it is crucial to thoroughly understand your insurance policy. Read through your policy documents carefully, paying attention to the following key elements:

1) Coverage Details

Familiarize yourself with what your insurance policy covers and what it does not. Understanding the limits, exclusions, and conditions of your coverage will help you make informed decisions and avoid unexpected expenses.

2) Payment Obligations

Take note of your payment obligations, including premium amounts, due dates, and acceptable payment methods. Ensure that you are aware of any grace periods or late payment penalties to avoid lapses in coverage.

3) Claims Process

Familiarize yourself with the process of filing a claim, including the documentation required and any applicable deductibles or co-payments. Promptly reporting and documenting any incidents covered by your insurance will help streamline the claims process.

c. Tips for Managing Insurance Payments

Managing insurance payments can be overwhelming, but implementing the following tips can help simplify the process:

1) Budgeting

Set aside funds for insurance premiums and other potential out-of-pocket expenses. Creating a budget that accounts for insurance payments ensures you can meet your financial obligations without any surprises.

2) Automatic Payments

Consider setting up automatic payments to avoid missing due dates. Most insurers offer electronic payment options, allowing you to automate premium payments, providing convenience and peace of mind.

3) Regular Review

Periodically review your insurance coverage to ensure it aligns with your current needs. Life changes, such as a new job, marriage, or the birth of a child, may require adjustments to your coverage or payment amounts.

4) Communication with Insurer

Maintain open communication with your insurance company. If you encounter financial difficulties, discuss potential payment options or flexible arrangements with your insurer. They may be able to provide assistance or offer alternative payment plans.

2. BPJS Health

The Social Security Administering Body (BPJS) for Health is a legal entity administering the National Health Insurance program for all people in Indonesia which aims to create a prosperous society with quality health insurance. BPJS Health with the Healthy Indonesia Health Insurance Program (JKN-KIS) seeks to expand the coverage of participation with the target being able to cover all Indonesian people so as to achieve Universal Health Coverage (UHC). Looking at its history, BPJS Kesehatan continues to make improvements to the system, membership techniques, as well as the facilities and infrastructure needed to run BPJS Kesehatan. BPJS Health uses the application of management information system knowledge to coordinate the flow of information. The management information system in BPJS Health is carried out by implementing computerization and online media to create a good information system (Krisdayanti, 2021).

a. Computer-based and online membership system

A computer-based and online membership system was implemented to cope with the large number of participants coming from the entire population of Indonesia. With the database used for BPJS membership portability, this database can later be accessed by all who need the data, so that double participation can be minimized.

b. Implementation of monitoring and evaluation of the system

In its implementation, every health system requires monitoring and evaluation as a basis for planning, implementing the system and continuously improving the process of implementing the system. In this Health BPJS, monitoring is carried out by observing and paying attention to the provision of training regarding the use of the INA-CBGs application that is good and correct and also pays attention to sudden random inspections.

c. Coordinated flow of information

Created a coordinated flow of information implemented to create a centralized Health BPJS media that can be implemented effectively and efficiently and can be accessed by all levels of society. Where in the flow are detailed explanations from BPJS Health itself such as.

- 1) Rights and obligations of BPJS Health participants
- 2) Basic information regarding the incidence of disease and its spread, this is an essential preventive measure
- 3) Information regarding the availability and access of BPJS Kesehatan participants to the nearest health service provider
- 4) PPK rating column filled in by BPJS Health participants as a form of service feedback carried out by the health service provider concerned with the objectives of optimization (SISTEM_INFORMASI_MANAJEMEN_BPJS, n.d.).

d. Change Management

- 5) Conduct counseling regarding the urgency of implementing management information systems at BPJS Health as steps aimed at improving good quality. This is done to create acceptance from

a good BPJS system from previously conducted routine training in accordance with the objectives of optimization (SISTEM_INFORMASI_MANAJEMEN_BPJS, n.d.).

Health Facilities

National health insurance begins in 2014, we will gradually move towards national health. In general, coverage is designed to make it easy for people Access to health services and access to quality health services. healthcare provider Limited and wide population distribution and access limited, resulting in reduced supply (service provision) government and others, causing difficulties Questions about access to sanitation facilities. Providing services depends on social infrastructure, the spread of healthcare infrastructure has improved, public health insurance is something unreal. The problem that arises is policy BPJS Kesehatan national health insurance can Increase access to health services and services Providing quality medical services to all Indonesian citizens on the principle of justice.

First Level Health Facility (FKTP)

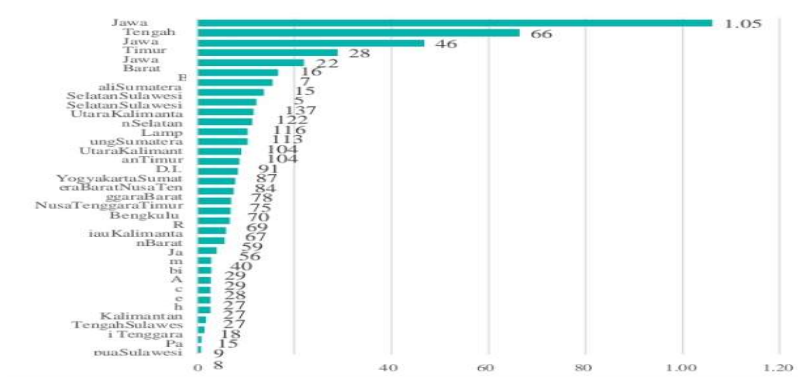
Community Health Service Center Regulation of the Minister of Health Number 43 of 2019 concerning Community Health Centers Indicates that the Puskesmas is a health service institution Organization of public health and personal hygiene Tier 1, by prioritizing promotive and preventive efforts in the regions succeed. As of December 2020, the number of Community Health Centers in Indonesia is 10,205 puskesmas, including 4,119 inpatient puskesmas and 6,086 puskesmas Ambulatory. This is an increase from 10,134 in 2019. There are 4,048 inpatient Puskesmas and non-Puskesmas 6,086 hospitalizations as many as abscesses.



Graph 1 Number of Community Health Centers in Indonesia

Source :

Medical practice is a series of activities carried out by doctors and dentists towards patients in carrying out health efforts. General practitioners and dentists who practice medicine are required to have a SIP (permit to practice) provided by the district or city health office and a Registration Certificate (STR) given by the Indonesian Medical Council to doctors and dentists that fulfills the requirements. In 2020, there are 4,704 general practitioners' independent practices and 1,158 practices independent dentist in collaboration with BPJS (Guarantee Organizing Agency). Social) Health. Provinces that have a number of independent practicing doctors and doctors Most of the Mandiri practitioners of dentistry who cooperate with BPJS are in the Province of Java Tengah, namely 1,059 doctors' independent practices and 303 dentists' independent practices



Graph 3: Number of Independent Practitioners for General Practitioners Collaborating with Bpjs Health by Province in Indonesia in 2020

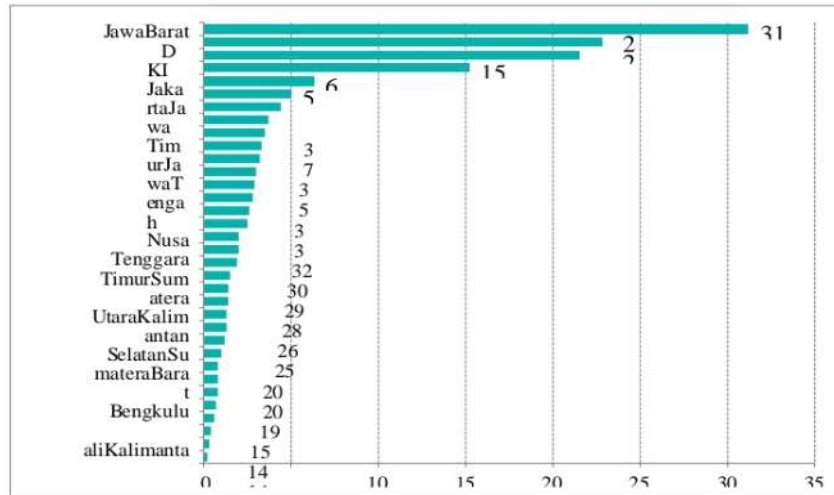
Source: Directorate General of Health Services, Ministry of Health, Republic of Indonesia, 2021 (BPJS data Health)

4. Supporting Health Facilities

a. Health Laboratory

The health laboratory is one of the supporting facilities in the implementation of health service efforts. A medical laboratory is needed to examine, analyze, describe, and identify materials for the determination of types of disease, causes of disease, and certain health conditions. The largest number of health laboratories are owned by the private sector, namely as many as 1,275 laboratories that have been accredited. Ownership of a health laboratory the second largest is the district/city government laboratory, namely 228 laboratories, 137 have been accredited. Ownership of a health laboratory: the third largest is the laboratory

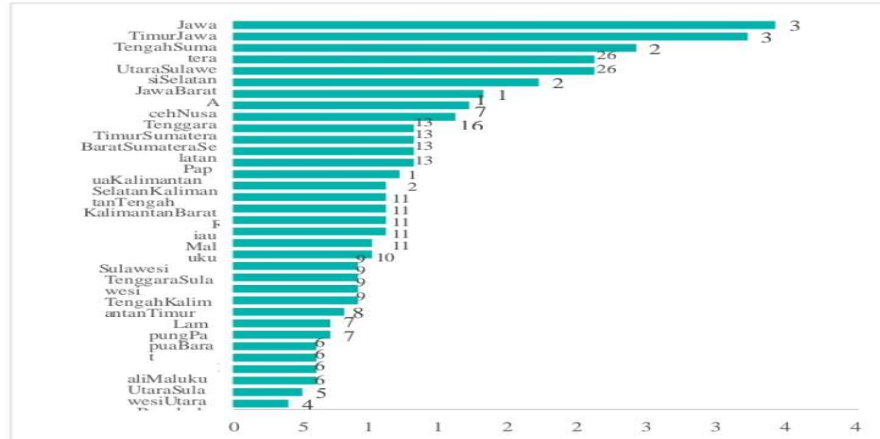
owned by the provincial government, namely as many as 28 laboratories. health laboratories owned by the Ministry of Health, and to become supervisors of Health laboratories spread across Indonesia based on the division of the region, namely four laboratories in the form of the Central Laboratory.



Graph 4: Number of Health Laboratories by Province in 2020 Source: Directorate General of Health Services, Ministry of Health, Republic of Indonesia, 2021.

b. Blood Transfusion Unit

According to Government Regulation Number 7 of 2011 and Ministerial Regulations on Health Number 83 of 2014, the Blood Transfusion Unit (UTD) is a service facility for health that organizes blood donors, blood supplies, and blood distribution. In 2020, there will be 460 UTDs in Indonesia, which will be held only by the government, local governments, and the Indonesian Red Cross (PMI). In 2020, the province with the highest total number of UTDs is East Java Province (39 UTD), while the province with the least total number of UTDs is Province North Kalimantan (4 UTD). Provinces that have the most UTD organized by the government or regional government are North Sumatra Province (21 UTD), while provinces that have the most UTD organized by PMI are East Java Province (37 UTD). There are 2 provinces that do not have UTD organized by the government or regional government, namely the Province of Bali and Banten, while UTD organized by PMI is owned by all provinces in Indonesia, namely North Maluku, Jambi, and Maluku Provinces.



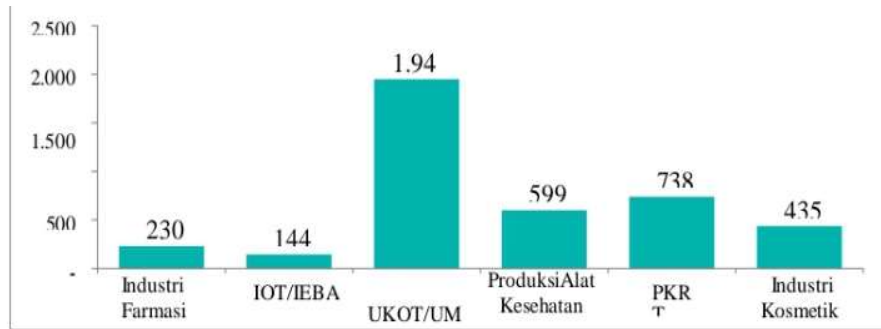
Graph 5: Number of Blood Transfusion Units by Province in Indonesia, Year 2020

Source: Directorate General of Health Services, Ministry of Health, Republic of Indonesia, 2021

c. Pharmaceutical Facilities and Medical Devices

The scope of production facilities in the pharmaceutical and medical device sectors illustrates the level of availability of health service facilities that carry out production efforts in the pharmaceutical and medical device sectors. Production facilities in the field of pharmaceuticals and tools include the pharmaceutical industry (IOT), traditional medicine small business/traditional medicine micro enterprise (UKOT/UMOT), medical device production (Alkes), production of household health supplies (PKRT), and industry cosmetics. If examined, production and distribution facilities in Indonesia are still showing an imbalance in terms of numbers. Most of the means of production and distribution are located on the islands of Sumatra and Java, amounting to 94.5% of production facilities and 76% of distribution means. This availability is related to the resources owned and needed in the local area. This condition can be used as a reference in the policy to develop the number of means of production and distribution of pharmaceuticals and medical devices in other parts of Indonesia so that equity occurs in the number of these facilities throughout Indonesia. In addition, this aims to open access to community-affordable health facilities in the field of pharmaceuticals and medical devices. In 2020, there will be 4,095 pharmaceutical and medical device production facilities in Indonesia. The province with the highest number of

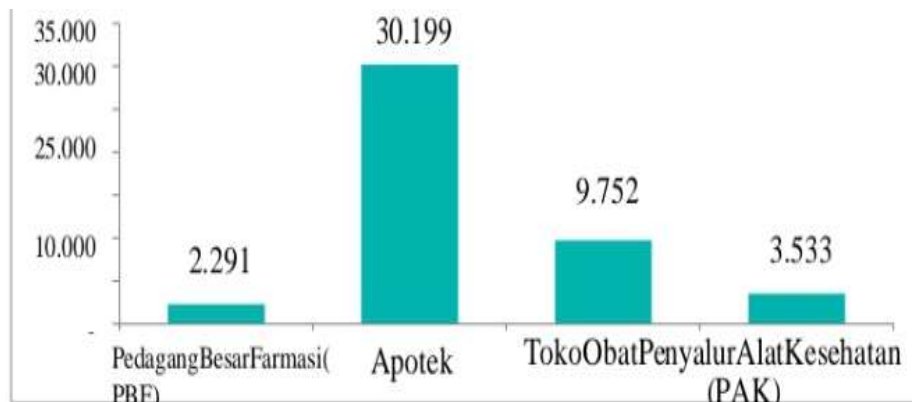
production facilities is West Java, i.e., as many as 1,148 facilities. This can be caused because West Java has a population big and wide area. However, there are 7 provinces that do not have the means to produce pharmaceuticals and medical devices.



Graph 6: Number of Pharmaceutical Production Facilities and Medical Devices in Indonesia in 2020

Source: Directorate General of Pharmaceuticals and Medical Devices, Indonesian Ministry of Health, 2021

Number of pharmaceutical distribution facilities and medical devices monitored by the Directorate General of Pharmaceuticals and Medical Devices, including pharmaceutical wholesalers (PBF), pharmacies, drugstores, and medical device distributors (PAK). The number of means of distribution for pharmaceuticals and medical devices in Indonesia in 2020 amounted to 45,775 facilities. The province with the highest number of distribution facilities is West Java, which has as many as 7,319 facilities.



Graph 7: Number of Pharmaceutical and Medical Device Distribution Facilities in Indonesia, Year 2020

Source: Directorate General of Pharmaceuticals and Medical Devices, Ministry of Health, Republic of Indonesia, 2021

3. Government

Governments play a critical role in healthcare management by establishing policies and regulations that govern healthcare delivery and financing. A study by Shortell and Kaluzny (2019) found that government involvement in healthcare management is necessary to ensure access to quality healthcare services for all citizens. The authors argue that government intervention is needed to address market failures and to ensure equity in healthcare delivery.

One way in which governments influence healthcare management is through the development and implementation of healthcare policies. A study by O'Byrne and Codd (2020) examined the role of the Irish government in healthcare policy development and implementation. The authors found that government policies were critical in shaping the Irish healthcare system and that policy implementation was a complex process that required collaboration between government agencies, healthcare providers, and other stakeholders. In addition to policy development and implementation, governments also play a critical role in healthcare financing. A study by Davis et al. (2020) examined the role of government in healthcare financing in the United States. The authors found that government financing of healthcare, through programs such as Medicaid and Medicare, is critical in ensuring access to healthcare services for vulnerable populations.

CONCLUSION

Insurance is an important aspect of our lives, providing financial protection and peace of mind in the face of unexpected events. However, understanding and managing insurance payments is often a complicated and confusing process. With the implementation of various health insurance reform programs in China, some provinces and municipalities have begun to manage health insurance spending at the health insurance payment level, thereby reducing the payment pressure on the health insurance fund. Controlling health insurance costs, on the other hand, does not happen overnight and

requires a coordinated effort on the part of stakeholders. As a result, reforms to health insurance payment methods can be used to limit costs.

The creation of a coordinated flow of information is carried out to create a centralized BPJS health media that can be implemented effectively and efficiently and can be accessed by all levels of society. Rights and obligations of BPJS Kesehatan participants Basic information about the incidence of disease and its spread is an important preventive measure. Information about the availability and access of BPJS Kesehatan participants to the nearest health service provider Column for health service provider ratings filled in by BPJS Kesehatan participants as a form of feedback on services carried out by the health service provider concerned management Change Conduct counseling regarding the urgency of implementing a management information system at BPJS Health as a step aimed at improving quality.

First Level Health Facility (FKTP) Community Health Service Center Regulation of the Minister of Health Number 43 of 2019 concerning Community Health Centers indicates that the Community Health Center is a health service institution. The implementation of public health and personal hygiene level 1 by prioritizing promotional and preventive efforts in the area is successful.

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