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E-CLAIM SYSTEM FOR HEALTH INSURANCE AND SOCIAL SECURITY (BPJS) TYPES IN INDONESIA: INNOVATION AND EFFECTIVENESS OF SERVICES

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ABSTRACT

There are four situations in the use of Hospital Information Technology applications or better known as SIMRS in Indonesian hospitals, first, the hospital has not had SIMRS yet, second, the hospital already has SIMRS but it has not been integrated, third, the hospital has an integrated SIMRS based on non-web service but has not bridged with E-claim application, and fourth, the hospital already has SIMRS based on Web Services and bridged with INA-CBG's E-Claim Application. The purpose of this study was to discuss the effectiveness of the National Health Insurance (JKN) Inpatient Claim using an integrated SIMRS web-based (Bridging System) with the INA-CBG'S E-Claim application Version 5.2 at Indonesia. Electronic Claims (E-Claims) or the INA-CBG's application is one of the patient data entry tools used to group rates based on data derived from medical resumes. The INA-CBG's E-Claim application has been installed in hospitals that serve JKN participants.

Keywords

SIMRS, *INA-CBG's, E-Claim application*

INTRODUCTION

The Social Security Agency, hereinafter abbreviated as *BPJS* , is a legal entity established to administer social security programs. *BPJS* (Health Social Security Agency) is a State-Owned Enterprise (BUMN) specially assigned by the government to provide health care insurance for all Indonesian people (1).

BPJS as referred to in Law Number 24 of 2011 is *BPJS Health* as the organizer of the Health Insurance Program and *BPJS Employment* Social Security Agency as the organizer of Work Accident Insurance, Old Age Security, Pension Security, and Health Insurance.

Indonesian Case Base Groups (INA-CBG's) is an application used by hospitals to submit claims to the government, in this case, *BPJS health* as the organizer. The hospitals will receive payments based on the average cost incurred for a diagnosis group. INA-CBG's is a continuation of the Indonesian-Diagnosis Related Group (INA-DRG) application, where this system is the first casemix system developed in 2006. The INA-CBG's system consists of several components that are interrelated with each other. The components directly related to service outputs are clinical pathways, coding, and information technology, while separately, there is a costing component that affects the process of preparing INA-CBG's rates for each group of cases in health financing (2).

Since January 1, 2014 INA-CBG's E-Claim Application has been declared as an application used in the *National* Health Insurance (*JKN*) program. This application has previously also been used in the health

insurance program launched by the government in the Public Health Insurance Program (*Jamkesmas*) in 2010 with version 1.5 (3).

The claiming stage in the hospital starts from several stages, it starts in the functional unit, the second stage is when the files are processed by the casemix team and the third stage is carried out by the hospital's internal verifier for the internal verification, and the fourth stage is to proceed to the claims administration and finance department. The casemix team carried out the claim process using the INA-CBG's E-Claim Application which started by inputting patient administration data, service rates, diagnosis codes based on International Code Diagnosis (ICD) X, International Code Diagnosis (ICD) IX action codes , and final delivery of data to the Data Center of the Ministry of Health. This input process requires accuracy, speed, and precision, especially for service rates, which have changed in the INA-CBG's E-Claim application version 5.2, the officer must input 18 items of hospital rates manually, where previously there were only 16 rate items in version 5.1 (3).

The problems faced by the officers who are responsible for rates input are time, accuracy, and errors due to manual input. This will result in delays and pending as well as hampering the hospital's financial cash flow.

The main reasons hospitals adopt information technology in their service , in general, include three things, to improve efficiency, effectiveness, and service quality. This goal can be achieved through the implementation of various functional applications such as billing systems, information systems for medical records, pharmacies, and other functional modules (4).

There are four situations in the use of Hospital Information Technology applications or better known as SIMRS in Indonesian hospitals, first, the hospital has not had SIMRS yet, second, the hospital already has SIMRS but it has not been integrated, third, the hospital has an integrated SIMRS based on non-web service but has not bridged with E-claim application, and fourth, the hospital already has SIMRS based on Web Services and bridged with INA-CBG's E-Claim Application.

A preliminary study conducted by researcher at the Ibnu Sina Hospital Indrapuri Aceh Besar, based on the results of interviews with 4 casemix team personnel at the Ibnu Sina Hospital stated that since the implementation of INA-CBG's E-Claim Version 5.2 the officers had difficulties and delays in completing claim status. In response to this, Ibnu Sina Hospital has used a Web Service-based Hospital Management Information System (Hospital Management Information System - SIMRS) which has integrated all service units and has been bridged with the INA-CBG's E-Claim Application Version 5.2 since February 2018. It is in line with Leonard's statement (2016) that the bridging system increases the effectiveness of entering data and efficient use of resources, and this bridging system can increase the speed of the claims management process.

Based on the foregoing discussion, the researchers were interested in conducting further research on the effectiveness of inpatient claims for the National Health Insurance (*JKN*) using an integrated web-based SIMRS (bridging system) with the INA-CBG's E-Claim application Version 5.2 at Ibnu Sina Hospital Indrapuri Aceh Besar.

HOSPITAL INFORMATION SYSTEM

In healthcare, the *Hospital Information System* is used to facilitate the management of clinical, financial, and administrative information in hospitals and is designed to improve the quality of care1. Integrating hospital information systems is very difficult, but necessary. Only in this way can a computerized hospital information system become a powerful tool for achieving clinical goals. It must have specifications for completeness, integrity, reliability and safety, ergonomic quality, comfort and usability for all levels of users (5).

Design and implementation of a comprehensive hospital information system with the desired functionality and standards, leading to the integration of electronic medical systems (6). Integration that data collected from many related hospital units or clinics/centers is stored in a unified database. Information about patients treated in each hospital unit (if permitted), is accessible. Integrity is not limited to patient information, but includes all hospital processes (7). Although hospital information systems are used in most health care

organizations, they are often not integrated. Data is incomplete and inconsistent and the flow of information is interrupted, because the focus of this protocol is on transferring data, not on integration and synchronization.

In addition to the internal differences of the hospital, which are caused by different activities and different workflows, the external communication of the hospital, also has an effect on the level and complexity of the HIS. To establish communication between hospitals, an integrated system is needed. Users as the main client of a system, have logical expectations. These expectations include access to all services provided, simplified and without intra-organizational restrictions and without space restrictions. It is clear that this expectation is not possible without the cooperation and mutual influence in various parts of the system to provide services to users.

The hospital information system is a hospital inventory system that manages patient info, staff info, stores and medicines, billing and report generation. This complex application communicates with *the database server back end* and manages all information related to hospital logistics. Hospitals need to implement a customer satisfaction-oriented system. For this reason, hospitals must create superior performance. Superior performance is one of the main factors that must be pursued to win global competition, as well as by health service providers. There are many ways that hospital managers can do to create superior performance, including through the provision of good services and accurate medical actions and quality management mechanisms of course. One of the strategies carried out by hospital managers in maintaining or increasing the number of consumers is service. The demand for quality and comfortable services is increasing, in accordance with the increasing awareness of the meaning of healthy living. Therefore, the hospital management needs to improve the quality and effectiveness of the service system in the hospital by implementing a service information system management. So can the effectiveness of information systems is a measure that reflects as an effort to achieve how far the targets set can be achieved. The higher the effectiveness of the information system, the better individual performance will be, thus supporting efforts to create effective use of the system so that the target can be achieved optimally. The effectiveness resulting from a system will be directly related to efforts to achieve system goals that can support the process of achieving the goals that have been set.

Hospital Information and Management System (SIMRS)

Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 82 of 2013, the Hospital Information and Management System (SIMRS) is a communication information technology system that processes and integrates the entire flow of hospital service processes in the form of a network of coordination, reporting and administrative procedures to obtain accurate information. and accurate and is part of the Information System Health. The *World Health Organization* (WHO) assesses that investment in information systems in the health sector will provide benefits, including:

1. Assist decision making to detect and control health problems, monitor progress and improve them.
2. Empowering individuals and communities quickly and easily and making various improvements to the quality of health services.
3. *Evidence-based* strengthening in effective policy making, evaluation and innovation through research.
4. Improvements in governance, mobilization of new resources and accountability of the means used.

The policy for using SIMRS in hospitals by the Ministry of Health of the Republic of Indonesia originated from the policy of implementing SIK in the Ministry of Health of the Republic of Indonesia. SIMRS is an integrated information system to handle the entire hospital management process starting from administration (recording patient registration, doctor scheduling, and queuing), main services (Emergency Installation, Inpatient, Polyclinic) and medical records (EMR/ *Electronic Medical Record*), *billing* , medical support facilities (laboratory, radiology, pharmacy, surgery, medical rehabilitation, diagnostics, nutrition, etc.) as well as supporting facilities for hospital operations such as personnel, accounting and finance.

Regulation of the Minister of Health of the Republic of Indonesia Number 82 of 2013 concerning Hospital Management Information System (SIMRS). SIMRS consists of three components, namely:

1. Input : Sources of data/information to support health efforts and management, data recording instruments, resources (manpower, costs, facilities) for data/information management and utilization
2. Process: organization and work procedure of data/information management unit including aspects of coordination, integration and cooperation between service units and data management (medical record unit), hospital data/information processing.
3. Output: utilization of data/information to support the management and development of health service activities in hospitals.

The SIMRS architecture as stated in the Minister of Health Regulation Number 82 of 2013 concerning SIMRS states that the SIMRS architecture must at least consist of:

1. Main service activities (*front office*): includes the registration process, the outpatient process (outpatient or inpatient) and the discharge process. The data entered in the treatment process will be used in the care and discharge process. SIMRS must be able to accommodate the minimum needs for poly obstetrics, pediatrics, surgery, dentistry, neurology, anesthesia, psychiatry, ENT, eyes, lungs, heart, skin. During the treatment process, patients will use resources, receive services and actions from units such as pharmacy, laboratory, radiology, nutrition, surgery, *invasive* , *non-invasive diagnostics* and others. The unit receives *orders* from doctors (eg in the form of prescriptions for pharmacy, lab forms and the like) and nurses which can be handled by *the Order Communication System* (OCS) module.
2. Administrative activities (*back office*): includes planning, purchasing/procurement, stock/inventory maintenance, asset management, HR management, money management (debts, receivables, cash, ledgers and others).
3. Communication and collaboration: data exchange standards that can be used to communicate from one application to another, namely *Health Level* 7 (HL7), DICOM and *Extensible Markup Language* (XML).

SIMRS development is recommended to use applications with open source code, *especially* in the main service section or *front office* so that it can be used on various operating systems. In addition, SIMRS must have data communication capabilities (interoperability):

1. State Property Management and Accounting Information System (SIMAK BMN) which can at least integrate goods code data.
2. Reporting Hospital Information System (SIRS) to the Ministry of Health of the Republic of Indonesia.
3. *Indonesian Case Base Group's* (INA-CBG's) are required to manage claims data with BPJS Health.
4. Another application developed by the government.
5. Other Health Service Facility Management Information System.

The principles that must be applied in building the SIMRS data architecture are:

1. Codification in automating or computerizing data as well as for integration and further data processing such as statistics.
2. *Mapping* data for further integration and management, for example *mapping* the codification of rate with estimated codes/ *chart of account* , *mapping* district/city codes with provinces and the like.
3. Standard data exchange between applications.
4. *Database* structure design that refers to the *best practice of* home database and draws from open sources and takes into account the information needs of relevant *stakeholders* .

The word "Integration" in the context of information technology is defined as a process that includes assembling a number of components or logical parts of several systems to become a unified system, checking the running of the system and system functionality carried out as an effort to save IT budgets. Integration can also be interpreted as a collection of logic and procedures for improving system performance, cost and time efficiency, design, installation, operation, configuration of one or several *existing systems*. Integration techniques need to be understood for hospitals that already have applications but have not been integrated

between each of these applications. Integration can be said as an effort to combine two or more systems that already exist and are running in an organization. Hospitals that need to integrate their applications need to define a sequence of steps, processes and strategies based on the goals or objectives in performing system integration.

Based on the important values of integration, namely:

1. Save budget in the provision, development, testing and maintenance of information systems.
2. Facilitate service providers and developers in providing services in one system as well as in repair, continuous development to system maintenance and maintenance.
3. Make it easier for users to remember the location of the service (eg in the form of a URL), access information, obtain data and information to use all the menus provided in it more optimally.

The approach in integrating can be done with a total and homogeneous approach and a gradual approach. The total and homogeneous approach focuses on how to carry out the integration process of a number of different systems owned by the organization as a whole (total) and simultaneously, into an integrated and the same system (homogeneous). The gradual approach is carried out with a number of process stages where the system integration is carried out in stages to each part. The gradual approach tends to use an existing system to be then integrated into a complete and integrated system which is carried out in stages by part. This approach may be chosen by an organization if:

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1. Not all units within the organization are ready to perform system integration.
2. Limited costs (funds or budget) for the system integration process.
3. Avoiding disruption to the process from using the system ongoing.

The health service system network requires an information system that is mutually supportive and related, so that every activity and health program that is implemented and felt by the community can be known, understood, anticipated and managed as well as possible. *Web services* will facilitate integration between applications even on different *platform environments* . Each application provides a *web service -based system* which is then integrated into a system/application that is easier to manage and further developed (8).

Web service is a software system designed to support machine-to-machine interaction on a network. It has an interface that is described in a machine-processible format such as WSDL (*Web Service Description Language*). Other systems that interact with *web services* are done through an *interface* using messages as in SOA. In general this message via HTTP and XML which is one of the web standards. The architectural concept that underlies *web service technology* is *Service Oriented Architecure* (SOA), SOA defines 3 different roles that show the role of each component in the system, namely: (9)

1. *Service provider* , which is an entity that provides an *interface* to the system that performs a certain set of tasks.
2. *Service requestor* , which is an entity that requests/obtains (and finds) *software services* in order to complete a certain task or provide a specific business solution.
3. *Service registry* , which is an entity that acts as a *repository for* a *software service* published by the *service provider* .

Electronic Claims (E-Claims)

The *casemix system* is a grouping of diagnoses and procedures with reference to similar/same clinical characteristics and similar/same treatment costs, the grouping is done using a *grouper* (3). This system, in fact, is no different from the health system implemented by the Australian government. The health facilities managed by *Healthscope* are among the best in the world, specifically designed to provide specialized healthcare services that prioritize patient comfort. The Australian health system is a complex and sophisticated system, a combination of public and private health services. All Australian citizens and permanent residents

have access to free of charge government-administered health care, however nearly half of Australians have private health insurance.

Over the years, the privately owned health system has developed to such an extent that it has a considerable role to play in health care. Private hospitals, including private hospitals managed by Healthscope, are equipped to provide almost all types of health care available, from sub-acute services such as rehabilitation to complex care such as surgery and intensive care units.

The Australian government has set accreditation standards nationally through the *Australian Council on Health Care Standards* (ACHS) and the *Evaluation and Quality Improvement* (EquiP) standard. Australian hospital accreditation standards are equivalent to US *Joint Commission International* (JCI) accreditation. Many even admit that Australia's accreditation standards are more comprehensive. Even ACHS itself has recently started accrediting hospitals throughout Southeast Asia and the Middle East, this accreditation is built on the high standards used by hospitals in Australia.

The Australian Health Sector is renowned worldwide for the very high quality of care. An international comparative study of health systems in six countries (Australia, Canada, Germany, New Zealand and the United States), proved that "Australia ranks highest in the area of healthy living, has the highest/second highest score in all of the assessment indicators defined" (*The Common Wealth Fund* , 2007).

Australian hospitals, doctors, universities and researchers are the best in their fields. Australia has more hospitals that are ranked in the top 500 research hospitals in the world than any other country in Southeast Asia (Cybermatics World Ranking). The Australian Institute of Health and Welfare (a federal government agency) is responsible for measuring and monitoring health and well-being in Australia. The agency also publishes data on hospitals in Australia that is freely accessible, allowing patients to compare the hospitals they are going to visit with national averages.

The *casemix system* was first developed in Indonesia in 2006 under the name INA-DRG (*Indonesian-Diagnosis Related Group*). Implementation of payments with INA-DRG began on September 1, 2008 at 15 vertical hospitals, and on January 1, 2009 was expanded to all hospitals that collaborated for the Jamkesmas program. On September 31, 2010, the nomenclature was changed from INA-DRG (*Indonesian Diagnosis Related Group*) to INA-CBG (*Indonesian Case Based Group*) in line with the change in grouper from 3M Grouper to UNU (*United Nation University*) Grouper. Thus, from October 2010 to December 2013, payments to Advanced Health Service Providers (PPK) in Community Health Insurance (Jamkesmas) used INA-CBG's. Since the implementation of the casemix system in Indonesia, there have been 3 changes in the amount of rate, namely the 2008 INA-DRG rate, the INA-CBG's rate in 2013 and the 2014 INA-CBG rate. The INA-CBG's rate has 1,077 rate groups consisting of 789 group codes/ inpatient group and 288 code groups/outpatient groups, using a coding system with ICD-10 for diagnosis and ICD-9-CM for procedures/actions. The grouping of diagnostic codes and procedures is carried out using the UNU *grouper* (UNU *Grouper*). UNU- *Grouper* is a *casemix Grouper* developed by *United Nations University* (UNU).

The INA-CBG's rates used in the January 1, 2014 National Health Insurance (JKN) program are enforced based on the Regulation of the Minister of Health, with several principles including the grouping of rate into 7 hospital clusters, namely: Class A Hospital Rates, Class B Hospital Rates, Hospital Rates Class B Education Hospital, Class C Hospital Rates, Class D Hospital Rates, National Referral Special Hospital Rates, National Referral General Hospital Rates.

Electronic Claims (E-Claims) or the INA-CBG's application is one of the patient data entry tools used to group rates based on data derived from medical resumes. The INA-CBG's E-Claim application has been installed in hospitals that serve JKN participants. To use the INA-CBG's E-Claim application, the hospital must already have a hospital registration code issued by the Directorate General of Health Efforts, then the INA-CBG's *software will be activated* for each hospital according to the hospital class and regionalization. The process of entering patient data into the INA-CBG's E-Claim application is carried out after the patient has finished receiving service at the hospital (after the patient has returned from the hospital), the required data comes from the medical resume, it is also necessary to pay attention to the completeness of administrative data for the purpose of claim validity .

The INA-CBG's E-Claim application is an application used in the National Health Insurance (JKN) program which started on January 1, 2014. This application has previously been used in health insurance programs launched by the government such as Jamkesmas in 2010 with the previous version. The INA-CBG's E-Claim application was first developed with version 1.5 which has been developed to date to become version 5 with developments on several things including (3).

1. *Interface*
2. Feature
3. *grouper*
4. Variable Addition
5. INA-CBG's fare
6. Integration Protocol Module with SIMRS and BPJS
7. Design and Build Data Collection from the Data Center Hospital of the Ministry of Health of the Republic of Indonesia.

The intended rate is in the form of a package that includes all components of hospital costs. Based on disease *costing* and *coding data,* referring to the *International Classification of Diseases* (ICD) compiled by WHO using ICD 10 to diagnose 14,500 codes and ICD 9 *Clinical Modifications* which includes 7,500 codes. Meanwhile, the INA-CBG's rate consists of 1,077 CBG codes consisting of 789 inpatients and 288 outpatients with three levels of severity. For the implementation of the JKN BPJS Health program, INA-CBG's rates are grouped into 6 types of hospitals, namely class D, C, B, and A hospitals as well as national referral hospitals and hospitals. INA-CBG's rates are also arranged based on class 1, 2, and 3 treatments. Previously, in Jamkesmas there were only INA-CBG's rates for class 3.

The rate grouping is based on adjustments after looking at the *Hospital Base Rate* (HBR) of the hospital which is obtained from the calculation of the total cost of hospital expenses. If there is more than one hospital in one group, then the *Mean Base Rate is used* . The INA-CBG's application is a patient data entry tool used to *group* rates based on data from medical resumes. The INA-CBG's application has been installed in hospitals that serve JKN participants. To use the INA-CBGs application, hospitals must have a hospital registration code issued by the Directorate General of Health Efforts, then the INA-CBGs software will be activated for each hospital according to the hospital class and regionalization. For hospitals that want to activate the INA-CBG's application, they can download the hospital *database* according to the hospital data on the Ministry of Health website.go.id. The E-Claim application continues to grow until the latest version, namely E-Claim Version 5.2 which adds 18 rate variables

BRIDGING SIMRS WITH EKLAIM VERSION 5.2

Bridging comes from the word " *Bridge* " which means bridge, bringing together, bridging. As the name implies, this tool is used to bridge 2 networks. But unlike a *repeater* which only functions as a physical bridge, a *bridge* can also function as a logical bridge *such* as disassembling and compiling rescue packets, *buffering* , and others. Thus the *bridge* can be used to connect 2 kinds of networks that have different packet formats or that have different speeds.

Bridging system is the use of web service information technology facilities that allow two different systems at the same time to be able to carry out two processes without direct intervention from one system to another, so that the level of security and confidentiality of each system is maintained. The purpose of this *bridging system* is to increase the effectiveness of *data entry processing* , efficient use of resources, and faster management processes, both claims, accounts receivable, verification, and so on. This system can improve participant administration services, save human resources and infrastructure, record health service data and the claim submission process becomes faster, and the settlement of service incentives based on workload is also completed more quickly. *Bridging* features :

1. Purification is done through *bridging application* . If SIMRS has also been *bridging* with RSSEP in the process of making SEP, it will be more secure to ensure the correctness of the SEP number in the

system when compared to manual number *entry* . However, re-checking is still carried out to avoid possible changes during the service implementation process.

2. Shipping is done in bulk. By making a *bridging application, grouping can be* carried out in bulk for a certain period, for example every day or every two days. For example, for outpatient services, the *grouping process* can be done the next day or at the end of the service day.
3. Data validation checks according to INACBG's provisions . The data validation in question includes the main diagnosis, the way to go home, birth weight for the case of infants, the patient's age, gender, date of birth of the patient, *length of stay* , date of entry, date of discharge and others according to INACBG's mandatory.
4. Get INACBG's rates whether you go up class or according to class allocation. SIMRS-INACBG's *bridging* process allows SIMRS to get INACBG's rate data directly from INACBG's software. This rate data can be used for claims evaluation, income calculation and others as needed. With this rate, SIMRS can also directly calculate the cost pool that must be paid by patients if they go to class.
5. Alerts you to a *Special* CMG. The application can alert the *user* if the patient data allows for the addition of a CMG Special. CMG specials can be known if *grouping has been done*. With this warning, the officer can check the data again. Thus, the possibility of loss due to unclaimed CMG specials can be minimized.
6. Revision of claim data. Usually in one claim there are several data requested to be changed by the verifier. By using this application we can immediately find out the data that must be revised directly through the application and immediately make changes. Claim data may also differ from medical data according to doctor's records, claim data and medical record data can be separated.
7. *Parse* INA-CBG's data. After sending, we can see directly or prove that the data has been sent to the INACBG's application through the INACBG's application. In addition, we can see data directly from the INACBG's *server through the parsing mechanism. This parsing* is exactly the same as what the RSSEP application does when it performs purification before being verified by the verifier. This purification process is possible for verifiers who have bridging between INACBG's and RSSEP.
8. Print individual data. We can print individual data as needed. In INA-CBG's application we have to print individual data one by one or all. With bridging we can print as needed, for example *Severity Level 3* only, or SL2 only or only those who pass verification and others.
9. Claim Evaluation. When combined with SIMRS SEP bridging, we can check whether the data we send has been verified by the verifier or not. can even know whether it passed the verification or not. With this feature we can know if there is data that has been missed by the verifier. Usually what we do is check the claim file, but this will be hampered if there are files that are lost or tucked away. With this application we check that we are not only based on files. In addition, the inspection process is easier because it is done with the application.
10. Evaluation of claim data verification results. This feature is used to check the final verification result. So that it can be seen how many passed the verification and how many did not pass the verification. Even if there is a missed claim data that has not been verified, it will be visible. This data can be used as a comparison with the data received from the verifier.

The following is a schematic of the flow of data exchange in SIMRS Integration with INA-CBG's E-Claim Application via *Web Service* , starting from SIMRS *generating-request* (Figure 1). With the flow in Figure 1, it is hoped that data will not be exchanged in an open condition. The following is the basic integration flow (Figure 2) that can be used as a minimal reference to integrate SIMRS with E-Claim. The methods used are minimal examples, other methods can be added or used as needed. The text in blue is the name of the method.

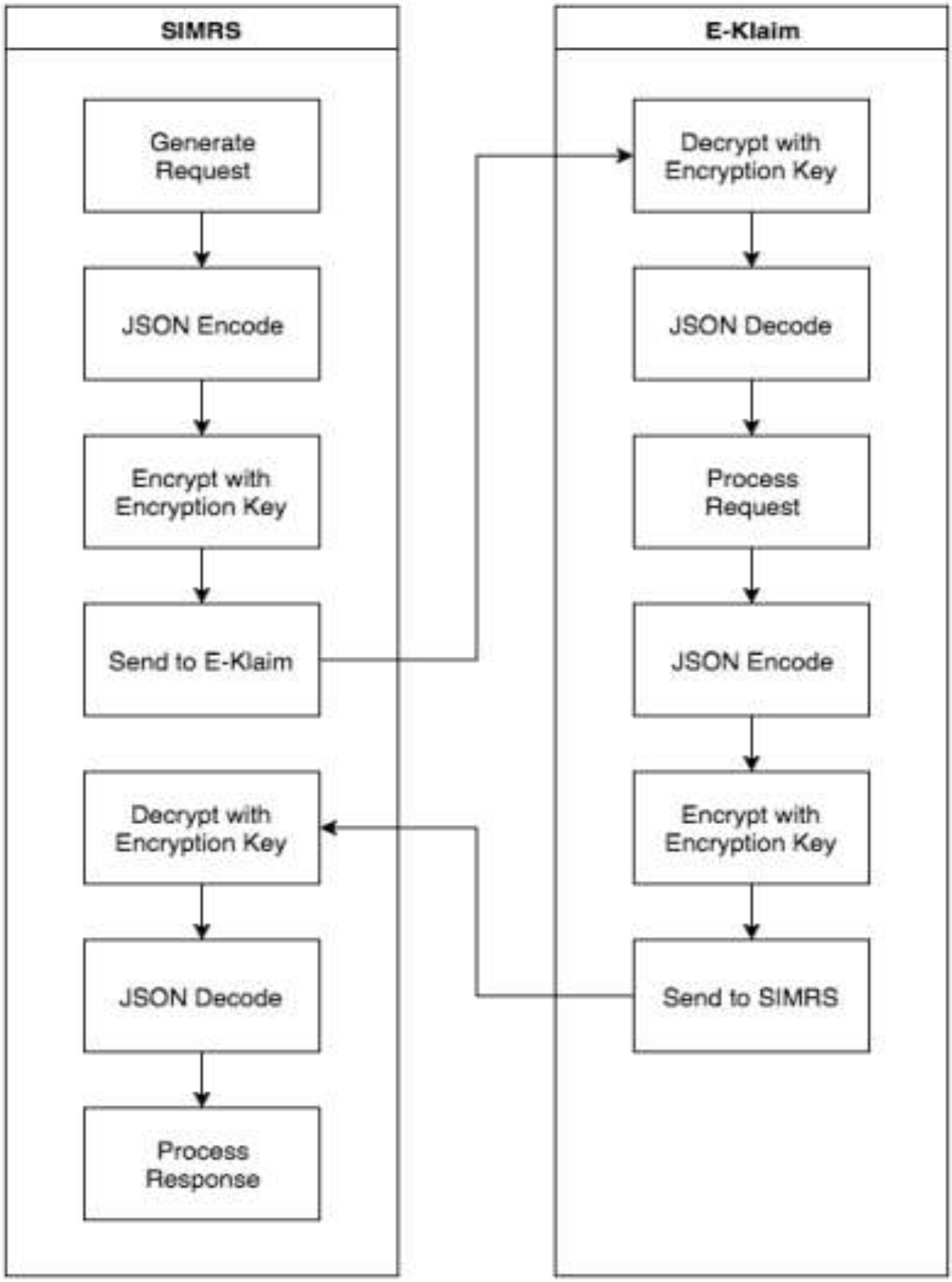

Figure 2.1 Data Exchange Flow in SIMRS Integration with E-Claim Application

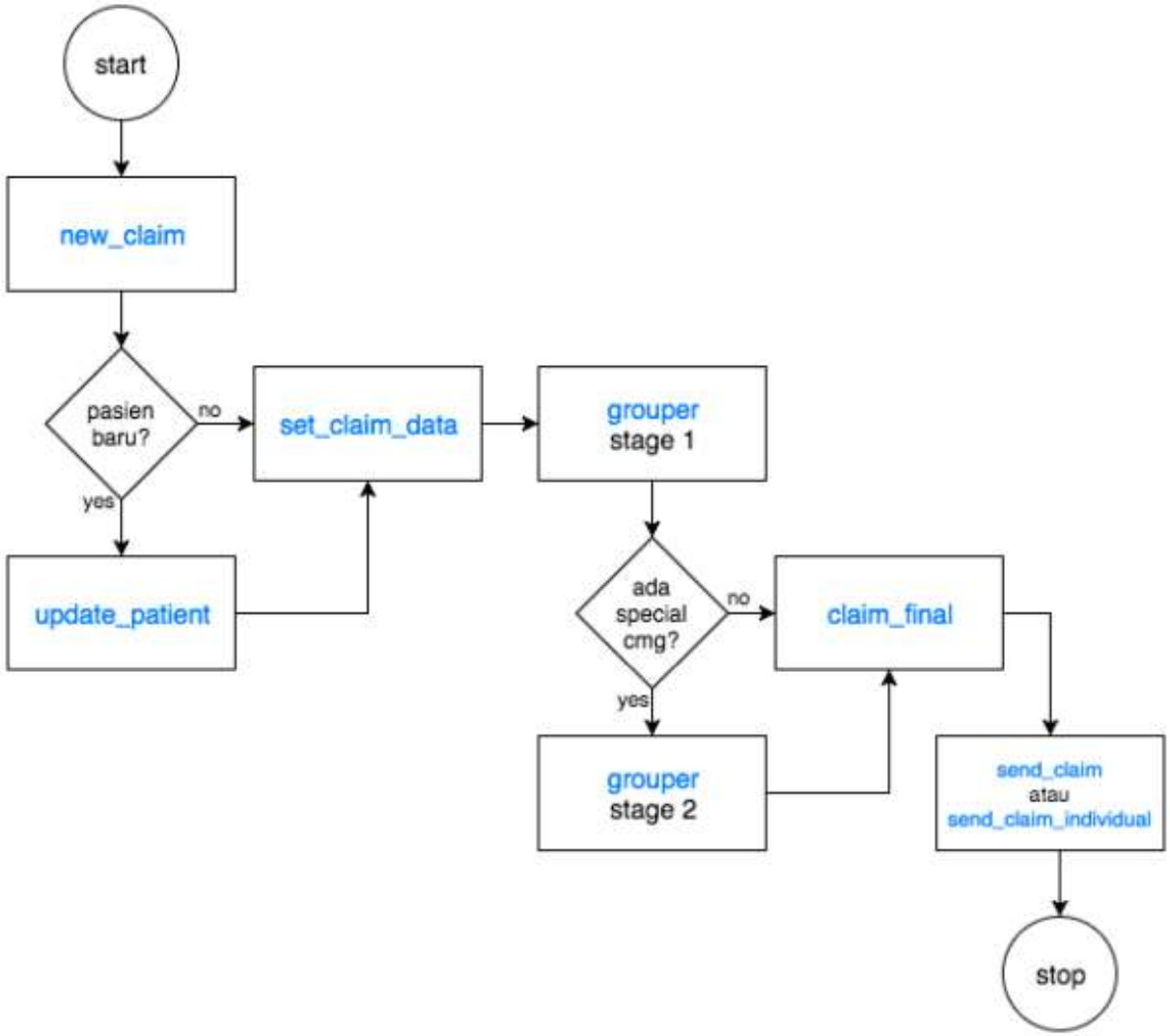

Figure 2. Basic Integration *Flow*

ABBREVIATIONS

JKN, National Health Insurance; INA-CBG's, Indonesian Case Base Groups.

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