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Academic Health System in West Java in Strengthening Primary Health Care

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A B S T R A C T

Academic Health System (AHS) has been developed in many countries to strengthen the relationship between medical education and health professions with the health care system, which is essential to improve health outcome. Indonesia has chosen to establish AHS in several provinces, each with the autonomy to develop the system in accord with regional needs. Health cluster faculties in Universitas Padjadjaran, with its two main teaching hospitals, the West Java provincial government strived to develop AHS to overcome health services problem and medical education in the province that has enormous geographical and demographic challenges. The strategy used focuses on two things: distributed medical education (DME) and the development of a more effective referral system. The goals are dividing the province into seven regionals, upscaling one local hospital in each to become a regional referral hospital, expanding learning opportunities for medical students, and endorsing research to strengthen the primary healthcare services. Activities were carried out through the distribution of medical students and residents to local hospitals and primary healthcare facilities along with the education of local medical professionals as supervisors. Grants were provided for research that focus on quality primary healthcare, construction of data portal for patient management referral systems, telemedicine, and tele-education. The challenges faced are mainly related to the different mindset between institutions that have different work cultures and the wide variance of situations between regions. It is therefore recommended to build a more straightforward AHS system with addition of sub-networks, besides continue to maintain close communication and policy development.

I. INTRODUCTION

Academic Health Systems (AHS) are systems in which academic institutions, health services, and governments support each other in creating integrated health care systems. This concept has a long history, at least since the 19th century in Europe, where medical scientists and educators sought to establish links between medical education and research with health services (Synderman, 2016). This concept developed and expanded in North America, particularly after the publication of Flexner Report, which highlighted the importance of the association between health facilities with medical faculties to strengthen the quality of health services while ensuring the quality of medical education.

The concept has been around the world since the 1990s (Culbertson *et al.*, 1996; French *et al.*, 2014), resulting in various models and implementations in many countries (French *et al.*, 2014; Wartman dan Steinberg, 2011; Wartman, 2015; Weiner *et al.*, 2001). The emerging model generally involves medical schools, and their affiliated hospitals termed Academic Health Centres (Wartman *et al.*, 2015). In the Indonesian context, which has geographical and demographic challenges and a semi-decentralized government system, the approach taken is the Academic Health System, which can be traced back since 2008. Later on, the concept has been established through the Medical Education Act (No. 20/2013).

The Indonesian Ministry of Health and the Ministry of Higher Education and Research auspice the establishment of AHS through decrees (Ministry of Health of the Republic Indonesia, 2015; Ministry of Research and Higher Education, 2016), resulting in the development of AHS in five provinces (Jakarta Special Capital Region, West Java, Central Java, East Java, and South Sulawesi). It involved at least five universities/medical schools and their affiliated central hospitals, together with local governments. With the reference of the broad different geographic-demographic-socio-economic challenges faced by those five provinces, AHS has evolved in different ways. Here we report how the concept has been implemented in the context of West Java Province, Indonesia, particularly in regards to the effort to maximize AHS benefit for strengthening primary healthcare services in the province.

II. METHODS

Secondary data of this study was collected from office documents, reports, and minutes of meetings in the Faculty of Medicine, Universitas Padjadjaran, particularly from AHS development activities that were conducted during the author's deanship period of 2016-2018.

III. RESULT

Situation of Primary Healthcare Services as a Background

There are, at least, two challenges faced by Indonesian primary level healthcare services, which are the demand side and the supply side. Challenges on the demand side include the low achievement in many health problems; for example, Indonesia is facing a double burden of disease (Mahendradhata *et al.*, 2017). Indonesia is still burdened by infectious diseases problem as a classic identifier of health conditions in developing countries. On the other hand, we are starting to face burden by chronic diseases such as cardiovascular disease and oncology, as well as the high morbidity rate due to trauma as a result of high traffic accident cases. In general, life expectancy increased to 69.1 in 2015, but this increase was accompanied by changes in the pattern of causes of death that has shifted toward chronic disease, although deaths due to low birth weight were still included as the top 20 causes of death (Mahendradhata *et al.*, 2017; World Health Organization, 2016). The improvement in education level is quite encouraging, but it

signifies the public demand for better quality health care. Changes to a better quality of life also signify the shift of paradigm from sickness into health paradigm, where people have realized the importance of healthy living. It means that doctors and other health professionals should be encouraged to be able to provide services not only to cure but also to give healthcare service on wellness.

At least there are two challenges on the supply side, namely health financing and resource management. Indonesia started to use a national health financing system since 2014 as a proxy to universal coverage health insurance. The challenge is not easy because the chosen financing scheme still contains problem (Mas'udin, 2017; Yulianti dan Thabrany, 2018). The national health insurance program or *Jaminan Kesehatan Nasional* (JKN) has been a quite successful scheme to cover the middle segment of the society that has not been well covered by the aid scheme for the low-income group, while they cannot afford to buy their private health insurance as the upper segment does. However, the standard of practice acknowledged by JKN is not parallel with the standard of practice that had been used and developed for decades that was built based on independent practice and out-of-pocket funding (Aditya *et al.*, 2017). JKN system is superior in its dependent on evidence-based medicine but also highly dependent on a clear division of tasks of different levels of health facilities, uses a relatively stiff referral system. It has been a challenge to practice the scheme by health professionals who are accustomed to practicing medicine very independently (Yulianti dan Thabrany, 2018; Aditya *et al.*, 2017). It constructs the healthcare system into three levels: primary (clinics, with or without inpatient service), secondary (hospitals with limited numbers of specialists), and tertiary (referral hospitals with almost all types of specialists and sub-specialists).

Another supply challenge is the management of resources that remains a serious problem. The number of health workers who have been sufficient in the matter of ratio, even excessive in some fields, is not accompanied by proper distribution (Meliala *et al.*, 2013). Doctors and other health professionals tend to work in urban areas. School financing system for healthcare professionals usually come from individuals and could be used to justify by health professionals to do practice in the preferred place and not in the place where they are most needed. Primarily before JKN, specialist care can be obtained by choice, without significant rationalization or initial assessments by primary level medical professional. The practice of back referral was not well managed. Specialist doctors were not only practicing specialist health service but what can be resolved at the primary level were apparently (and still) executed in the secondary or even tertiary level of health care. Unwittingly, health service became high in cost, inefficient and burdensome for individuals.

AHS Development in West Java

West Java province is geographically small in Indonesia, but it is home for approximately 20% of the Indonesian population. In the year 2015, when the AHS was initially established, the population of West Java was 46.7 million. The governance is divided into 27 cities/regencies, which populated smaller areas due to the mountainous character of the area. The northwest region of West Java is a buffer zone of Jakarta, the Indonesian capital, in which the population is very dense and has urban characteristics, similar to Bandung City as the capital of the province. The northern coastal regencies are mostly agricultural; a few areas are considered as remote, while a small part in the northeast (Cirebon) which is more urban. The southern coastal regencies facing the Indian ocean are also agricultural and geographically mountainous and more challenging. Some parts of the southern regencies are still considered as very remote and not easily accessed.

Like other provinces in Indonesia, West Java province has one central referral hospital (tertiary healthcare facility), owned by the central government. The referral system has been

divided into three levels since early time, primary, secondary, and tertiary levels. The standardized referral mechanism is the primary healthcare facility could refer to the secondary facility (local hospital), and both the primary and secondary healthcare facilities could refer to the central hospital. Ironically, before the JKN, both secondary and central hospitals provide primary healthcare services. This is a considerable problem because in this way the central hospital bears a hefty responsibility, both for providing all levels of healthcare service and medical education.

Based on the situation described above, a number of institutions in West Java have committed to developing AHS in West Java. They are a leading university (Universitas Padjadjaran *c.q.*, health cluster faculties), the central referral hospitals (Rumah Sakit dr. Hasan Sadikin/RSHS and Pusat Mata Nasional Rumah Sakit Mata Cicendo/RSMC; owned by central government), and the respected provincial and city governments (as owners of well-distributed local hospitals and public primary care centers). The ground argument that was agreed upon AHS concept is that the success of health services, as health professionals, healthcare institutions, and health system in general, should not be assessed based only on medical quality parameters, such as the effectiveness, safety, and patient-centeredness, as well as financial success. Instead, healthcare facilities should be able to provide services that support long-term impact, which should also be measured by quasi-medical indicators such as accessibility, affordability, efficiency, and equity. It could be said that the desired outcome is a better-quality service, equality of services for individuals, families, and communities, better health outcome, with minimal cost (Universitas Padjadjaran, 2015; Fakultas Kedokteran Universitas Padjadjaran, RSUP Dr. Hasan Sadikin Bandung, PMN RS Mata Cicendo, 2015).

The essential formula to achieve all of those is a good quality of primary healthcare service, which was believed to be able to solve a more substantial portion of health problems by preventing incidence, complications, and chronicity. The main characters of the primary healthcare used are as follows: generalist approach, primary healthcare acting as a meeting point and starting point of the continuum of care, patient-centeredness, family-oriented, community-oriented, comprehensive plan, and coordinative (Fakultas Kedokteran Universitas Padjadjaran, RSUP Dr. Hasan Sadikin Bandung, PMN RS Mata Cicendo, 2015). Higher education of health professionals should act not only as producers of graduates and ideas but also have to ensure that graduates and ideas produced for primary health care have all of those characters (Universitas Padjadjaran, 2015).

As the first generation of medical schools was focused on education and the second generation introduced scientific research as the additional key goal, the third generation of medical schools, as strongly triggered by Flexner Report, escalating the links between education and healthcare services (Synderman, 2016; Ludmerer, 2011). Universitas Padjadjaran, together with healthcare institutions, collaborate to transform healthcare service from a conventional discrete approach to integrated one by using health outcomes as indicators. Operationally, the target was to ensure that medical research breakthroughs lead to direct clinical benefits for patients and the community health outcome.

RSHS and RSMC are the main teaching hospitals for the Faculty of Medicine, Universitas Padjadjaran (FMUP). The three institutions agreed to respond to the strategic challenges to develop better health system by developing a collaborative Business Strategic Plan 2015-2019, regardless of they are under different ministry management (Public university are overseen by the Ministry of Research and Higher Education, while the Ministry of Health oversees most of the central hospitals at the provincial level). The vision of the Strategic Plan is that main teaching hospitals agreed to work alongside FMUP and other health-related faculties to develop medical services in networking hospitals and primary care services in the West Java area. West Java is the province where RSHS plays the role of the top referral.

The core strategy of includes collaboration to develop integrative health service; to guarantee continuum of care and broader service coverage; performing and facilitating research-based practice; using multi- and trans-disciplinary approach in research, education, and service; integrating students in health care system; integrating organization, management, governance as a synergy between university – teaching hospital – networking hospitals and primary care facilities; and using outcome-based performance as success indicators (Fakultas Kedokteran Universitas Padjadjaran, RSUP Dr. Hasan Sadikin Bandung, PMN RS Mata Cicendo, 2015). The objective is to develop an integrative system to provide a research-based healthcare system, providing a promotive-preventive-curative approach for better health outcomes in West Java; and integration of health service and medical education. This concept should and have been supported by networking hospitals involved and respected local government. The network can be seen in Figure 1.

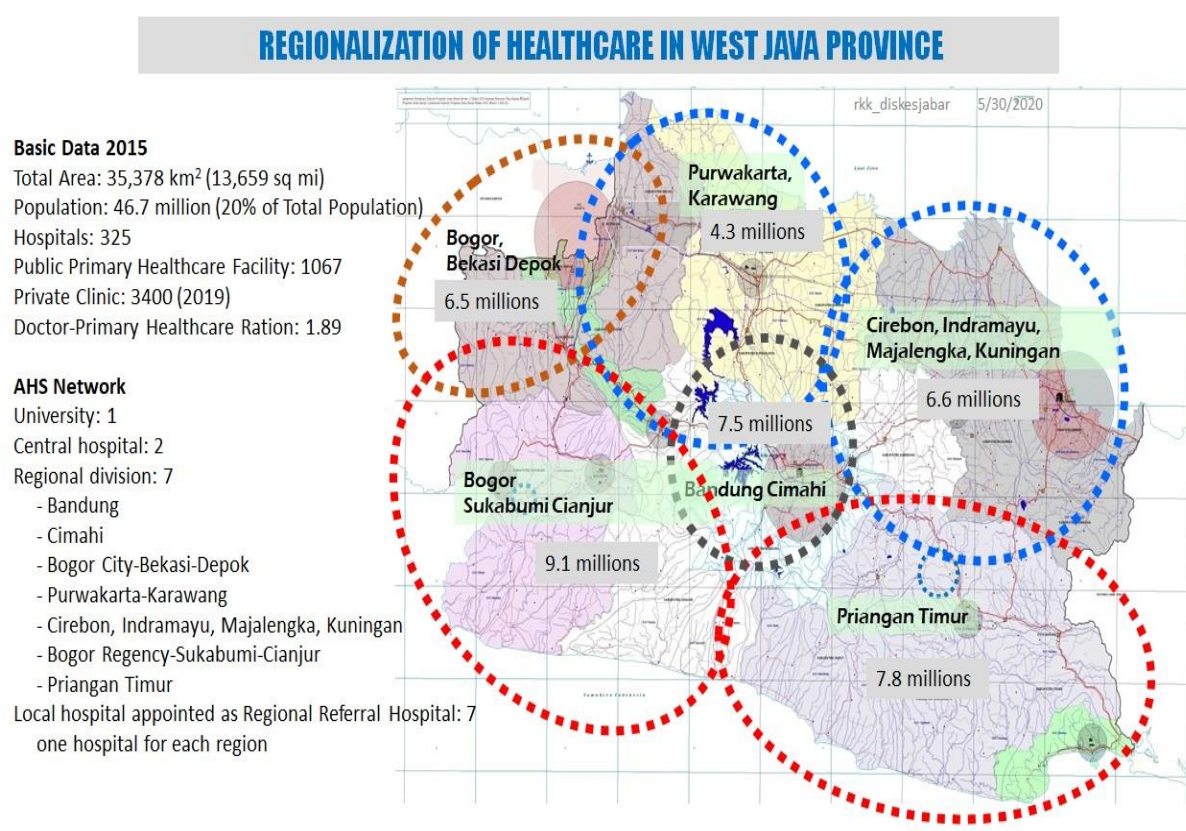


Figure 1. Regionalization of AHS in West Java Province

The province was divided into seven regions (Bandung and Cimahi regions are geographically very close and appeared as overlapped), each with one regional hospital (7 in total), with 2 top referral hospitals.

The seven regional hospitals are to become referrals for smaller local hospitals. (Source of the map picture: Tri Hanggono Achmad - Rector of Universitas Padjadjaran, Business Strategic Planning 2015-2019, presented in FMUP meetings in 2015)

FMUP-RSHS-PMN RSMC, together with the provincial government, agreed to divide the health service referral system as priorly concentrated in one referral hospital. Instead, the referral system is divided into seven regions. Under the supervision from the Ministry of Health, the division is as follows: Bogor-Bekasi-Depok, Purwakarta-Subang-Karawang, Cirebon-Indramayu-Majalengka-Kuningan, Bandung, Cimahi, Sukabumi-Cianjur, and Priangan Timur regions. Each of the regionals has one local hospital to be upgraded as a regional hospital. FMUP-RSHS-PMN RSMC, located in Bandung City as the capital of the West Java Province,

took a role as the center of AHS, and have the responsibility to promote the academic capacity and quality of the seven regional hospitals. The main aim is to prepare them to become a referral hospital for the region. The approach could be a very significant departure from the conventional prior system when RSHS was a referral for all hospitals in the 27 regencies in West Java. The shifting of referral system concept to AHS can be seen in Figure 2.

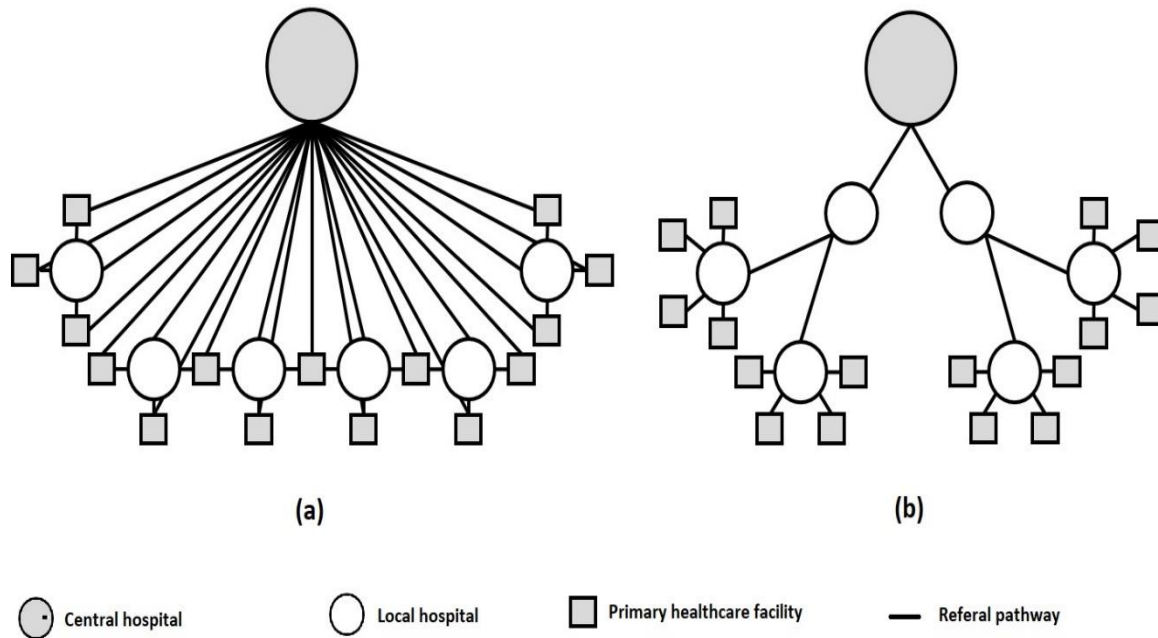


Figure 2. Comparison of the referral pathways

(a) The conventional referral pathway allows primary and secondary healthcare services to make a referral to the central hospital; (b) Referral pathway proposed through AHS, which positioned several leading local hospitals to be augmented as a regional referral hospital.

Memorandum of Understanding was signed by all institutions involved, after effortful meetings and workshops. The content of the MoU comprises strategies for implementation, which are:

- Integrated-alignment of performance indicators of lecturers/professors, in service, research, and education;
- Research should be focused on problems in West Java, both from health care facility-based and community-based health problems;
- Agreement to allow research be conducted in all level of health care facilities;
- Developing an integrated data portal (starting from cancer referral management);
- Educating student supervisors in primary, secondary, and regional health care facilities;
- Collaborative funding for the educational process, particularly for capacity building of supervisors;
- Developing a multi- and transdisciplinary approach in education, research, and medical practice as a culture, including Inter-professional education (IPE).

Internally, Universitas Padjadjaran c.q. FMUP applied specific policies to ensure the strategies are implemented, which are described in Table 1.

Table 1. FMUP Policies in Accord with AHS

Target of Policy	Programs
Vocational education	Midwifery student fieldwork in remote southern West Java
Medical education – Bachelor level	Early exposure starting from 5 th semester in primary facilities
Medical education – MD level	<ul style="list-style-type: none"> - Partly in primary and secondary facilities - Education free of charge: Letter of Agreement to serve for certain years in suburb primary care in West Java
Medical education – Primary Healthcare Physician (GP) level	Work-based place in primary healthcare facilities
Medical education – Specialist	<ul style="list-style-type: none"> - Partly in secondary facilities - Education free of charge: Letter of Agreement to serve for certain years in suburb primary care in West Java
Annual fieldwork for all students	Short-term camp in remote areas, starting from 3 regencies in the southern coast of West Java (until 2016) to 2 regencies in the northern coast (2017-2018) (Sari <i>et al.</i> , 2019)
Professors/Lecturer	<ul style="list-style-type: none"> - Reward for research focusing on West Java problems - “Professors Enter Village” program (Professors are encouraged to perform research in villages involving students from all level (University program)
Centre Studies	<ul style="list-style-type: none"> - West Java Centre (University program) - SDGs Centre (University program) - Health System Centre (FMUP)
Facilities	<ul style="list-style-type: none"> - “Bumi Walagri” village basecamps for students and professors in the southern part of the West Java province as the relatively remote and isolated area - Telemedicine

IV. DISCUSSION

Indonesia is a vast country with a considerable population of 258,4 million (2015), with scattered distribution into various geographical areas, which in many cases significantly distant from each other. Distribution of healthcare professionals is a big challenge. Moreover, Indonesia uses a referral system as the basis for universal coverage health funding since 2014. As a consequence, patients are distributed into different levels of healthcare facilities. Cases for primary care physicians are concentrated in primary care facilities, not in the main teaching hospital as it did until the year 2014. It is almost impossible for medical students to involve in

managing primary care level cases in the main teaching hospital. Distributed medical education is a must. The new referral system and standard of service should be used as the basis for distributing the educational process. This approach could also be used as an opportunity to increase the capacity of primary healthcare professionals since they would involve in education), strengthen the quality of primary health care service, and eventually have a significant effect to doctor redistribution.

Education process, which tends to become more high cost, specialized, centralized, and urban, AHS offers the opportunity for it to be made more focused on low-cost primary healthcare, decentralized, and rural. The construction of a stronger link to academic and research community in universities enables the development of standards of patient care to frontline vis-à-vis enhancing research activities focus on heightening primary healthcare service. It opens the internship opportunity for medical students, increase case management involvement for residents, and research opportunities for fellows. The widen the academic atmosphere that usually occurred in an enclosed campus or main teaching hospital to the networking smaller local hospitals, primary healthcare facilities, working along with local health professionals and authorities. This also gives the opportunity to fill in the empty seats of medical and health professionals in the rural area, although the issue of competence is still to be addressed.

In this AHS development, the distributed medical education's goals are not only to deliver tele-education and telemedicine, but most importantly, its role in providing broader scope and various levels of learning opportunities. Different levels of students need different levels of cases, which can be provided by different levels of healthcare services. Although every faculty of medicine own teaching hospital, it is usually a tertiary one. It needs more for lower levels of healthcare facilities, secondary and primary healthcare facilities for undergraduates as the major part of student body. Moreover, FMUP and its two main teaching hospitals encourage their medical educators to conduct a number of academic interaction and supervision to local doctors and local healthcare managements, both through teleconferences or direct visits. The goal is to exert information exchange and experience sharing between faculties and their peers in the regions. Lesson learned from many situations in Canada and Australia. It has been proven that Distributed Medical Education could result in many positive impacts on health services, particularly in the secondary and primary levels, especially in the rural area (Hassan dan Rogers, 2011; De-Villiers *et al.*, 2017).

Nevertheless, some challenges have to be faced in planning and implementing Academic Health System, which can be list as follow:

- The autonomy of local government as Indonesia is still adjusting from centralized governance during the New Order era (until 1998) to decentralization. The policy of the highly autonomous city-level governments do not always in line with AHS, despite it is a central government policy;
- The need for different collaboration scheme for each autonomous city;
- Different perception on administrative regulations and policy due to different approach between ministries involved;
- Encouraging the culture of professors and clinical supervisors for the occasional visit to the suburb that needs further affirmation;
- The student affirmation program that opens the opportunity for local star-students to become medical students requires decisive monitoring to avoid possible misconduct or graft;
- Limited infrastructure (healthcare facilities, communication technology, bandwidth);
- The basic qualification of local healthcare professionals to be educated as supervisors;
- The problem of transportation and accommodation due to geographical challenge;

- The integrated data portal is still a new paradigm in the referral system;
- Changes in provincial governors, city majors, and their staffs require constant maintenance of communication and policy development.

The core national regulation of central and local government authorities in the financing, employment, staffing, income-generating, taxing, and tariffing demand all parties to be in continual communication in such a large province as West Java. Memorandum of Understanding between parties' present ample opportunity, both to enter or depart from commitment. It requires constant endeavor.

While the previous challenges are still to be addressed, a new approach in medical education has offered another interest, which would become the fourth generation of medical education. It uses valorization of market innovations, development of startups, and bridging the gap with industrial applications by bringing the ideas outside the university (Ostrovsky, 2014; Leinarts, 2014). On the other side, the Covid-19 pandemic situation is potentially draining the energy of the whole AHS management and capitals. Although, if only an AHS has been established strongly, it could become one of the ways out to manage the pandemic more effectively.

V. CONCLUSION

An endeavor to establish AHS has been conducted in West Java province involving a university with health cluster faculties, healthcare providers, and local government by constructing a referral network and agreement on distributing education, human capital, and focusing research on developing better healthcare system. Evaluation should be conducted to search for a fine-tuned AHS model for a vast and challenging geographic and demographic, and a complex governmental organization such as in West Java. It is suggested to develop smaller sub-networks with a more straightforward partnership to potentially enhance the effectiveness of AHS.

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REFERENCES

- Aditya PE, Lelonowati D, Ramdani HK. Delayed Data Collection for BPJS Claim Verification in X Hospital: What is the Root Cause and Solution?. *Jurnal Medicoeticolegal dan Manajemen Rumah Sakit*, Vol. 6, No. 2, 2017, pp. 112-121.
- Culbertson RA, Goode LD, Dickler RM. Organizational models of medical school relationships to the clinical enterprise. *Academic Medicine*, Vol. 71, No. 11, 1996, pp. 1258-1274.
- De-Villiers M, Van-Schalkwyk S, Blitz J, Couper I, Moodley K, Talib Z, Young T. Decentralised Training for Medical Students: A Scoping Review. *Medical Education*, Vol. 17, 2017, pp. 196.
- Fakultas Kedokteran Universitas Padjadjaran, RSUP Dr. Hasan Sadikin Bandung, PMN RS Mata Cicendo. *Strategic Business Planning 2015-2016*. Fakultas Kedokteran Universitas Padjadjaran, RSUP Dr. Hasan Sadikin Bandung, PMN RS Mata Cicendo, Bandung, 2015.

- French CE, Ferlie E, Fulop NJ. The International Spread of Academic Health Science Centres: A Scoping Review and the Case of Policy Transfer to England. *Health Policy*, Vol. 117, No. 3, 2014, pp. 382-391.
- Hassan N, Rogers E. Distributed Medical Education: A Student Centered Review and Best Practice Recommendation. Canadian Federation of Medical Students. 2011.
- Leinarts R. Knowledge Valorization Around Academic Medical Centers [Thesis]. Universiteit Utrecht. 2014.
- Ludmerer KM. Flexner and Medical Education. *Perspectives in Biology and Medicine*, Vol. 54, No. 1, 2011, pp. 8-16.
- Mahendradhata Y, Trisnantoro L, Listyadewi S, Soewondo P, Marthias T, Harimurti P, Prawira J. The Republic of Indonesia Health System Review. *Health System in Transition*, Vol. 7, No. 1, 2017.
- Mas'udin. Identification of Financial Problem in the Era of *Jaminan Kesehatan Nasional*. *Info Artha*, Vol. 1, No. 2, 2017, pp. 111-119 – in Bahasa Indonesia
- Meliala A, Hort K, Trisnantoro L. Addressing the Unequal Geographic Distribution of Specialist Doctors in Indonesia: The Role of the Private Sector and Effectiveness of Current Regulations. *Social Science & Medicine*, Vol. 82, 2013, pp. 30-34.
- Ministry of Health of the Republic of Indonesia. Strategic Planning 2015-2019. Jakarta. 2015 - in Bahasa Indonesia.
- Ministry of Research and Higher Education. Ministry of Research and Higher Education in agreement with Ministry of Health to Enhance the Quality of Healthcare Service, Research, and Education by Establishing a Joint Commission. Press Release. Jakarta, 2016 – in Bahasa Indonesia
- Ostrovsky A, Barnett M. Accelerating Change: Fostering Innovation in Healthcare Delivery at Academic Medical Centers. *Healthcare*, Vol. 2, 2014, pp. 9-13.
- Sari NM, Susannah S, Pratiwi YS, Khairani AF, Atik N, Hilmanto D, Syukriani YF. Integrating Community Services with Learning: An Approach to Soft Skills Development for Medical Students Universitas Padjadjaran. *Journal of Medical Education Development*, Vol. 12, No. 35, 2019, pp. 61-66.
- Snyderman R. A Chancellor Tale: Transforming Academic Medicine. Duke University Press. 2016. e-ISBN 9780822373933.
- Universitas Padjadjaran. Strategic Planning 2015-2019. Bandung: s.n. 2015.
- Wartman SA, Steinberg MJ. The Role of Academic Health Centers in Addressing Social Responsibility. *Medical Teacher*, Vol. 33, No. 8, 2011, pp. 638-642.
- Wartman SA, Zhou Y, Knettel AJ. Health Reform and Academic Health Centers: Commentary on an Evolving Paradigm. *Academic Medicine*, Vol. 90, No. 12, 2015, pp. 1587-1590.
- Wartman, SA. The Academic Health Center in a Disrupted World. *Pharos Alpha Omega Alpha Honor Medical Society*, Vol. 78, No. 2, 2015, pp. 2-9.

- Weiner BJ, Culbertson R, Jones RF, Dickler R. Organizational Models for Medical School-Clinical Enterprise Relationships. *Academic Medicine*, Vol. 76, No. 2, 2001, pp. 113-124.
- World Health Organization. *World Health Statistics 2016: Monitoring Health for the SDGs*. Geneva: World Health Organization. 2016. ISBN 9789241565264.
- Yuliyanti C, Thabrany H. Delayed Claim Payment and the Threat to Hospital Cash Flow Under the National Health Insurance Scheme in Indonesia. *International conference on Applied Science and Health (ICASH)*. Proceedings of International Conference on Applied Science and Health, 3: ICASH-A18, 2018.