



DISTRICT-LEVEL IMPACTS OF HEALTH SYSTEM DECENTRALISATION IN INDONESIA: A SYSTEMATIC REVIEW

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DISTRICT-LEVEL IMPACTS OF HEALTH SYSTEM DECENTRALISATION IN

INDONESIA: A SYSTEMATIC REVIEW

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| 11 | 44 |
| 12 | Abstract |
| 13 | |
| 14 | 45 |
| 15 | The local-level impacts of decentralizing national health systems are significant, yet |
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| 17 | infrequently examined. This review aims to assess whether localized health services |
| 18 | 47 |
| 19 | delivery in Indonesia, which commenced a health system decentralization process in 2001, |
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| 21 | achieved its objectives or could be enhanced. |
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| 24 | A systematic review was undertaken to collate published evidence regarding this topic and |
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| 26 | synthesize key findings holistically using the six building blocks framework of the World |
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| 28 | Health Organization (WHO) to categorize health system performance. Four research |
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| 30 | databases were searched in 2016 for relevant evidence published between 2001 and 2015. |
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| 32 | The inclusion criteria were: relevance to the topic of decentralization impacts at the district |
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| 34 | level, original research, and published in English. Included articles were appraised for |
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| 36 | quality using a standardized tool, with key findings synthesized using the WHO building |
| 37 | 57 |
| 38 | blocks. Twenty-nine articles met the inclusion criteria and categorized under the WHO |
| 39 | 58 |
| 40 | building blocks categories. |
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| 43 | The findings highlight problematic impacts of decentralization related to three building |
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| 45 | blocks: service delivery, health financing and workforce. In the 15 years post- |
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| 47 | decentralization in Indonesia, the service delivery, health workforce, and health financing |
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| 49 | blocks should be prioritized for further research and policy evaluation to improve the |
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| 51 | overall health system performance at the district level. |
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76 Introduction

77 Decentralization policy agendas have become a widespread and far-reaching influence on
78 health systems' performance, internationally¹. There are many examples of the positive
79 impacts it can engender. For example, since Bolivia's implementation of a decentralization
80 regime in the 1990s, responsiveness to local health needs has increased due to improved
81 local investment in the health sector ². Additionally, after implementing decentralization
82 in the mid-1930s and late 1970s, respectively, Argentina and Spain have successfully
83 decreased infant mortality rates through local policies enabling effective, accountable
84 action^{3,4}.

85 Nonetheless, decentralization can also exacerbate problems associated with fragmented
86 health planning, under-provision of health services, and inadequate funding^{5,6}. Under the
87 decentralized health system of the Philippines, some local governments did not implement
88 the national health planning policies connected with reproductive health and family
89 planning, resulting in poor financing and inequity in those areas⁷. Starting
90 decentralization in 1986, Uganda faced barriers in health service provision due to frequent
91 drug shortages and poor financial management at the district level⁸. Furthermore, the
92 Italian health system encountered different levels of financial deficit among its regions for

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3 93 six consecutive years during decentralization, due to variation in financial management
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6 94 and administrative skills⁹.
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9 95 Indonesia implemented a cross-sectoral decentralization policy agenda from 2001. The
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11 96 central government authorities were decentralized to provincial and district government
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14 97 levels (Figure 1). The term district (Kabupaten) is at the same level with the city (Kota).
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17 98 Similar to district, a city is an autonomous region under the provincial level. In 2015, there
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19 99 were 515 district/city government authorities across Indonesia¹⁰. These sub-national
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22 100 government authorities are mandated to construct local policies, establish fiscal regulations
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25 101 and manage their resources, such as personnel, assets and remuneration systems, with the
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27 102 aim of achieving greater efficiency, accountability and improved performance^{11–13}. The
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30 103 Ministry of Health (MoH) has largely conferred its responsibilities to the provincial and
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33 104 district health offices, with the provincial health offices (PHO) mandated to coordinate
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36 105 with district programs in their province. The district health offices (DHO) are authorized
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39 106 to customize their health planning, financing and health care services according to regional
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42 107 needs, with the expectation that this will facilitate improved health system performance at
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45 108 the district level¹⁴.
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48 110 **Figure 1. Levels of Government in Indonesia¹⁰**

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51 111 Following the 1998 monetary crisis, Indonesian gross domestic product (GDP) increased
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54 112 by 0.8% in 1999 and steadily grew by 3% to 6% per annum between 2000 and 2015¹⁵.
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56 113 During the same period, the proportion of the population living below the poverty line
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declined from 18.3% to 11.3%¹⁶. Both the levels of literacy in the population and quality of education were also improved by 1.2%¹⁷. However, despite these improvements in economic, poverty and education indicators post-decentralization, the Indonesian health system's performance has remained problematic¹².

The influence of decentralization has been mediated by Indonesia's health system design, which consists of three tiers (Figure 2). Both public and private sectors contribute significantly to the first and second tiers established in the sub-district and the district levels, respectively. The first-tier health providers consist mostly of community health centers (*Puskesmas*), maternal and child health posts (*Balai Kesehatan Ibu dan Anak*), medical centers (*Balai Pengobatan*), and individual public and private practitioners; namely, midwives, nurses and pharmacists, and private general practitioners¹⁸. Health providers in the second tier are delivered by government through public district hospitals (*RSUD*). Meanwhile, the private sector in the second tier consists of specialist clinics and the specialists themselves. The third tier is solely provided by government through specialist hospitals (*RS Khusus*) and public provincial hospitals (*RSUP*)¹⁸.

Figure 2. Indonesia's Health System¹⁸

Post decentralization, Indonesia implemented various public insurance schemes covering basic health care for its citizens (Figure 3). Starting from 1992, employers had to be enrolled in the *Jaminan Sosial Tenaga Kerja* (JAMSOSTEK) scheme, which was partially paid by their employees. The insurance scheme covered pensions, general health costs, and

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135 specific costs produced by workplace injuries. Since 2005, the healthcare needs of the poor
136 have been covered by *Asuransi Kesehatan Miskin* (ASKESKIN), also recognized as *Jaminan*
137 *Kesehatan Masyarakat* (JAMKESMAS)¹⁹. In 2014, the central government launched
138 *Jaminan Kesehatan Nasional* (JKN) scheme, a mandatory universal health coverage scheme
139 widely known as *Badan Penyelenggara Jaminan Sosial* (BPJS). Under this insurance
140 scheme, ASKESKIN and JAMKESMAS were merged into JKN. JAMSOSTEK was also
141 managed under the JKN scheme, known as *BPJS Kesehatan*²⁰.

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Figure 3. Timeline of key changes to health insurance schemes in Indonesia

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146 Despite the introduction of these macro-level, positive health system interventions,
147 studies of Indonesia’s health system performance at the sub-national level indicate that
148 further improvements remain necessary across diverse domains. A qualitative study in
149 West Java province reported that limited availability of health providers and distance to
150 services have prevented mothers from accessing skilled birth attendants²¹. Health
151 workforce maldistribution problems have been identified in 16 provinces across
152 Indonesia²². As expected, the highest workforce density is found in the Java Region, where
153 the capital and 60% of the total Indonesian population reside²³. However, the outer
154 regions have shortages of health care workers (HCWs)²². Additionally, poor birth
155 registration recording, resulting from poor perinatal service utilization, was observed in
156 Nusa Tenggara Barat province²⁴.

158 The World Health Organization six building blocks framework

159 The World Health Organization (WHO) developed a framework of six building blocks
 160 (Figure 4) to provide a comprehensive categorization of health systems and their
 161 components, to identify areas of priority, and as a tool to locate the gap between health
 162 system objectives and the current performance²⁵. The WHO's six building blocks cover
 163 service delivery, health workforce, health information systems, access to essential medicines,
 164 financing and leadership/governance²⁶.

165 Under the service delivery block, the health system is expected to safe practices by
 166 responsible, qualified professionals. Under the health workforce block, the number of
 167 competent and responsive HCWs should be met. Health information systems provide a
 168 structured platform in disseminating, pooling and analyzing information required by decision
 169 makers. According to the fourth building block, a well-performing health system should ensure
 170 the accessibility of essential medicines and their quality, efficacy and cost effectiveness. Health
 171 financing is designed to provide financial protection for people requiring health services by
 172 pooling adequate funds. Leadership and governance, as the last block, should be emphasized
 173 to strengthen the health system by promoting accountability, ensuring the existence of strategic
 174 policy, coalition building, and the publication of effective regulations²⁵.

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176 Figure 4. The World Health Organization's Health System Building Blocks²⁵

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178 Due to the scale, complexity and diverse outcomes associated with health systems, it is
 179 necessary to utilize the WHO building blocks framework to enable more precise

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examination of Indonesia’s health system performance at the district level. By using the WHO health systems framework, it is expected that any problems involved in health system performance will be identified by either National or Local level. The problems can then be prioritized for further action to strengthen the health system and improve health outcomes, as identified in Figure 4²⁵.

When viewed via the lens of the WHO health systems framework, it is apparent that existing studies examining Indonesia’s health system performance at a sub-national level have focused on one or partial components of the WHO building blocks, with limited holistic investigation of systems-level problems. Consequently, this systematic review aimed to identify the post-decentralization problems in the Indonesian health system at the district level based on the WHO six building blocks, and their points of articulation, to identify priorities for policy formulation, adequate intervention and evaluation. In addition, this review also aims to propose policy recommendations, based on the findings identified, to improve the health system’s performance at the district level.

Methods

This systematic literature review was conducted between June and October 2016 using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)²⁷. The method covers identification, screening, eligibility and inclusion stages.

Identification

At the identification stage, the Medline, Scopus and Emerald databases were searched to find articles published from 2001 to 2015, inclusive. This timeframe was used for all the databases to provide relevant historical evidence about Indonesian health system performance after decentralization.

The keywords used as search terms related to: the WHO building blocks ('workforce', 'financing', 'access', 'governance', 'leadership', 'information', 'essential medicine', 'health service', 'service quality', 'information'); the health system ('decentralization', 'health', 'health system'); performance ('utilization', 'performance', 'challenge', 'obstacle'); health information ('birth registration', 'vital registration', 'health surveillance'); and the study population ('community engagement', 'local government', 'local health', 'district'). Each keyword was combined with the term 'Indonesia' using 'AND'. The keywords were selected based on the terms referred to in the description of the WHO health system building blocks and their respective functions in health system performance²⁵, as well as the Indonesian health system and systematic review expertise and experience of the authors. In addition to the date range, further limits were applied regarding publication type (journal articles) and language of publication in (English).

Screening, Eligibility and Inclusion

Records were initially screened by the first author. Ongoing discussions were held with the other authors (JP and RH) throughout the screening process to refine and validate the approach used. Eligibility screening was conducted across two phases: title and abstract, followed by full text.

Of the 10,794 articles identified, only 29 were deemed eligible for data extraction and quality appraisal (Figure 5). Data extraction included author names, published year, title, objectives and research questions, study design, potential bias/confounding variables, position in the health system hierarchy, findings and conclusions. Included articles were then appraised by the authors for quality using a standardized assessment tool²⁸. Policy recommendations were then collaboratively developed based on the problems identified from the selected articles, and the policy-making experience of the three authors.

Figure 5. Flowchart of Search Method

Findings

Twenty one of the 29 included articles were focused on the Java Region. Twelve articles investigated service delivery, mostly focused on basic health services, such as maternal and child health (MCH) (Table 1).

The quality of the selected studies was varied. Due to the nature of decentralization, conducting the studies using randomized controlled trials was not feasible in most cases, resulting in a relatively low strength of evidence. Cross-sectional studies were conducted in 21 articles, one study performed modeling predictive method and seven articles did not clearly specify the study design²⁹. Although all the selected studies provided research questions relevant to this review, only 21 studies performed quantitative analyses.

During decentralization, the Indonesian health system has encountered challenges across all six building blocks that hinder its performance at the district level (Figure 6). The findings demonstrate that there are some overlaps among the building blocks indicating the interconnections among the blocks. Key issues drawn from the literature, which relate to each of these six areas, are outlined below.

WHO building block: Service delivery

Child and maternal immunization coverage and availability remain pressing issues at the district level in Indonesia (Table 1). Complete child immunization in most districts in Indonesia is below the recommended WHO threshold of 80%. In 2002, complete child immunization coverage in Central Java (Cilacap, Rembang, Jepara, Pemalang, Brebes) and East Java (Trenggalek, Jombang, Ngawi, Sampang, Pamekasan) was below 51%, with the lowest level at 9% in Sampang district, East Java³⁰. By 2007, significant improvement in coverage level was observed in most districts, especially in Cilacap, Ngawi and Trenggalek that had exceeded the 80% threshold coverage level. However, complete child immunization coverage in other districts remained below 51%³⁰, indicating potential geographically-variable impacts of decentralization in Indonesia.

Figure 6. Issues and Outcomes in the WHO Building Blocks at the District level in Indonesia, Post Decentralization.

Similar results were also reported in 2011, covering almost all districts in Indonesia. Only 57 out of 497 districts in Indonesia have met the recommended immunization

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coverage level. One third of the districts have child immunization coverage varying from 60% to 80% of the target population, children aged 12 to 23 months old. Lower child immunization levels of 40%-60% and 20%-40% were found in 146 and 85 districts respectively³¹. Low child immunization coverage (< 20%) was found in 50 districts, notably in Papua and a few districts in Java³¹.

Between 2002 and 2007, tetanus toxoid (TT) immunization varied in the 10 districts in Central and East Java. The 2002 TT immunization coverage in Central Java varied from as low as 53%, in Jepara, to 78% in Cilacap district. In the same year in East Java, TT coverage ranged from 12% (Sampang district) to 74% (Trenggalek district). In 2007, variation at the provincial level narrowed to 19% and 25% in Central and East Java, respectively. By 2007, a TT coverage increase was only found in Jepara, Jombang and most notably in Sampang districts. The proportion had decreased by approximately 50% in Pamekasan and Trenggalek. Meanwhile, the remaining districts experienced varied TT immunization coverage levels, ranging from 8% to 21%³⁰.

The quality of maternal services provided by health professionals in Serang and Pandeglang districts has also been reported as questionable, with births attended by health professionals almost twice as likely to result in maternal death. Additionally, the proportion of maternal deaths in Serang and Pandeglang districts was 34% and 31%, respectively³². HCWs' lack of capabilities, medical equipment unavailability and budget constraints were found to affect service delivery at the district level. Lack of midwifery capabilities were observed from studies in Pandeglang, Serang and Ende districts between 2005 and 2013^{33,34}.

284 Midwives were found to be incapable of attending difficult labour, delivered only partial
285 maternal checks, missed necessary treatments and also conducted unnecessary treatments.
286 Midwives also displayed unpleasant attitudes and behaviours, for instance yelling at
287 expectant mothers and giving them insufficient service^{33,34}. In 2012, lack of geriatric
288 equipment and budget constraints were identified by HCWs working at *Puskesmas* in the
289 Gowa district, who were attempting to deliver health services for the aging population³⁵.

290 The low availability of maternal health services at the district level was mostly affected
291 by limited numbers of midwives. In Serang and Pandeglang districts, eight of 13 emergency
292 obstetric cases were not attended by midwives because there were none available³³. In
293 Ende, Garut, Ciamis and Sukabumi Districts, midwife unavailability and limited antenatal
294 and post-natal care services have driven mothers to seek maternal health services through
295 traditional birth attendants (TBAs)^{21,34}.

296 Problems about the quality of services were also observed at the district level. In
297 Surabaya, antibiotics were dispensed without prescriptions in kiosks, drug stores and even
298 pharmacies^{36,37}. Only a few pharmacists were found to have advised patients to seek a
299 physician's advice³⁷.

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302 WHO building block: Health workforce

303 The health workforce studies concentrated solely on the Java region. Studies conducted
304 between 2003 and 2009 indicated that the district level encountered low workforce density

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and maldistribution and low competencies among HCWs after decentralization^{38–40}. Workforce density at the district level was found to be insufficient by WHO standards at 23 HCWs per 10,000 population to deliver basic health services⁴¹. In this context, HCWs comprise general practitioners, nurses and midwives, who form the 'core' HCWs delivering basic health care to the population⁴¹. Low workforce density was found across 17 districts in Java. Since other districts were served by less than 10 HCWs per 10,000 population, Rembang and Jepara Districts were considered as having 'high' workforce density at 14.3 and 10.7 per 10,000 population, respectively³⁹. In Serang and Pandeglang Districts, only 2.2 midwives were available to deliver MCH services per 10,000 population³⁸.

Between 2006 and 2008, in Ciamis, Garut and Sukabumi Districts, HCWs density has increased, resulting from an increased proportion of HCWs assigned as public servants, so-called *PNS (Pegawai Negeri Sipil)*⁴². When HCWs are public servants, the government is able to relocate them to prioritized areas, particularly rural and remote areas. However, in 2009, when further research was conducted in those districts, village midwives' density was low due to low retention rates. The midwives assigned to the villages moved to other health facilities or to another village, were promoted or pursued higher qualifications⁴⁰.

The findings across the districts were consistent in confirming maldistribution of midwives between urban and rural areas. Of all the midwives' placed in Serang and Pandeglang Districts, half of them were living in the urban areas. As a result, midwife density in urban areas was 4.8 per 10,000 population, higher by 2.5 and 4 times, than in rural Pandeglang and Serang Districts, respectively. In addition, instead of receiving MCH

326 services provided by a midwife, 10% of the population received such services from nurses⁴³.

327 Moreover, a qualitative study in Pandeglang District also found similar problem on midwife

328 unavailability, where midwives were absent in 8 of 13 emergency obstetric cases³³.

329 A negative correlation ($r=-0.46$) between HCWs and population density confirmed

330 similar problem in other districts across Java⁴⁴. Only a few HCWs resided in districts with

331 dense population, probably because the district health systems gave incentives for HCWs

332 to live in rural and remote areas. Conversely, more HCWs were stationed in less populated

333 districts⁴⁴. This maldistribution of HCWs caused low health professional utilization during

334 delivery³⁸. In addition, uneven distribution of HCWs in public and private health facilities

335 was also found. Since 90% of health facilities across the districts were private institutions,

336 Most of the HCWs worked in private health facilities and those working in public health

337 facilities also worked part-time in the private health facilities⁴⁴.

338 Inadequate HCWs' competencies were also confirmed by the existing studies. The

339 majority of midwives in Ciamis (83%), Garut (64%), and Sukabumi (55%) Districts received

340 one year of midwifery education (*Diploma 1/D1*) prior to their assignment. Nevertheless,

341 as the majority of them lived in the assigned areas for more than 10 years, they may have

342 gained sufficient midwifery experience over time⁴⁰. Further information about training or

343 other development programs during their assignments were not disclosed. Clinical

344 incompetency, such as poor knowledge about MCH, poor clinical management resulting in

345 sub-optimal continuity care and mistreatment, was captured in a qualitative study in

346 Pandeglang district³³.

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348 **WHO building block: Health information systems**

349 Few published studies on health information systems at the district level in Indonesia were
350 found in this review. Of the limited research identified, problems regarding malaria
351 surveillance and the completeness of vital registration and tuberculosis reporting were
352 recognized as being problematic at the district/city level. Under-reported malaria cases
353 were detected in Purworejo district due to limited access to diagnostic tools and facilities,
354 budget constraints and poor transportation facilities to conduct cross-microscopic
355 validation of malaria slides from village HCWs to sub-district primary health centers (PHC)
356 or DHO⁴⁵. The study also reported that the validity of malaria diagnoses were potentially
357 undermined because diagnostic facilities were located a considerable distance away. Even
358 though village HCWs have conducted finger pricks for malaria smear analysis, cross
359 validation conducted by PHC/DHO is crucial in confirming the diagnosis⁴⁵, highlighting a
360 key problem[].

361 In Pekalongan and Surakarta Districts, the death registration rate was estimated at 50%
362 and 72%, respectively. However, the death registration obtained from the death
363 registration department, survey results and the Indonesian Mortality Registration System
364 Strengthening Project (IMRSSP) demonstrated high variability in the number of death
365 records⁴⁶. Limited death records and unorganized death registration data indicate that the
366 quality of data management of health information system at the district level is
367 problematic⁴⁶.

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6 369 Indonesia, namely Jakarta, Bandung, Semarang, Surabaya, Medan, Palembang, Banjarmasin
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9 370 and Jayapura, where most of the population of Indonesia lives. More than 80% of
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11 371 tuberculosis cases treated by private GP in those cities were not reported to the National
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13 372 Tuberculosis Prevention (NTP) office. The highest tuberculosis reporting rate was found in
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16 373 Semarang and it was only 17% of the total cases. The lowest reporting rate was detected in
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19 374 Jayapura (3%), Papua province⁴⁷.

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24 376 **WHO building block: Access to essential medicines**

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27 377 Problems in accessing essential medicines were observed in several districts due to over
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30 378 dispensing, high variation of antibiotic prices, pandemics and drug shortages. Antibiotics
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32 379 were over accessed in Surabaya, East Java due to its highly flexible dispensability by both
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35 380 official (pharmacies) and unofficial providers such as kiosks and drug stores that dispense
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37 381 drugs to patients with or without prescriptions³⁶. About 72% of the antibiotic samples were
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40 382 purchased from pharmacies, yet amoxicillin was mostly available from kiosks without a
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43 383 prescription and even some pharmacies dispensed antibiotics without a prescription. The
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45 384 population was also able to access prescribed antibiotics, such as chloramphenicol,
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48 385 ciprofloxacin, co-trimoxazol and tetracycline, from pharmacies without prescriptions³⁶.
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51 386 Antibiotic prices among providers were highly variable, ranging from 2 to 20 times
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53 387 compared to the lowest price. Antibiotics prices in kiosks were up to 4 times higher than
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56 388 those in pharmacies³⁶.

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A modeling exercise carried out on an influenza pandemic in nine districts in Bali Province predicted that amoxicillin, antiviral treatment and co-trimoxazole would be able to supply demand during a low pandemic event. However, antiviral and co-trimoxazole shortages were likely to occur if a high influenza pandemic emerged in the districts²⁹. Therefore, the districts will not be prepared to absorb any upcoming pandemics of this magnitude.

Limited access to antimalarial drugs was also found in Purworejo District in Central Java. The problem was caused by the current policy emphasizing the circulation of antimalarial among the public health facilities, without engaging the private health care providers⁴⁸. Antimalarial drug procurement for the population was mandated to chemist warehouses, the so-called *gudang farmasi* and DHO that distributed the medicines to PHC. However, PHC are not allowed to stock the medicines, with the result that antimalarial drugs shortages were common in the district⁴⁵.

The low availability of other medical products such as blood stock and vaccines are also identified as a hindrance to establishing reasonable quality basic health services. In Pandeglang and Serang districts in West Java, for example, blood stock shortages occurred which caused barriers in accessing maternal health services, especially for emergency obstetric cases during delivery or post-delivery⁴⁵. The low availability of infant vaccines, particularly Bacille Calmette Guerin (BCG) vaccine, also prevented mothers to access postnatal care for their newborn in Garut, Ciamis and Sukabumi districts²¹.

WHO building block: Financing

Budget constraints, ineffective public spending and sub-optimal public insurance coverage were identified as health financing issues at the district level. After decentralization, increased fiscal independence at the district level was recognized in the majority of districts across Indonesia^{49,50}. The increase allowed DHO to manage their spending and prioritize according to their local health needs. However, in Bantul, Mataram, Kutai Kartanegara and Ngada Districts, budget constraints were more common after decentralization than before, due to public health budget reduction⁵¹. A similar finding was identified through a qualitative study in Gowa District which hindered the utilization of health service delivery for the aging population³⁵.

Problems in public spending in the health sector were also found at the district level. Spending allocated for maternal health services targeting the poor in Serang and Pandeglang Districts was mostly utilized by women with high socio-economic status (SES)⁵². Furthermore, only 43% of the 497 districts in Indonesia have fully spent the funds available at the district level. In addition, only 22% of the districts managed to spend 30% to 50% of their local funding³¹.

Sub-optimal population coverage of insurance schemes was also observed at the district level. In Serang and Pandeglang districts, health insurance (*ASKES*) and insurance for the poor (*ASKESKIN*) only covered 57% and 70% of the target population respectively⁵³. Meanwhile, only 50% of respondents in Bantul, Mataram, Ngada and Kutai Kartanegara Districts indicated they were covered by a health card (*kartu sehat*). More importantly,

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431 66.7% of the respondents revealed that after decentralization, the costs of health services
432 varied among public and private providers. They also stated that health care costs were
433 higher and irregular fees were charged in addition to official costs⁵¹.

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435 **WHO building block: Leadership/governance**

436 Prominent leadership and governance issues identified by the WHO, including issues
437 around transparency, accountability, health strategy, guideline implementation and system
438 design, were found in several districts in Java, Lombok, Kalimantan and Bali Regions^{29,45,51}.
439 Lack of transparency and accountability in health budgeting and expenditure were
440 discovered in Bantul, Mataram, Kutai Kartanegara and Ngada Districts⁵¹. The actual level
441 of health expenditure was not available in these districts and data was limited to the health
442 budget only, implying that the district government should be encouraged to improve its
443 budget transparency and accountability to tackle the existing health issues in the
444 population⁵¹.

445 District level disease reporting has not yet been implemented according to the strategy,
446 even for priority diseases such as tuberculosis⁴⁷. Although possessing sufficient work
447 experience, the vast majority of general practitioners (GPs) in Indonesia's major cities were
448 not aware of the International Standards for Tuberculosis Care (ISTC), resulting in low
449 implementation of the ISTC strategy. In turn, that has led to low utilization of tuberculosis
450 diagnostic tests, improper prescribed medication, and a high rate of unreported tuberculosis
451 cases particularly at district level⁴⁷.

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3 452 The implemented strategies for malaria surveillance in Purworejo have led to a high
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6 453 level of unreported malaria incidence, increase barriers to diagnosis validation and
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9 454 antimalarial drugs shortages. Between 2007 and 2011, only 26% of the total cases were
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11 455 reported. In addition, during 2009 and 2010, neither village malaria workers were hired
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14 456 nor was surveillance conducted in the Purworejo district with the result that the incidence
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16 457 of malaria during the period was not reported. Inadequate facilities supporting the malaria
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19 458 diagnostic referral system to confirm malaria slides and policies limiting the distribution of
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22 459 antimalarial drugs have caused delayed treatment for those in need⁴⁵.

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24 460 Following a modeling exercise conducted by Adisasmito et al. in 2015²⁹, problems in
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27 461 system design that were likely to lead to overall resource shortages were identified as a
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30 462 barrier in coping with the predicted high influenza pandemic in 9 districts in Bali. Health
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32 463 resources, such as masks and antivirals, were concentrated in districts located in the south
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35 464 of Bali and around Denpasar because health facilities located in these areas were designated
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37 465 as referral hospitals. However, the current health resource system, human resources
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40 466 allocation and bed capacity in these areas were not adequate to anticipate the influenza
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43 467 pandemic, as confirmed by modeling²⁹.

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469 Discussion

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52 470 This systematic review identified 29 published studies that examined issues related to the
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55 471 six WHO building blocks at the district level of Indonesia's health system after
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58 472 decentralization. The issues identified highlight potential policy recommendations that

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could address continued problems and strengthen health system processes outcomes at the district level. To our knowledge, this is the first systematic review of evidence on post-decentralization at district health-level in Indonesia.

The findings indicate that the service delivery, health workforce and financing blocks should be prioritized for health system strengthening at the district level in Indonesia. Due to the approach of synthesizing published evidence using the WHO building blocks, there was significant overlap between the issues identified within each building block, as reflected in the results section above. However, this is understandable because health systems involves interrelated staff, institutions and resources^{25,54,55}.

High variation in basic child immunization rates among districts in Indonesia may indicate significant inequity in basic child immunization provision at the district level^{56,57}. This problem was also documented in India, where inequity in accessing child immunization services resulted from financial barriers and the limited availability of HCWs⁵⁶. In addition, the low quality of birth assistance by health professionals at the district level may hamper health system outcomes due to increased maternal and infant mortality ratio resulting from inappropriate use of therapies, unmanaged newborn complications and untreated complications during labour^{58,59}. This finding is similar to that found in Ghana, where dissatisfaction on the quality of service delivered by HCWs was uncovered⁶⁰. As confirmed by previous studies^{56,60,61}, problems in service delivery block are interrelated with the health workforce, financing and governance, therefore these blocks should also be prioritized for improvement.

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3 494 This review also found that maldistribution and low HCWs density in the majority of
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6 495 districts in Indonesia may affect other aspects of the health system, for instance the quality
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9 496 and availability of health services delivery and routine surveillance^{62,63}. Maldistribution of
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11 497 HCWs generates disparity in health access and service coverage among districts, resulting
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14 498 in health inequity. Those with high HCWs density may have more health services available
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17 499 for the population and have higher population coverage. Consequently, they may have
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19 500 better health access, and thus, better health outcomes than those living in low HCWs
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22 501 density areas. In contrast, districts with low HCWs density may provide limited health
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25 502 services depending on the available skill mix of the HCWs. In areas of low HCWs density,
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27 503 the proportion of the unserved population may increase, resulting in poorer health
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30 504 outcomes^{64,65}. Similar issues were also experienced by the Chinese local government, where
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33 505 disparities in urban-rural HCWs density led to inequity in infant mortality rate^{66,67}.
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35 506 Additionally, low HCWs density has influenced the population to access health providers
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38 507 at a higher tier, thus, generating other health workforce problems connected with uneven
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40 508 workload among tiers⁶³. Moreover, low HCWs density at the district level prevents routine
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43 509 disease surveillance in pandemic areas, leading to health system inadequacies, for example
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45 510 insufficient data to support pandemic preparedness.

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48 511 Underreported malaria and tuberculosis cases in Indonesia, as identified through this
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51 512 review, are still significant problems at the district level, with limited effort to strengthen
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54 513 its health information system at municipal or district level^{68,69}. Limited cases registration
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56 514 may cause inappropriate health planning in local government, namely HCWs deployment,

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515 medicines procurement and preventive strategies that hamper health service readiness. As
516 a result, malaria and tuberculosis outbreaks may occur^{70,71}. In addition, underreporting may
517 decrease health provider responsiveness in coping with outbreaks⁷². Subsequently, health
518 status in affected districts may worsen.

519 This review suggests that access to essential medicines, particularly antimalarial drugs,
520 and blood transfusions at the district level remains a problem in the Indonesia’s health
521 system due to frequent shortages, as also found in Tanzania and Malawi^{73,74}. Inability to
522 access antimalarial drugs may result in life threatening conditions and even death due to
523 lack of treatment. Blood shortages are also crucial in obstetric emergency cases⁷⁴. Poor
524 access to blood stock increases maternal and infant mortality rates because blood
525 transfusion, mostly performed in emergency obstetric cases before and after birth delivery,
526 cannot be delivered by GPs, nurses and midwives⁷⁵.

527 This systematic review identified budget constraints, low public insurance coverage,
528 ineffective public spending and reduction of the public goods and services budget, as health
529 financing problems at the district level in Indonesia. The constraint may force district
530 governments to reorient their priorities and health expenditures. Additionally, these newly
531 oriented priorities may have to compete with other emergencies arising from other sectors.
532 Consequently, the quality and availability of health service delivery may be affected and,
533 further, decrease the population’s health status. This consequence is similar to Gambian
534 districts’ health service provision which was limited as a result of budget constraint at local
535 level⁷⁶.

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3 536 Along with service delivery and health workforce, priority in strengthening health
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6 537 financing should also be conducted to improve health system performance. Budget
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9 538 constraints also prevent district government from employing adequate numbers of HCWs
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11 539 to meet the WHO minimum standard of health service⁷⁷. Therefore, low workforce density
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14 540 at the district level in Indonesia is commonly found, leading to low population coverage,
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17 541 service availability and poor quality of health services. In addition, the low proportion of
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19 542 population covered by public insurance schemes (*ASKES*, *ASKESKIN*), contemporarily
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22 543 known as Indonesia's universal health scheme, may lead to inequity in accessing health
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25 544 services. Unlike rich people, the poor may be prevented from accessing health services for
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27 545 cost reasons, resulting in a greater disparity of health outcomes between rich and poor.

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29 546 Moreover, ineffective public spending may lead to poor public service provision in the
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32 547 health sector because the spending failed to address people of low SES and their health
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35 548 needs. It appears that Indonesia's district government has shifted its priority from public to
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38 549 private goods. This reprioritizing resembles of those conducted by Uganda government
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40 550 which reducing the public goods budget following decentralization⁷⁸. This new priority
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43 551 may increase inequity in accessing health services. Instead of providing the services free of
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46 552 charge, the population must purchase them. Accompanied with ineffective public
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49 553 spending, the reduction in the public goods budget may lead to inadequate financial
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51 554 protection for the poor. Compared to richer people, the poor will spend a larger proportion
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54 555 of their household income to access health services and, consequently, they may sink
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56 556 further below the poverty line if they choose to access health services^{79,80}.

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The findings demonstrate that governance in disease management, transparency and lack of accountability in health budgeting and expenditure at the district level are problematic in the leadership/governance aspect of the Indonesian health system. Problems in health system governance affects all building blocks in the health system, resulting in challenging pandemic preparedness, medicine shortages and low levels of health service provision⁸¹. This problem is closely related to the risk of corruption that results in budget depletion without either significant health outcomes or worthwhile investments in the health sector being achieved.

Policy recommendations

While key health system problems persisting in the post-decentralization were identified in this review, there are several options available to policymakers to begin addressing them (Table 2). The policymaking experience and focus of the research team makes this issue a vital implication of the review. Due to its pronounced impacts on other building blocks within the health system, improvement of performance should spring from the leadership/governance building block, as this is needed to initiate policy evaluation and development in the prioritized areas of health service delivery, health workforce and financing⁸².

The policy recommendations (Table 2) have also been implemented by other low middle-income countries experiencing decentralization at earlier years, for example India. Strategic leadership and vision (governance) have been suggested in this review as a key

starting point from inside the health system to initiate public private partnership, HCWs quality improvement and HCWs association involvement as policy recommendations to strengthen the health systems⁸³.

Strength and limitations

Whilst this review identified problems in the Indonesian health system at the district level after decentralization, based on the WHO's six building blocks, the uneven distribution of studies across those blocks may under-report various problems occurring in the health system during the decentralization period. This may apply particularly to the health information system block, which contained few relevant studies. In addition, further studies on the performance of the Indonesian health system at the district level in regions other than Java should be conducted to provide a more comprehensive national analysis relating to decentralization era. Another limitation is that this review only includes studies published in English. This criterion may have excluded useful articles published in Bahasa Indonesia (the Indonesian language).

Conclusion

After decentralization, the performance of the Indonesian health system at the district level still encounters key challenges across the six WHO building blocks. Yet, it should also be noted that the findings from selected studies have shown a positive impact of decentralization for the local health system particularly for improving the quality of local

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health care services and focusing more efforts in tackling the local health issues. Therefore, the leadership/governance element in Indonesian health system planning should be strengthened as the main pillar to support other building blocks, particularly policy evaluation, by prioritizing health service delivery, health workforce numbers and financing to improve health system performance at the district level. Health information systems and access to essential medicines should be improved by involving the private sector and empowering community engagement. These approaches, when implemented effectively, can be used to address the existing district-level health system challenges facing Indonesia.

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Table Legend

- 1. Health system problems identified from the selected articles based on the WHO six building blocks framework
- 2. Policy recommendations

Figure Legend

- 1. Levels of government in Indonesia
- 2. Indonesia's health system
- 3. Timeline of Key changes to health insurance schemes in Indonesia
- 4. The World Health Organization's Health System building Blocks
- 5. Flowchart of Search Method
- 6. Issues and outcomes in the WHO building blocks at the district level in Indonesia, post decentralization

Appendices

Table 1. Health System Problems Identified from the Selected Articles based on the WHO Six Building Blocks Framework

| No | Themes | Sub themes | References | District/City | Data collection | Description | Findings |
|----|------------------|---|---|--|------------------|---|--|
| 1 | Service delivery | Poor maternal health service readiness | D' Ambruoso, et al., 2009 Pardosi, Parr, & Muhidin, 2015 | Pandeglang (Banten) Ende (East Nusa Tenggara) | 2006 2013 | Maternal health providers lacked competencies to deliver maternal health services | Midwives performed unnecessary treatments and conversely missed necessary treatments Mothers also experienced unpleasant attitude from the midwives |
| | | Lack of resources to deliver health services for aging population | Kadar, et al., 2014 | Gowa (South Sulawesi) | 2012 | Geriatric health providers lacked basic resources, such as equipment and fund | The staff cannot perform home visit because of unavailable elderly kits and transportation lack of fund to improve community |

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| | | | | | | | health services for the elderly |
| | | High variation in child immunization coverage among districts | P. Heywood & Choi, 2010 | Cilacap (Central Java), Rembang (Central Java), Jepara (Central Java), Pemalang (East Java), Brebes (East Java), Trenggalek (East Java), Jombang (East Java), Ngawi (East Java), Sampang (East Java), Pamekasan (East Java) | 2002-2003, 2007 | The proportion of immunized children varied among districts | In 2007, more than 80% of children in Cilacap, Ngawi and Trenggalek had complete immunization, meanwhile, in Jember, Jombang, Sampang, Pamekasan, Jepara, Rembang, Pemalang, Brebes districts complete immunization only covered less than 51% of the children. |
| | | | Maharani & Tampubolon, 2014 | 497 districts all over Indonesia | 2011 | | In 2011, the coverage level of immunized children in most districts in Papua was below 20%. |

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| | | | | | | | Contrastingly, the coverage level of immunized children in Java was above 80%. |
| | | Low maternal service availability | D'Ambruoso et al., 2009 Pardosi et al., 2015 Titaley et al., 2010 | Pandeglang (Banten) Ende (East Nusa Tenggara) Garut (West Java), Sukabumi (West Java), Ciamis (West Java) | 2006 2013 2009 | Maternal health service was often unavailable due to high unavailability of midwives in the area | Most of emergency obstetric case were not attended by midwives Ante and post natalpost-natal care were unavailable |
| | | Low quality of health services | Hadi et al., 2010 Puspitasari, Faturrohmah, & Hermansyah, 2011 | Surabaya (East Java) Surabaya (East Java) | 2006 2010 | Health services were delivered with poor quality by HCWs | Antibiotic were dispensed by pharmacists to patients without prescription and relevant information |

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|--|--|-----------------|----------------------------------|---|------|---|--|
| | | | | (Central Java), Cilacap (Central Java), Jepara (Central Java), Pemalang (Central Java), Rembang (Central Java), Jombang (East Java), Ngawi (East Java), Pamekasan (East Java), Sampang (East Java), Trenggalek (East Java) | | | |
| | | Maldistribution | P. F. Heywood & Harahap, 2009 | Ciamis (West Java), Cirebon (West Java), Garut (West Java), Subang (West Java), Sukabumi (West | 2006 | Uneven HCWs distribution among districts and between rural and urban areas | The number of midwives in Serang and Pandeglang urban areas was up to 4 times higher than that in rural areas |

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| | | | | Java), Brebes (Central Java), Cilacap (Central Java), Jepara (Central Java), Pemalang (Central Java), Rembang (Central Java), Jombang (East Java), Ngawi (East Java), Pamekasan (East Java), Sampang (East Java), Trenggalek (East Java) Serang (Banten), Pandeglang (Banten) | 2005 | | More HCWs were assigned in less populated areas, in contrast, less HCWs were stationed in more populated ones |
| | | | Makowiecka, Achadi, Izati, & Ronsmans, 2008 | | | | |

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| | | Low retention among village midwives | P. Heywood, Harahap, Ratminah, & Elmiati, 2010 | Ciamis (West Java), Garut (West Java), Sukabumi (West Java) | 2009 | The midwives only stay for a short-term period | The assigned midwives moved to other areas |
| | | Low preference among HCWs to work in public sector | P. F. Heywood & Harahap, 2009a | Ciamis (West Java), Cirebon (West Java), Garut (West Java), Subang (West Java), Sukabumi (West Java), Brebes (Central Java), Cilacap (Central Java), Jepara (Central Java), Pemalang (Central Java), Rembang (Central Java), Jombang (East Java), Ngawi | 2006 | HCWs chose to work in private health sectors | Most of HCWs worked in private health facilities |

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| | | | | (East Java), Pamekasan (East Java), Sampang (East Java), Trenggalek (East Java) | | | |
| | | Low midwifery competencies | D'Ambruoso et al., 2009 | Pandeglang (Banten) | 2006 | Low level of education, lack of knowledge in MCH, poor clinical management | More than 50% of midwives in Ciamis, Garut and Sukabumi districts only received a 1-year formal midwifery education Maternal mistreatments in Pandegelang district |
| | | | P. Heywood, Harahap, Ratminah, & Elmiati, 2010 | Ciamis (West Java), Garut (West Java), Sukabumi (West Java) | 2009 | | |
| | | Low midwives availability | D'Ambruoso et al., 2009 | Pandeglang (Banten) | 2006 | Low midwives to patient ratio | Most of the obstetric cases were not attended by midwives |
| 3 | Health information system | Suboptimal diagnostic validation | Murhandarwati et al., 2015 | Purwokerto (Central Java) | 2007-2011 | Malaria cross validation was prevented | Only finger pricks results were used to |

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| | | in malaria surveillance | | | | | confirm malaria diagnosis |
| | | Budget constraints to implement malaria surveillance | Murhandarwati et al., 2015 | Purwokerto (Central Java) | 2007-2011 | Insufficient funding to conduct the surveillance | Unavailable budget to send samples to PHC or DHO |
| | | Unreliable death registration completeness | Rao et al., 2010 | Pekalongan (Central Java), Surakarta (Central Java) | 2007 | The death registration data was incomplete | The completeness rate of death registration was estimated at 50% and 72% in Pekalongan and Surakarta respectively |
| | | Poor data management | Rao et al., 2010 | Pekalongan (Central Java), Surakarta (Central Java) | 2007 | Data was not well-organized and underreported | In Pekalongan and Surakarta districts, death registration data was scattered in several organizations |
| | | | Mahendradhata et al., 2015 | Jayapura (Papua) | 2011 | | Only 3% of TB cases were reported in Jayapura |
| 4 | Access to essential medicines | High variation of antibiotics price | Hadi et al., 2010 | Surabaya (East Java) | 2006 | | Antibiotics sold in kiosks were up to 20 times more expensive |

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| | | | | | | | than those available in the pharmacies |
| | | Over-accessed antibiotics | Hadi et al., 2010 | Surabaya (East Java) | 2006 | Antibiotics were often accessed from the providers (official and unofficial) | Patients accessed antibiotics, with or without prescriptions, from pharmacies, kiosks and drug stores |
| | | Medicine shortages | Adisasmito et al., 2015 | Badung (Bali), Bangli (Bali), Buleleng (Bali), Denpasar (Bali), Gianyar (Bali), Jembrana (Bali), Karangasem (Bali), Klungkung (Bali), Tabanan (Bali) | Not available* | Antibiotics and antivirals were potentially out of stock during high pandemic event | Antiviral and co- trimoxazol shortages were likely to occur during high influenza pandemic in 9 district in Bali |
| | | Ineffective policy of anti-malaria procurement and storage | Murhandarwati et al., 2015 | Purwokerto (Central Java) | 2007-2011 | The policy did not mitigate antimalarial shortages | Pharmacies were not allowed to procure and sell antimalarial |

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| | | | | | | | PHC were not allowed to stock antimalarial |
| | | Low availability of essential medical supply | D'Ambruoso et al., 2009 | Pandeglang (Banten) | 2006 | Low availability of blood and infant vaccine | Blood shortages during obstetric emergency cases in Serang and Pandeglang districts |
| | | | Titaley, Hunter, Heywood, & Dibley, 2010 | Ciamis (West Java), Garut (West Java), Sukabumi (West Java) | 2009 | | Low availability of infant vaccines in Ciamis, Garut and Sukabumi districts |
| 5 | Financing | Budget constraints | Kadar, McKenna, & Francis, 2014 | Gowa (South Sulawesi) | 2012 | Insufficient budget to deliver health service for the population | Health budget reduction in Bantul, Mataram, Ngada and Kutai Kertanegara districts |
| | | | Kristiansen & Santoso, 2006 | Ngada (East Nusa Tenggara), Bantul (Central Java), Mataram (West Nusa Tenggara), Kutai | 2003-2004 | | Unavailable budget to serve the aging population in Gowa district |

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| | | | | Kertanegara (East Borneo) | | | |
| | | Ineffective public spending | Ensor, Nadjib, Quayyum, & Megraini, 2008 | Serang (Banten), Pandeglang (Banten) | 2005-2006 | Off-target health fund, low cost recovery rate in public hospitals suboptimal health spending | In Serang and Pandeglang districts, maternal health fund was mostly utilized by rich women 67% of 497 districts in Indonesia only spend a maximum of 50% of their health budget |
| | | Suboptimal population coverage by insurance schemes | Kristiansen & Santoso, 2006 | Ngada (East Nusa Tenggara), Bantul (Central Java), Mataram (West Nusa Tenggara), Kutai Kertanegara (East Borneo) | 2003-2004 | The majority of the targeted population was not covered by insurance scheme | Thirty to fifty percent of the poor population were not covered by health insurance provided by the government |

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| | | | Quayyum, Nadjib, Ensor, & Sucahya, 2010 | Serang (Banten), Pandeglang (Banten) | 2005-2006 | | |
| | | Priority shifting from public to private goods | Abdullah & Stoelwinder, 2007 | Aceh Utara (Aceh), Banda Aceh (Aceh) | 1999-2004 | More priority was given to sellable goods | After decentralization, the proportion of public goods budget dropped by around 40% |
| | | High variation of health service fees | Kristiansen & Santoso, 2006 | Ngada (East Nusa Tenggara), Bantul (Central Java), Mataram (West Nusa Tenggara), Kutai Kertanegara (East Borneo) | 2003-2004 | There was no fixed price of health services among health providers | 2/3 of the respondents in stated that health care costs were varied among providers |
| 6 | Leadership/governance | Low transparency and accountability | Kristiansen & Santoso, 2006 | Ngada (East Nusa Tenggara), | 2003-2004 | The budgeting and expenditure figure was | The real health expenditure report |

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| | | in budgeting and expenditure | | Bantul (Central Java), Mataram (West Nusa Tenggara), Kutai Kertanegara (East Borneo) | | not available | was not available |
| | | Ineffective strategy in malaria surveillance | Murhandarwati et al., 2015 | Purwokerto (Central Java) | 2007-2011 | The surveillance strategy did not indicate the actual number of cases | Only one fifth of the total malaria cases were reported, no surveillance workers were hired, poor malaria diagnostic facilities, poor malaria diagnostic referral system |
| | | Ineffective policy to maintain the availability of antimalarial drugs | Murhandarwati et al., 2015 | Purwokerto (Central Java) | 2007-2011 | The current policies limited antimalarial distribution to only government bodies without involving private sectors | Antimalarial shortages were common because PHC were not allowed to stock the medicines and local pharmacies were not |

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| | | | | | | | allowed to sell the medicines |
| | | Poor implementation of tuberculosis case management | Mahendradhata, et al., 2015 | Jayapura (Papua) | 2011 | Unreported TB cases, low awareness of ISTC | The majority of GP practicing in 8 major cities across Indonesia were not aware about TB case management. |
| | | Unprepared system design to cope with high influenza pandemic events | Adisasmito et al., 2015 | Badung (Bali), Bangli (Bali), Buleleng (Bali), Denpasar (Bali), Gianyar (Bali), Jembrana (Bali), Karangasem (Bali), Klungkung (Bali), Tabanan (Bali) | Not available [†] | The health provider system was not well designed to tackle pandemic events | The designated referral hospitals in 9 districts in Bali was predicted to lack of masks, antivirals and bed capacity during high pandemic influenza event |

[†]The study was conducted by modeling method

Table 2. Policy Recommendations

| Key issue | Policy recommendation | Rationale |
|---|--|--|
| High variation in child immunization coverage among districts Poor maternal health service readiness Low service availability in maternal health and aging population Low quality of health services | Including the basic health service utilization as PHO key performance indicators to reinforce the provincial government to facilitate and evaluate health service delivery at district/city level. | The indicators are used by MoH's as national key performance indicator on health service delivery ⁸⁷ . |
| Low workforce density Maldistribution Low retention among village midwives Low preference among HCW to work in public sector Low midwifery competencies | Developing policy to specifically address GP, nurses and midwives to be assigned in rural and remote areas in a compulsorily basis to meet WHO workforce density standards to improve the quality and population coverage level. Broaden the <i>Nusantara Sehat</i> program geographical scope to other islands and regions and require the participants to deliver up-to-date health and administration-related knowledge and skills for HCWs residing in those areas to improve the quality of health services delivered. | Voluntarily assignments proposed by GP, nurses and midwives to rural and remote areas with minimum HCWs did not meet WHO standard in workforce density ⁸⁸ . <i>Nusantara Sehat</i> encourages HCWs to apply for a two-years contract in rural and remote areas ⁸⁹ . The contract duration allows adequate time for the participants to update the local HCWs knowledge and skills |
| Budget constraints Ineffective public spending Suboptimal population coverage by insurance schemes High variation of health service fees | Systems governing a well-coordinated budget collection and redistribution from the Central to the District government should be established ⁷⁴ . The government should design streamlined systems in health | The streamlined systems may simplify local HCWs administration work when submitting health budgets to higher levels of government and may reduce the bottleneck in health funds flowing to the district level. |

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| | <p>planning and budgeting by cutting redundant procedures and accelerating the verification process to reduce the size and frequency of budget constraints at the district level.</p> <p>Reinforcing the implementation of UHC as a compulsory scheme starting</p> | <p>The WHO has advocated Universal Health Coverage (UHC) to improve financial protection through centralized fund pooling which improves access to health services, coverage and health outcomes⁹⁰. By utilizing the UHC, people accessing health services will not suffer from financial catastrophic that is commonly experienced in the OOP scheme. The centralized fund pooling implemented within the UHC scheme facilitates financial protection among its members through risk sharing among the health and unhealthy members. In addition, by employing diagnosis related group scheme, UHC reduces the disparities in health services access among different socio economics status. Thus, UHC not only improves the access to health system, but also promotes health equity.</p> |
| <p>Budget constraints to implement malaria surveillance</p> <p>High unreported TB cases</p> | <p>Community participation in malaria and tuberculosis</p> | <p>Community involvement may overcome HCWs shortages</p> |

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| | surveillance should be introduced in the policies to improve health information systems at the district level in Indonesia ⁹¹ . | and act to reveal underreported cases due to low HCWs awareness. The existing community organizations, such as The Family Welfare (<i>Pembinaan Kesejahteraan Keluarga</i> /PKK) and Integrated Health System Post (<i>Pos Pelayanan Terpadu</i> /Posyandu) which are available at village level, should be utilized to mobilize its community members to actively report malaria and tuberculosis symptoms to the respective village personnel, so that necessary diagnostic tests can be conducted and followed with appropriate reporting procedures. As a result, it is expected that the number of unreported malaria and tuberculosis incidence can be minimized, thus strengthening health system responsiveness in addressing the problem. |
| High variation of antibiotics price Expected medicine shortages in high influenza pandemic Anti-malaria shortages Low availability of blood and infant vaccines | In improving access to essential medicines, policies supporting logistics management to ensure the availability of medicines and accessibility to them should be emphasized. Public-private partnership in medicine distribution and sales to improve access to medicines at | Pharmacies and drug stores are medicine providers in the private sector with flexible trading hours and are closer to residential areas which should improve health system responsiveness. |

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| | <p>the district level is proposed⁹².</p> <p>Capacity building in medical logistic and supply chain management for the respective civil servants should be conducted in government's health facilities to prevent drug shortages through effective and efficient medical logistic system.</p> <p>Local government should monitor the implementation of the highest retail price policy (so-called <i>harga eceran tertinggi</i>/HET in Bahasa Indonesia) to control the price variation between providers and the types of medicines sold in both providers.</p> | <p>Improved capacity in supply chain management minimizes the likelihood of medical commodities shortages. As a results, health care can be accessed.</p> <p>Price control improve equity in medicine access. Therefore, health equity in accessing health care will be achieved.</p> |
| Low transparency and accountability in budgeting and expenditure | <p>Government commitment in enhancing transparency and accountability of health expenditure should be reflected in its policy and systems design. Potential lapse of opportunities in abusing the health expenditure should be mitigated or, preferably, eliminated to reduce opportunities for corruption.</p> <p>Strengthen the leadership/governance element in central government strengthened, so</p> | <p>Transparency is vital since open systems enable other stakeholders to monitor budgeting and expenditure.</p> |

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| | that it can deliver the stewardship needed for quality health system governance at provincial and the district levels. | |
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For Peer Review



PRISMA 2009 Checklist

| Section/topic | # | Checklist item | Reported on page # |
|------------------------------------|----|---|--------------------|
| TITLE | | | |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | 1 |
| ABSTRACT | | | |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | 3 |
| INTRODUCTION | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. | 4-7 |
| Objectives | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). | 8 |
| METHODS | | | |
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. | N.A. |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. | 8-10 |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. | 8, 9 |
| Search | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. | 8, 9 |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). | 9, 10 |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. | N.A. |
| Data items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. | N.A. |
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. | N.A. |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means). | N.A. |
| Synthesis of results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis. | 9 |



PRISMA 2009 Checklist

Page 1 of 2

| Section/topic | # | Checklist item | Reported on page # |
|-------------------------------|----|--|--------------------|
| Risk of bias across studies | 15 | Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). | N. A. |
| Additional analyses | 16 | Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. | N. A. |
| RESULTS | | | |
| Study selection | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. | 9, 10, Fig 5 |
| Study characteristics | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. | Table 1 |
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). | N.A. |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. | N.A. |
| Synthesis of results | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. | N.A. |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). | N.A. |
| Additional analysis | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). | N.A. |
| DISCUSSION | | | |
| Summary of evidence | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). | 10-19 |
| Limitations | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). | 24 |
| Conclusions | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. | 19-23 |
| FUNDING | | | |
| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | N.A. |

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: www.prisma-statement.org.

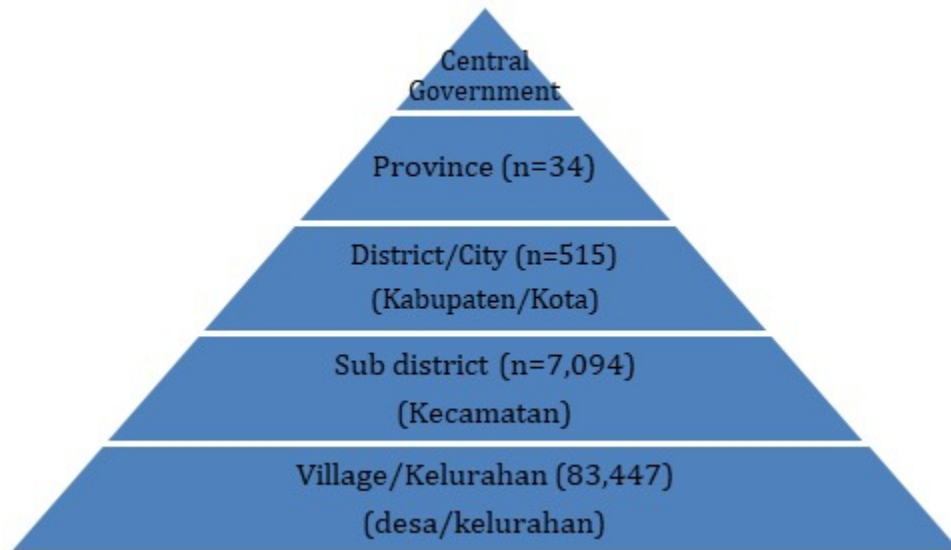


Figure 1. Levels of Government in Indonesia

41x23mm (300 x 300 DPI)

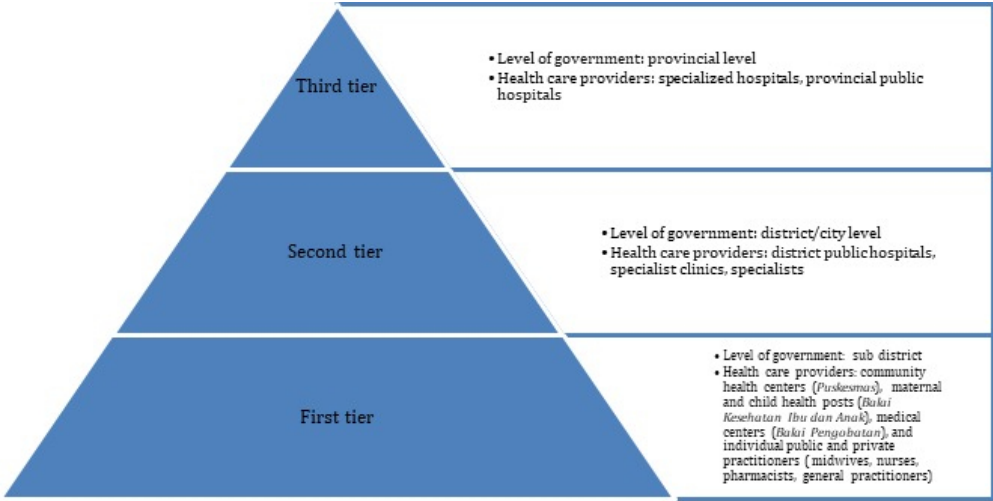


Figure 2. Indonesia's Health System

56x28mm (300 x 300 DPI)

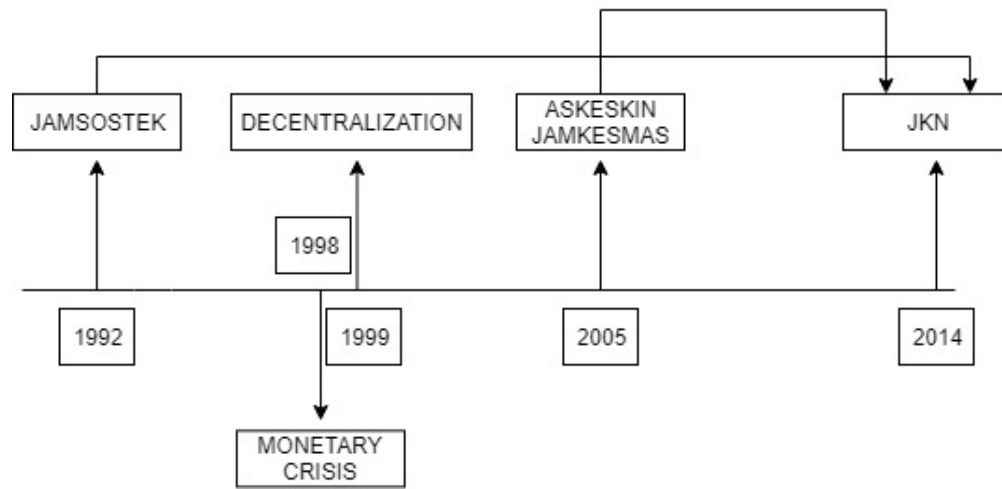


Figure 3. Timeline of key changes to health insurance schemes in Indonesia

45x22mm (300 x 300 DPI)

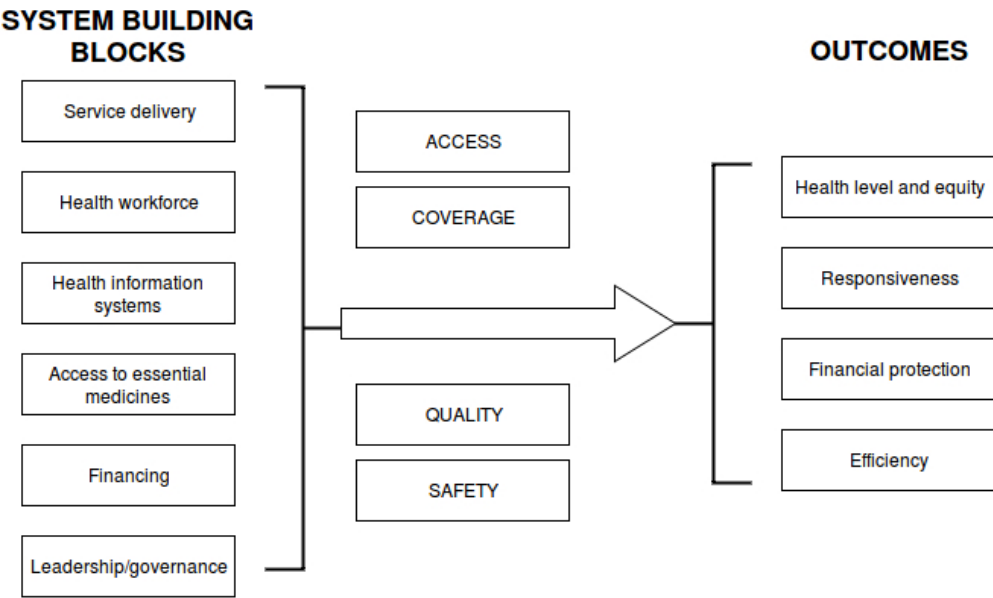


Figure 4. The World Health Organization’s Health System Building Blocks
55x34mm (300 x 300 DPI)

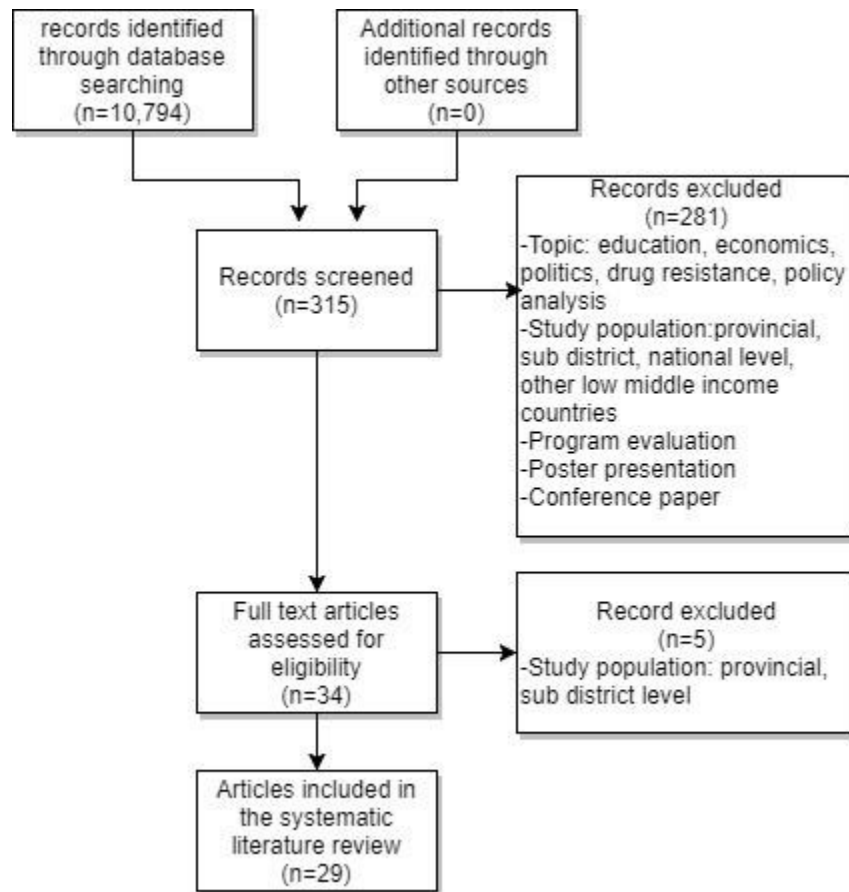


Figure 5. Flowchart of Search Method

35x37mm (300 x 300 DPI)

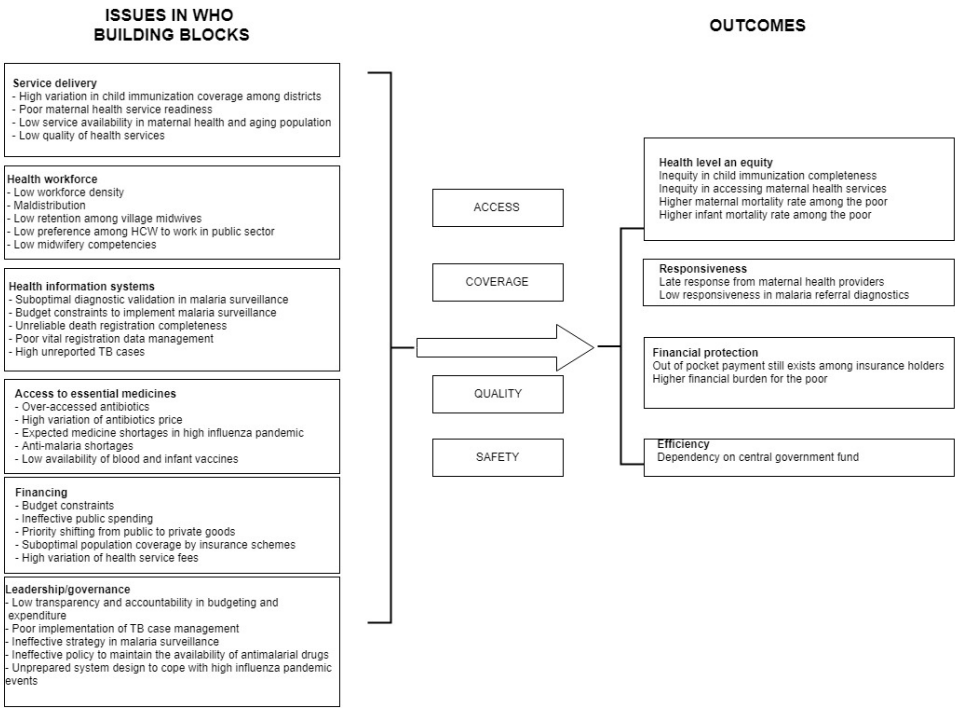


Figure 6. Issues and Outcomes in the WHO Building Blocks at the District level in Indonesia, Post Decentralization

90x63mm (300 x 300 DPI)