

The Integration of the PESIAR Program with the Lean Six Sigma Approach to Support the Achievement of Universal Health Coverage in Indonesia: A Qualitative Case Study

ABSTRACT

Aims: Indonesia's Universal Health Coverage (UHC) agenda continues to face enrolment and implementation challenges despite the expansion of the JKN program. This study explores stakeholder perspectives on the PESIAR Program, a community-based initiative program that designed to support UHC through outreach and enrolment.

Methods: A qualitative case study was conducted in West Sumatra, Indonesia, between March and July 2026. Semi-structured interviews were conducted with 30 purposively selected participants, including branch management, membership managers, membership officers, and community outreach agents. The study also collected additional data through non-participant observation and document review. The study analyzed data using thematic analysis informed by the Systems Approach (Input-Process-Output-Outcome). The Lean Six Sigma Define-Measure-Analyze-Improve-Control (DMAIC) framework guided the analysis based on the participants' reflections.

Results: This study shows input readiness relies on local government commitment and resources. DMAIC analysis redefines low enrollment as a systemic issue involving data accuracy, coordination, community understanding, and affordability. Participants attributed growth mainly to reactivating inactive members and promoting sub-district collaboration. Member activeness, not total enrollment, is a bigger challenge for long-term sustainability.

Conclusion: The findings highlight the importance of collaboration, data quality, and local implementation capacity in achieving sustainable program outcomes. Lean Six Sigma, particularly the DMAIC framework, provided a useful lens for understanding implementation processes and identifying opportunities for continuous improvement.

Keywords: DMAIC, Lean Six Sigma, National Health Insurance, PESIAR Program, qualitative case study, Systems Approach, Universal Health Coverage

Introduction

The World Health Organization has promoted Universal Health Coverage (UHC) as a means of enabling people to obtain health services without financial hardship [1]. The global commitment to UHC was reinforced through the United Nations General Assembly Political Declaration on Universal Health Coverage in 2019, which emphasized health-system strengthening, reduced inequality, and financial protection for vulnerable groups as the key elements of the UHC agenda [2]. The UHC framework includes three related dimensions, which are population coverage, service coverage, and financial protection. All of the dimensions must be achieved at the same time to secure equitable access to healthcare [3].

In Indonesia, UHC is achieved through the National Health Insurance (*Jaminan Kesehatan Nasional* [JKN]), managed by the Social Health Insurance Administration Body (*Badan Penyelenggara Jaminan Sosial Kesehatan* [BPJS Kesehatan]), a government agency set up to provide social health insurance for Indonesian people [4]. Since it was introduced in 2014, the number of people participating in JKN has increased considerably, with membership increasing significantly from 216.5 million in 2019 to 220.2 million in 2022 [5]. Over this same period, there has been a significant rise in the program's revenues, reflecting the ongoing growth in enrolment and in the number of contributions collected (BPJS Kesehatan, 2023).

While the JKN has made significant strides in expanding access to health services, many implementation challenges in achieving UHC sustainability, including inactive membership, inaccurate beneficiary data, uneven implementation from one region to another, limited public awareness, and ongoing concerns about program sustainability and financial protection [5, 6]. These challenges highlight that labor-market constraints, opportunity costs, administrative barriers, and local service capacity are essential to translating coverage into equitable access [7].

To address these challenges, BPJS Kesehatan introduced the Mapping, Outreach, Advocacy, and Registration program, known as PESIAR (*Petakan, Sisir, Advokasi, Registrasi*), in July 2024. PESIAR is a community-based outreach initiative designed to identify uninsured populations, facilitate enrollment, and strengthen community engagement [8]. The program reflects international recommendations emphasizing community engagement, primary healthcare approaches, and local implementation capacity as important strategies for improving equitable access to healthcare and advancing UHC goals [1].

Nevertheless, the early stages of PESIAR implementation have revealed operational difficulties, including inaccurate targeting, poor data quality, inconsistent field performance, and limited program monitoring [9]. Administrative data from the BPJS Kesehatan Bukittinggi Branch (PESIAR Program report,

2025; see Table 3) illustrate these problems. In 2024, insurance coverage reached 98.24%, but only 64.34% of registered members stayed active, well below the national target of 80%; the same indicator stood at 75.63% in 2025, still below the target (Table 3). By May 2025, the program had recorded only 167 enrollments against a target of 6,970 (2.40%). The gap between reported coverage and actual member engagement suggests the core problem lies in how PESIAR is carried out, not in how it was designed. Moreover, the main problem concerns the implementation of the program rather than the policy's design.

In this regard, Lean Six Sigma (LSS), particularly its Define-Measure-Analyze-Improve-Control (DMAIC) framework, can provide a structured approach to identifying process inefficiencies and underlying causes of performance gaps [10]. Recently, the LSS framework was well established in hospital settings, but its use in community-based health insurance outreach remains limited [11]. Moreover, there is limited knowledge of how LSS could support strategies to expand coverage and sustain participation in UHC initiatives [12, 13].

This gap is important to address because sustainable UHC depends not only on expanding coverage but also on maintaining active participation, strengthening data quality, improving cross-sectoral collaboration, and enhancing local implementation capacity [14]. Examining PESIAR through a Lean Six Sigma perspective may provide insights into how community-based outreach programs can address operational inefficiencies and contribute to UHC sustainability [9]. Moreover, combining Lean Six Sigma with a Systems Approach enables the examination of relationships among program inputs, implementation processes, outputs, and outcomes within a single analytical framework [15].

Therefore, this study explores stakeholder perspectives on implementing the PESIAR Program and its perceived contribution to supporting UHC in Indonesia. In particular, the study aims to: 1) examine the readiness of program inputs, including regulation, human resources, infrastructure, and information technology; 2) analyze the program implementation through the DMAIC phases of Lean Six Sigma; 3) assess program outputs in terms of JKN membership growth and contribution revenue; and 4) examine program outcomes relevant to UHC sustainability. By integrating the Systems Approach with Lean Six Sigma in a community-based health insurance setting, this study contributes new evidence on applying continuous improvement principles to support sustainable Universal Health Coverage in Indonesia.

Methods

Study Design

This study employed a qualitative descriptive case study design to explore the implementation of the PESIAR program and its perceived contribution to supporting UHC in Indonesia. A case study approach was considered because PESIAR is a complex community-based outreach initiative operating within a dynamic organizational and policy environment. Case study methodology enables an in-depth examination of contemporary programs while accounting for the contextual factors that shape their implementation and outcomes [16]. In this study, participants were invited to share and reflect on their experiences implementing the PESIAR program, guided by the Systems Approach (Input-Process-Output-Outcome) [17], to understand PESIAR's implementation, performance, and contribution to UHC sustainability. Moreover, the study used the Lean Six Sigma Define-Measure-Analyze-Improve-Control (DMAIC) framework to structure the program's process.

Setting

The study was conducted within the operational area of the BPJS Kesehatan Bukittinggi Branch in West Sumatra Province, Indonesia. The branch oversees the implementation of the PESIAR program across several districts and municipalities with varying levels of UHC achievement, member activeness, and socioeconomic conditions. This setting was selected purposively because it had actively implemented PESIAR and exhibited substantial variation in program performance. This context provided an information-rich setting for examining factors influencing PESIAR implementation and its contribution to UHC. The case was bounded spatially by the operational area of the BPJS Kesehatan Bukittinggi Branch, which covers one municipality and four regencies, and temporally by the data-collection period (March–July 2026).

Participant sampling and recruitment

Participants were selected using purposive sampling to ensure inclusion of individuals directly involved in the implementation and management of the PESIAR program. Sampling aimed to capture perspectives from across the full PESIAR program implementation chain, including strategic (Branch Head), managerial (Heads of Membership Division), operational (Membership Officers), and field-level actors (PESIAR Agents), reflecting a criterion-based purposive sampling strategy designed to capture perspectives across organizational levels rather than statistical representativeness [18]. Eligible

participants held a formal appointment to a role in the PESIAR program and had been actively involved in its implementation for at least six months.

Thirty participants were approached through formal institutional channels following approval from BPJS Kesehatan, and interviews were arranged at times convenient to participants. All invited individuals agreed to participate, with no refusals or withdrawals. Including participants from different organizational levels enabled triangulation of perspectives and facilitated a more comprehensive understanding of how program policies, operational processes, and field activities interacted during implementation. Collecting data from multiple stakeholder groups is recognized as an important strategy for enhancing the credibility and depth of qualitative findings by capturing diverse experiences and validating interpretations across different sources of evidence [19].

Data Collection

Data were collected between March and July 2026 using three complementary methods: in-depth semi-structured interviews, non-participant observation, and document review. This combination was intended to support methodological and data-source triangulation across interviews, observation, and documentation. The data set comprised 30 in-depth interviews, 12 non-participant observation sessions (approximately 20 hours in total), and 18 administrative documents. Semi-structured interviews served as the primary data source. An interview guide consisting of 32 open-ended questions was developed by the research team and organized around the study objectives and analytical framework. The interview questions explored input readiness, implementation processes, program outputs, and perceived outcomes related to UHC sustainability. Moreover, the interview guide was pilot-tested prior to data collection and refined for clarity and relevance.

Individual interviews with BPJS Kesehatan personnel were held in private meeting rooms at branch offices, while interviews with PESIAR Agents were conducted in private locations at subdistrict offices or participants' workplaces to ensure confidentiality and privacy safeguards for qualitative fieldwork. A semi-structured format with open-ended questions was used to encourage participants to share their thoughts, feelings, and personal experiences. Each interview was held for 45 to 60 minutes in Indonesian in a well-ventilated room, with adequate lighting and a comfortable seating arrangement. To ensure accuracy, the interview process was recorded using two audio tape recorders. Following the interviews, the first researcher transcribed each recording verbatim and captured every detail for subsequent data analysis.

Furthermore, non-participant observations were conducted during selected PESIAR outreach activities to obtain contextual information on program implementation, stakeholder interactions, and operational challenges encountered during field activities. Detailed field notes were recorded during and immediately after each observation.

Document review was also conducted, including the technical guidelines, memoranda of understanding (MoU), cooperation agreements, UHC action plans, dashboard reports, membership reports, and monitoring documents. These documents were used to verify and contextualize findings obtained through interviews and observations. Data collection continued until thematic saturation was reached, where no new themes, codes, insights, or patterns emerged from interviews [20] or the analysis process was examined by co-investigators [21].

Data Analysis

Data were analyzed using thematic analysis following the approach described by Braun and Clarke (2006), which involved six iterative stages, including familiarisation with the data, generation of initial codes, construction of categories, development of themes, review of themes, and definition and naming of themes [22].

A hybrid coding technique was applied, combining data-driven and concept-driven categories for a comprehensive view. The coding process analyzed interview transcripts, observation notes, and documentary evidence concurrently using the Systems Approach and DMAIC framework. Deductively, the four Systems-Approach domains (Input, Process, Output, Outcome) were established a priori as the four themes [17]; within the Process theme, the five DMAIC phases (Define, Measure, Analyze, Improve, Control) were used a priori as sub-categories. Inductively, categories and codes within each theme and DMAIC phase were derived from participants' accounts and supporting documents [23]. The framework was treated as revisable rather than fixed: where inductive coding produced content that did not fit the a priori structure, the structure was reconsidered. For example, an affordability/capacity-to-pay theme emerged inductively from field agents' accounts; because it lies outside the process-improvement scope of DMAIC, it was retained as a boundary condition of the framework and is examined as such in the Discussion, rather than being forced into a DMAIC phase. Because coding was undertaken by more than one researcher, using independent coding of an initial subset, consensus discussion, and a shared codebook, the analysis

follows a codebook-oriented variant of thematic analysis rather than fully thematic analysis. This hybrid approach was chosen to combine the consistency and transparency needed in multi-researcher analysis with the interpretive openness of thematic analysis; reflexivity was retained through the reflexive journal described below

Two researchers independently coded the first four transcripts and compared coding line-by-line to establish a shared coding framework (codebook). Differences were resolved through discussion and consensus. The agreed coding framework was subsequently applied to the remaining data. Given the manageable volume of data, coding was conducted manually using Microsoft Word and Microsoft Excel rather than specialist qualitative software. Themes and interpretations were refined through iterative discussion among the authors until consensus was reached. Representative quotations were translated from Bahasa Indonesia into English by the first author and reviewed for conceptual accuracy.

Researcher reflexivity

The first author conducted all interviews and observations. He is a male PhD candidate in Management with over 20 years of experience in Indonesia's National Health Insurance system. At the time of the study, he served as Head of the Membership Division and had formal training in qualitative research methods and interviewing techniques. As an insider researcher with professional experience in the organization under study, the first author recognized both the advantages and potential risks associated with insider status. While organizational familiarity facilitated access and contextual understanding, it also created the possibility of assumptions and bias. To mitigate these risks, prior to each interview, participants were informed that the study was being conducted for academic purposes rather than organizational evaluation or audit. The researcher maintained a reflexive journal throughout the study, used open-ended and non-leading interview questions, actively sought divergent viewpoints, and discussed emerging interpretations with the supervisory team. The second and third authors, who were not involved in data collection, independently reviewed coding decisions and contributed to analytical discussions.

Trustworthiness

Member checking was not conducted, given the limited fieldwork period and participants' operational workloads. Credibility was instead established through methodological triangulation (interviews, observation, document review), source triangulation across four organizational levels, peer debriefing with the supervisory team, an audit trail of coding decisions, and the reflexive journal maintained throughout.

Results

Participant Characteristics

A total of thirty participants were purposively selected to represent the complete implementation chain of the PESIAR Program at the BPJS Kesehatan Bukittinggi Branch Office. The participant composition was structured to capture the full vertical continuum of program governance, spanning the strategic, managerial, operational, and field levels, aligning the participant base with the Systems Approach (Input - Process - Output - Outcome) that framed the study. Among the thirty participants in this study, 17 were male, and 13 were female, as presented in Table 1. At the strategic level, a male Branch Head (coded KC) served as the officer with overall responsibility for implementing the PESIAR program. He acted as the main decision-maker, guiding strategic direction, distributing resources, and aligning branch operations with national UHC objectives.

At the managerial level, four Heads of the Membership Division (coded KBK), comprising three males and one female, were included. Their role centered on ensuring the program's operational implementation, translating strategic directives into actionable work plans, overseeing day-to-day coordination, and monitoring the progress of enrollment activities across their respective units.

At the operational level, eight Membership Staff (coded SK), consisting of three males and five females, served as the personnel directly executing the program. Their responsibilities encompassed the administrative and technical processes underpinning participant registration, data verification, and the routine tasks required to sustain program delivery. At the field level, seventeen PESIAR Agents (coded AP), comprising ten males and seven females, served as the program's frontline actors. Acting simultaneously as agents and field officers, they carried out community-level outreach, direct engagement with prospective and existing participants, and on-the-ground recruitment activities that constitute the operational frontier of the PESIAR initiative.

This multi-level configuration of participants was intended to triangulate perspectives across the program hierarchy, enabling the study to capture both the intended policy logic articulated at the strategic and managerial tiers and the enacted practices observed at the operational and field tiers.

Table 1. Participants characteristics

Code	Role	n	Male	Female	Role in the PESIAR program
KC	Branch Head	1	1	0	Officer with overall accountability for program implementation
KBK	Head of Membership Division	4	3	1	Ensuring operational realization of the program
SK	Membership Staff	8	3	5	Executing the program
AP	PESIAR Agent	17	10	7	Serving as agents and field officers delivering the program

The integration of the PESIAR program and UHC achievements

This study was based on thirty in-depth interviews, complemented by non-participant observation and document review. Thematic analysis identified four themes and sixteen categories, with the coding structure illustrated in Figure 1 and detailed in Table 2. Quotations are marked with role codes and participant numbers (e.g., KC1, AP3) and were translated from Bahasa Indonesia by the first author. Table 4, at the end of this section, links each category to its data sources and an illustrative quotation.

Figure 1. Coding tree

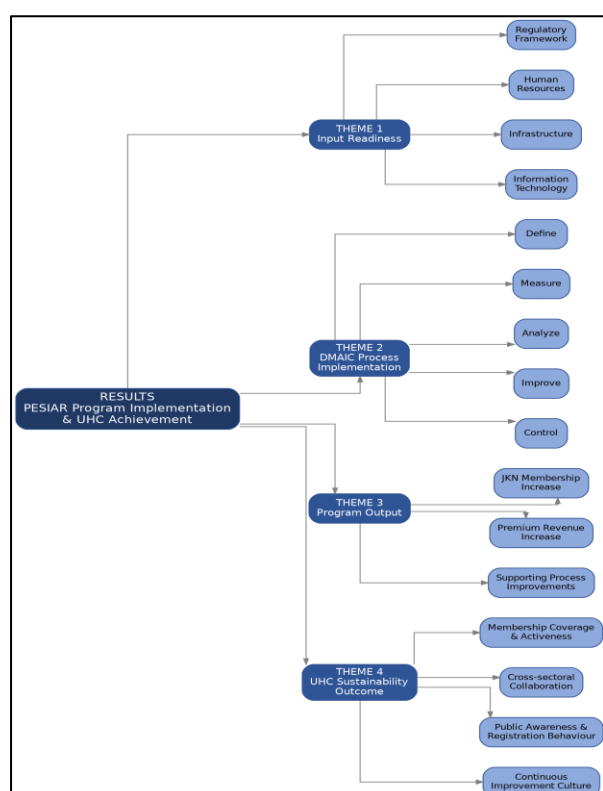


Table 2. Themes from data collection methods

Theme	Category	Codes derived from the data
Theme 1 Input readiness	Regulation	National policy gives clear direction for JKN expansion and UHC
		Local government commitment, budget and local regulation determine field success

Theme	Category	Codes derived from the data
		MoU, PKS and UHC work plans available but technical regulation needs strengthening
		Cross-sectoral coordination and sub-district involvement facilitated by policy support
	<i>Human resources</i>	Number of personnel not proportional to target and coverage area
		Basic competence adequate; gaps in data analysis, IT and advocacy skills
		Training and technical guidance provided but not yet continuous
		High workload across mapping, outreach, advocacy and registration
	<i>Infrastructure</i>	Smartphones and tablets support data capture and reporting
		Limited operational vehicles constrain field mobility
		Uneven internet connectivity in remote sub-district
		Delays in real-time reporting
	<i>Information technology</i>	PESIR dashboard supports target identification and monitoring
		System data not always consistent with field conditions; requires re-verification
		System use depends on user competence and connectivity
		Improved communication between BPJS, agents and local government
Theme DMAIC process	<i>Define</i>	Membership problems identified from coverage gap and inactive-member data
		Priority sub-district determined from coverage data and field conditions
		Targets aligned with UHC acceleration
	<i>Measure</i>	Achievement of mapping, outreach, advocacy and registration activities measured
		Data sources: BPJS system, dashboard, agent reports, sub-district data
		Gap between target and realization used to prioritize
	<i>Analyze</i>	Root-cause analysis via team discussion, coordination meetings, dashboard monitoring
		System data compared against field reality (moved, deceased, not found)
		Root causes: inactive members, unregistered residents, arrears, inaccurate data
		Low community understanding of JKN and limited ability to pay premiums
		Field validation and sub-district confirmation strengthen the analysis
	<i>Improve</i>	Strengthened collaboration with local government and sub-district

Theme	Category	Codes derived from the data
		Agent training and mentoring intensified
		Data validation and update mechanisms improved
		Persuasive community education and advocacy strategies
	<i>Control</i>	Routine monitoring and periodic evaluation meetings
		Dashboard monitoring and regular performance reporting
		Field supervision involving BPJS staff and sub-district officials
		SOP and quality-control guidance applied
Theme Program output	<i>New membership</i>	Gradual growth in new JKN members over the last 2–3 years
		Mapping and outreach identify previously unprotected residents
		Sub-district collaboration eases identification and communication
		Consistent follow-up of targets determines conversion to registration
	<i>Premium revenue</i>	Registration through agents raises premium collection
		Reactivation of inactive members contributes to revenue
		Premium arrears remain a constraint
	<i>Agent productivity and enablers</i>	Agent productivity varies by area and mentoring intensity
		Sub-district and local government roles decisive in achievement
		Data quality and registration efficiency improved
Theme 4 UHC sustainability outcome	<i>Coverage</i>	Contribution to accelerating coverage toward the ≥98% UHC target
		Previously unregistered residents identified and enrolled
	<i>Member activeness</i>	Improved activeness through education, mentoring and reactivation
		Activeness, not enrolment alone, is the harder outcome to sustain
	<i>Cross-sectoral collaboration</i>	Synergy of BPJS – local government – sub-district – agents – community
		Sustained local government commitment and budget allocation required
	<i>Sustainability requirements</i>	Periodic data validation and stronger information systems
		Routine monitoring and evaluation
		Continuous education, advocacy and agent capacity building

Input readiness

Across all levels, participants described national policy as offering clear direction for JKN expansion, while local government commitment was what ultimately determined whether that direction produced results in the field. Supporting local regulation, budget allocation, and the engagement of sub-district administrations came up repeatedly as the variable that made the difference.

“National policy already gives a clear direction for accelerating UHC, but local government support is the key to mobilizing the sub-district, the regional apparatus and the community so the program can run effectively.” (KC1)

"The national basis is strong enough because PESIAR is aligned with JKN expansion policy. Success in the field, however, depends heavily on the local government's commitment to providing supporting regulation, target data, and cross-sectoral coordination." (KBK1)

Formal instruments MoUs, cooperation agreements, and UHC work plans were in place, though participants felt technical regulation and operational commitment still needed strengthening, so that PESIAR could function as a shared undertaking rather than a BPJS Kesehatan initiative alone.

"Support at national and local level is adequate, but it needs to be strengthened into a more operational commitment, so that PESIAR is not only a BPJS Kesehatan program but a joint movement." (KBK4)

Human resources stood out as the most frequently cited constraint. Staffing levels did not match the size of the target population or the geographic spread of the working area, which left mapping, outreach, advocacy, and registration concentrated among a relatively small number of personnel. Participants generally considered basic competence adequate, but pointed to gaps in data analysis, information technology, and advocacy skills, noting that while training and technical guidance were provided, they had not yet become a continuous process. Infrastructure proved only partially enabling. Smartphones and tablets worked well for data capture and reporting but limited operational vehicles and inconsistent internet connectivity in remote sub-districts constrained field mobility and slowed real-time reporting.

The PESIAR dashboard helped with target identification and membership monitoring, and improved communication among BPJS Kesehatan, agents, and local government. At the same time, participants were clear that system data did not always match conditions on the ground and needed re-verification before advocacy or registration could move forward, an issue that resurfaces as a root cause in Theme 2.

DMAIC process implementation

Define. Membership problems surfaced through the gap between coverage targets and actual results, along with data on inactive and unregistered residents. Priority sub-districts were identified by combining coverage data with field conditions reported by agents and sub-district officials.

"We identify the membership problems by looking at JKN coverage, how active the participants are, and which areas have not yet reached the UHC target, and then we analyze that data to decide which villages become the priority for intervention." (KC1)

Measure. Progress on mapping, outreach, advocacy, and registration was tracked using the BPJS Kesehatan system, the PESIAR dashboard, agent activity reports, and sub-district data, with the gap between targets and realizations guiding prioritization.

"We measure achievement by recapping the data in the application and the dashboard; every activity is recorded, from the target data and visit results to participant status and follow-up registration." (SK1)

Analyze. Root causes were traced through team discussion, coordination meetings, dashboard monitoring, data analysis, field validation, and confirmation with sub-district officials. Comparing system records against field reality often revealed outdated information, participants who had moved, died, or could not be located at their recorded address. Beyond data quality, participants pointed to limited community understanding of JKN and limited ability to pay premiums as substantive underlying causes.

"Root causes are often found through direct visits, brief conversations, confirmation with residents, and house-to-house outreach - that is how we learn about the low ability to pay premiums and the reluctance to register or reactivate." (AP3)

Improve. Improvement efforts centered on stronger collaboration with local government and sub-district, more intensive agent training and mentoring, better data validation and updating mechanisms, and more persuasive approaches to community education and advocacy.

"The improvement that has the biggest effect is strengthening the coordination between BPJS Kesehatan, local government, and the villages, so that PESIAR in the field becomes more directed and faster." (KBK3)

Control. Oversight relied on routine monitoring, periodic evaluation meetings, dashboard monitoring, regular performance reporting, field supervision involving both BPJS staff and sub-district officials, and standard operating procedures for quality control.

"Monitoring and evaluation is carried out in stages and on a regular basis achievement data is monitored daily, discussed with the team weekly, and evaluated monthly to make sure PESIAR stays on target." (KBK1)

Program output

New membership grew steadily over the past two to three years. Mapping and outreach Participants described new membership as growing gradually over the past two to three years, although the administrative indicators available for this study (Table 3) cover only 2024 and 2025 and are not sufficient to establish a trend. Mapping and outreach activities identified residents who had not previously been

covered by JKN, and collaboration with sub-district administrations made these targets easier to reach and follow up with. Participants were clear that identification alone was not enough - converting a mapped target into an actual member depended on consistent follow-up through to registration.

Participants perceived that premium revenue was supported both by new registrations facilitated by agents and, notably, by the reactivation of previously inactive members, a contribution they felt was often overlooked; the administrative record shows PESIAR-related contribution revenue of IDR 25,620,000 in May 2025 against a target of IDR 318,389,000 (8.05%; Table 3). Premium arrears, however, remained a persistent constraint, reflecting the affordability concerns raised earlier in the Analyze phase.

Agent productivity varied depending on area and the intensity of mentoring received, and participants consistently pointed to the role of sub-district officials and local government as decisive in achieving results. Secondary improvements were also reported in data quality and registration efficiency.

Table 3. Quantitative programme indicators (BPJS Kesehatan Bukittinggi Branch)

Indicator	Period	Denominator	Target	Actual value	Definition	Source
UHC coverage	2024	Population in branch area	≥98%	98.24%	Share of population registered in any JKN scheme	PESIAR Program report, BPJS Kesehatan Bukittinggi Branch, 2025
Active-membership rate	2024	Registered members	80%	64.34%	Members with active (non-dormant) status	PESIAR Program report, BPJS Kesehatan Bukittinggi Branch, 2025
Active-membership rate	2025	Registered members	80%	75.63%	Members with active (non-dormant) status	PESIAR Program report, BPJS Kesehatan Bukittinggi Branch, 2025
PESIAR enrolments	May 2025	Mapped targets	6,970	167 (2.39%)	New enrolments recorded via PESIAR	PESIAR Program report, BPJS Kesehatan Bukittinggi Branch, 2025
PESIAR contribution revenue	May 2025	Revenue target	IDR 318,389,000	IDR 25,620,000 (8.05%)	Premium/contribution revenue collected via PESIAR	PESIAR Program report, BPJS Kesehatan Bukittinggi Branch, 2025

UHC sustainability outcome

Participants judged PESIAR to contribute to accelerating coverage toward the ≥98% UHC target by identifying and enrolling previously unregistered residents. They were consistent, however, in stating that coverage alone was not the outcome that mattered: member activity, sustained through education, mentoring, and reactivation of dormant members, was the harder achievement to maintain. Sustainability was described as resting on synergy among BPJS Kesehatan, the local government, sub-district administrations, agents, and the community, as well as on the continuity of the local government's commitment and budget allocation.

"The outcome can be sustained through stronger local government commitment, policy support and continuous budget allocation." (KC1)

Participants also pointed to periodic data validation, stronger information systems, routine monitoring and evaluation, and continuous education, advocacy, and capacity building for agents as necessary to sustain these outcomes over the long term. However, accounts were not entirely uniform. While most participants framed the problem in terms of process and data, a minority, particularly field agents, who deal directly with households, saw low enrolment and premium arrears primarily as an economic issue: the capacity of informal-sector households to afford monthly premiums. This

interpretation falls outside the Lean Six Sigma lens, since no process improvement can raise household income, and it is taken up again in the Discussion.

A second divergence concerned data quality. Managerial participants tended to describe system data as broadly adequate, requiring only routine updates, whereas field agents pointed to a more fundamental mismatch between system records and field reality: unclear addresses, members who had moved or died, and targets that could not be found. This gap between managerial and field perspectives is itself a finding and suggests that dashboard-based monitoring alone may understate the extent of verification work at the field level.

Discussion

This case study found that input readiness was necessary but not sufficient. Regulation and information technology were in place, yet the gaps that kept recurring staffing disproportionate to target, uneven connectivity, limited vehicles, and system data that didn't match field reality were exactly the root causes that resurfaced later in the Analyze phase. This tight coupling between inputs and process problems supports the Lean Six Sigma premise that process quality is bounded by input quality [12, 24], and aligns with health-workforce evidence pointing to workforce capacity as the binding constraint on service expansion more broadly [25, 26].

The DMAIC framework demonstrated that it proved workable even in a community outreach setting quite different from the hospital contexts where Lean Six Sigma is usually studied [27, 28]. Its value showed most clearly in the Analyze phase, where root-cause reasoning reframed low enrolment from what looked like an agent-performance problem to a systemic one spanning data accuracy, cross-sectoral coordination, community understanding, and affordability. This extends the existing evidence base by showing that Lean Six Sigma can transfer meaningfully to social health-insurance administration, not just clinical settings [12, 29].

Moreover, the growth in program outputs was driven largely by the reactivation of dormant members rather than by new enrollments alone. This finding highlights the importance of active membership as an indicator of effective UHC participation [14]. However, the substantial gap between coverage and active participation observed in the Bukittinggi Branch, where coverage reached 98.24% while activeness remained at only 75.63%, which identifies inactive membership as a persistent challenge for JKN sustainability and effective population coverage [5].

Furthermore, field agents' concerns about affordability highlight the limitations of the Lean Six Sigma approach. Process improvements can enhance data accuracy, coordination, and registration efficiency, but they cannot increase a household's capacity to pay [30]. When arrears result from income constraints rather than process issues, subsidy mechanisms like regionally sponsored membership segments are more appropriate than DMAIC [31]. Recognizing this boundary clarifies the types of problems Lean Six Sigma can address, without diminishing its value [14]. These insights underpin a conceptual framework in which properly prepared inputs facilitate a DMAIC-driven process, yielding measurable results aligned with sustainable UHC objectives, with the Control phase providing feedback to refine inputs and complete the cycle [29].

Conclusions

Based on stakeholder perspectives, PESIAR was perceived as a useful operational mechanism for supporting UHC acceleration in the Bukittinggi Branch, one whose perceived contribution depends on two things working together: prepared inputs (regulation, human resources, infrastructure, and information technology) and a Lean Six Sigma DMAIC structure guiding implementation. Participants reported that applying DMAIC helped them trace root causes, improve membership data quality, strengthen cross-sectoral coordination, and base decisions on evidence rather than assumption, and they perceived these practices as contributing to new enrolment, member reactivation, and premium collection. Because this study is qualitative and the administrative indicators available cover only 2024 and 2025, the findings describe perceived operational contributions and implementation mechanisms; they do not demonstrate that PESIAR caused changes in enrolment, member activeness, or revenue. Sustaining these perceived gains will take continued effort: local government commitment and budget allocation need to hold steady, data validation should happen periodically rather than as a one-off exercise, and monitoring, evaluation, and capacity building for field agents all need to continue over time.

Furthermore, BPJS Kesehatan and local governments should prioritize refining technical regulation, building workforce capacity, strengthening digital infrastructure, and deepening cross-sectoral collaboration, while recognizing that premium affordability is better addressed through subsidy instruments than through further process improvement; future research would benefit from incorporating the perspectives of community members and JKN beneficiaries directly, from evaluating the program's

effects with verified trend data on enrolment, activeness, and revenue, and from testing this model across branches with different geographical and socioeconomic profiles.

In Press

In Press