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Agile in Healthcare: Streamlining Medicare and Medicaid Claims Processing While Ensuring HIPAA Compliance

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Abstract: Healthcare institutions experience major operational issues while handling Medicare and Medicaid claims because they must meet strict HIPAA security standards. The waterfall model method together with traditional approaches leads to various delays along with multiple errors in addition to different compliance risks because of its strict framework. The iterative collaborative adaptive framework of Agile methodologies provides healthcare organizations with a solution to optimize processing claims and minimize operational problems while maintaining HIPAA standards. Agile principles serve as the basis for this paper which investigates methods to enhance Medicare and Medicaid claims processing systems. The paper investigates existing claims processing challenges before exploring how Agile transformations work while providing strategies to keep HIPAA compliance active inside Agile organizations. This paper uses case studies and best practices with future analysis to show how Agile transforms claims processing in healthcare though protecting patient information.

Keywords: Agile Methodologies, Medicare, Medicaid, Claims Processing, HIPAA Compliance, Scrum, Kanban, Lean, Healthcare Efficiency, Data Security, Process Optimization.

Introduction: The U.S. healthcare system relies heavily on Medicare and Medicaid programs to insure coverage for more than 140 million citizens who belong to different segments of the population. Data processing systems for programs often perform poorly due to high numbers of errors and long review durations and

difficult rules administrators must follow. Health Insurance Portability and Accountability Act (HIPAA) of 1996 established specific data protection standards that complicate the process of handling claims. Traditional project management together with waterfall-based software development processes face difficulties with these challenges due to their rigid linear sequencing system.

The original purpose of Agile methodologies for software engineering included iterative work alongside stakeholder engagement with continuous changes to project demands. Agile principles applied to healthcare claims processing help agencies improve work efficiency while they reduce mistakes and achieve better stakeholder outcomes while keeping HIPAA rules in full force. This paper delivers an extensive study showing how Agile processes will revolutionize Medicare and Medicaid claims document handling. The research examines both the processing difficulties of claims and the application of Agile frameworks together with HIPAA compliance methods and case study and best practice implementation approaches.

2. Challenges in Medicare and Medicaid Claims Processing

2.1 Complexity of Claims Processing

The Medicare and Medicaid claims processing requires complex workflows that engage multiple entities such as healthcare providers and insurance companies as well as clearinghouses and the Centers for Medicare & Medicaid Services (CMS). The entire process demands an examination of patient eligibility followed by diagnostic and procedural coding before claiming submission to subsequent claim adjudication and payment dispatch. The process contains multiple stages that introduce potential errors including wrong coding and incomplete details that result in provider financial penalties and delayed or denied claims.

2.2 High Error Rates

The Medicare fee-for-service claims payment system experienced 8.6% improper payment rate in 2022 which led to billions of erroneous disbursements (CMS, 2022). The most frequent payment errors consist of improper billing codes and absent documentation together with policy breaches. The payment errors affecting Medicaid claims grow worse since providers must deal with different state-level regulations on top of the usual issues. Organizations must spend additional resources to manage such mistakes while suffering delayed reimbursements which harm both

provider monetary stability and patient relationship trust.

2.3 Processing Delays

Medicare claims take 15 to 30 days for completion, but Medicaid claims may consume more time because each state runs separate adjudication procedures. The process becomes more prolonged when claims need appeals or additional paperwork because this leads to additional delays in resolution times. Provider operations suffer interruptions that result in staff dissatisfaction together with dissatisfied medical service users.

2.4 HIPAA Compliance

Under HIPAA regulations health organizations must protect protected health information (PHI) by ensuring confidentiality together with integrity and availability. The necessary security elements for claims processing systems include both encryption technologies together with access regulations and audit trail systems that stop data breaches. Sanctions for HIPAA non-compliance can be substantial since per violation fines may exceed \$1.5 million according to HHS (2023). The challenge of ensuring compliance proves difficult to maintain system efficiency in claims processing operations.

2.5 Legacy Systems and Technological Barriers

Most healthcare institutions continue to handle claims using years-old legacy system platforms. Due to their rigidity as well as their unfeasible connection to contemporary technological solutions and error-prone nature these systems prove problematic. Healthcare organizations face substantial funding hurdles when they need to modernize or replace their outdated systems which restricts their ability to implement new modernized solutions.

3. Agile Methodologies: A Paradigm Shift

Scrum and Kanban together with Lean constitute agile methodologies created to overcome problems found in waterfall methods during software development. Agile puts primary focus on teamwork between multiple departments while providing ongoing project assessment and incremental work cycles. Core principles are:

Iterative Development: Small functional work increments can be delivered which allows stakeholders to test and refine everything frequently.

- **Customer Collaboration:** The project team involves stakeholders to verify that solutions fulfill their requirements together with their expectations.
- **Continuous Improvement:** The team uses retrospectives as a process to determine system or process inefficiencies.
- **Adaptability:** Our organization reacts swiftly to changing requirements that include new regulations as well as technological advancements.

Healthcare practitioners implement Agile in two major domains: they apply it to create claims processing software platforms while simultaneously optimizing their operational workflows. The Agile approach supports better efficiency in handling claims processing through its combination of collaboration and quick cycle development.

4. Applying Agile to Medicare and Medicaid Claims Processing

4.1 Agile Frameworks for Claims Processing

Agile frameworks demonstrate excellent compatibility with claims processing through multiple frameworks including:

Scrum: Scrum divides work efforts into sprints which run for 2-4 weeks using multiple functional teams to produce gradual increments. Scrum methodology allows teams to build automated coding software in addition to real-time eligibility examination features and anti-fraud systems.

Kanban: The Kanban system displays workflow progression through tracking that observe tasks starting from the claim submission step to review and adjudication completion. This method enables teams to detect limits and enhance processing speed through improved throughput.

Lean: Under Lean principles organizations eliminate needless costs and deliver peak value to their clients. The implementation of Lean techniques will enhance processing workflows by removing redundant operations which include manual data entry as well as unnecessary approval requirements.

4.2 Key Agile Practices

Organizations should utilize this set of Agile practices to enhance their claims processing operations including: -

User Stories: The requirements should be defined

through stakeholder perspectives when performing tasks (for instance "I need real-time claim status updates to enhance cash flow as a provider"). The use of user stories ensures developers tackle significant problems which exist in real-world situations.

Daily Standups: Daily meetings between teams help teammates stay connected while resolving problems while sustaining development speed.

Continuous Integration/Continuous Deployment (CI/CD): CI/CD tools enable software developers to provide frequent system updates for claims processing which delivers both enhanced performance and shorter interruption times.

Retrospectives: Team performance enhances through regular assessment sessions which let members evaluate past accomplishments together with observed difficulties to develop consistent betterment practices.

Test-Driven Development (TDD): The testing process must occur before programming to ensure new functions satisfy their functional duties and regulatory mandates.

4.3 Benefits of Agile in Claims Processing

Agile methodologies deliver multiple advantages for managing Medicare and Medicaid claims and their associated processes including:

Reduced Error Rates: A testing process followed by stakeholder responses enables the detection of early errors that enhance claim reliability.

Faster Processing Times: The implementation of automated workflows leads to successive improvements that minimize adjudication processing time along with payment delivery duration.

Enhanced Stakeholder Satisfaction: Through collaboration, providers ensure their solutions fulfill payer and patient needs.

Scalability and Adaptability: The agile system design demonstrates the ability to cope with growing insurance claims and follows regulatory adjustments.

Cost Savings: The Agile method works to decrease both incorrect payment costs and administrative expenses through its approach.

5. Ensuring HIPAA Compliance in an Agile Environment

Agile high-speed work methods present implementation challenges to HIPAA compliance which organizations can overcome through proper preventative measures. The following methods will help Agile processes achieve compliance with HIPAA requirements:

5.1 Secure Development Practices

- **Encryption:** Protecting PHI requires deployment of encryption protocols which should include AES-256 encryption for data stored on systems and TLS 1.3 encryption for data that moves between systems.
- **Access Controls:** The healthcare organization will establish role-based access controls (RBAC) which only permit authorized staff to gain access to PHI.
- **Audit Trails:** System activities must be recorded thoroughly to monitor user access and PHI modifications.
- **Secure Coding:** It should follow guidelines for secure coding from the Open Web Application Security Project (OWASP) to stop the system from having vulnerabilities.

5.2 Incorporating Compliance into Agile Workflows

- **Compliance User Stories:** The system should incorporate HIPAA requirements through user stories that precisely state business needs (the first user story occurs as follows - "A compliance officer needs to log all PHI access so we can perform audits").
- **Definition of Done (DoD):** The DoD should include HIPAA regulatory requirements as standard criteria across all its increments.
- **Automated Compliance Testing:** Staff should conduct automated HIPAA compliance tests during every sprint for early detection of potential problems.
- **Regular Security Audits:** At the end of each sprint tests should be conducted to check compliance status and detect potential weaknesses.

5.3 Training and Awareness

- Every member of the team must receive complete instruction regarding HIPAA rules together with secure Agile practice methodology.
- All team members should understand a fundamental awareness about security while developers prioritize PHI protection at every development cycle.
- Teams should prepare their incident response by participating in regular data breach simulations

5.4 Third-Party Vendor Management

The claims processing workflow includes working with external service providers who serve as clearinghouses or cloud service providers. To ensure HIPAA compliance:

- The practice requires all vendors who manage PHI to sign Business Associate Agreements.

- Healthcare organizations should audit vendor security practices using both internal audits and external certifications like HITRUST or SOC 2.
- Regular assessment of vendor performance will verify their continuous adherence to standards.

5.5 Risk Management

- The organization needs to perform routine risk assessments that detect weaknesses in Agile processes and systems.
 - Put in place solutions for vulnerability treatment through penetration testing and vulnerability scanning and incident response planning.
- The organization should allocate priority to address its most serious compliance problems based on risk assessment.

6. CASE STUDIES

6.1 Case Study 1: State Medicaid Program

A Medicaid state program encountered 15% denial of claims because its processes involved manual work and coding mistakes. The organization implemented Scrum to create an AI-driven coding tool which would operate as an interface with its claims processing system. A staff composed of coders and IT developers and compliance officers worked together alongside each other within two-week sprints to provide continuous enhancements. Real-time coding recommendations within this tool decreased the 15% claim denial rate by 60% during its sixth month of use. Improved processing time became half as long due to reduced times from 40 days to 18 days while HIPAA requirements remained satisfied by encryption methods and RBAC regulations and regular security audits. The project achieved its objectives which resulted in implementing the solution to additional state-run programs.

6.2 Case Study 2: Medicare Advantage Plan

The Medicare Advantage plan utilized Kanban to enhance its claims adjudication procedure. Observing the process on the Kanban board helped the team discover operational blocks in their manual review and documentation verification steps. Through the implementation of automated decision-support tools the adjudication process duration decreased by 16 days from 28 days to 12 days. The Kanban workflow included security requirements to uphold HIPAA compliance and staff conducted biweekly reviews regarding these requirements. The healthcare providers experienced substantial satisfaction because accelerated payments improved their financial performance.

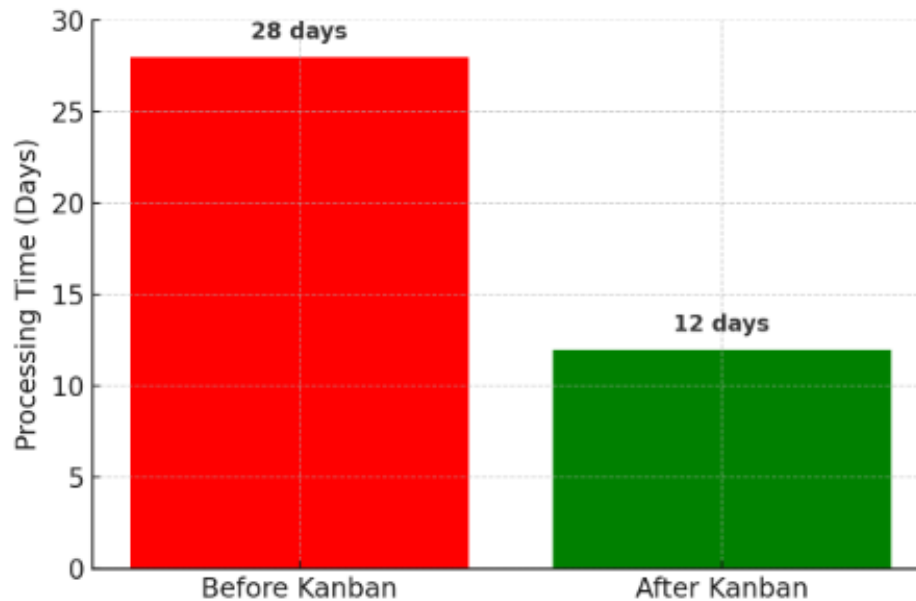


Figure 1: Reduction in Claim processing time after Kanban Implementation

7. Challenges and Mitigation Strategies

7.1 Resistance to Change

Organizations in healthcare tend to oppose Agile implementation because of established procedures and regulatory requirements as well as doubts about Agile's suitability. To overcome this resistance:

- Stakeholders need to attend learning programs that teach them about Agile advantages.
- Begin with small demonstration projects which will show immediate success while winning support from the organization.
- Obtain leadership support to advance Agile implementation and connect it to established organizational targets.

7.2 Balancing Speed and Compliance

Agile project delivery speed poses challenges for healthcare organizations to comply with HIPAA's strict requirements. Mitigate this by:

- Compliance tasks must become part of every project sprint to prevent them from being treated as add-on responsibilities.
- Security as well as compliance verification runs automatically through real-time tools designed for automation testing.
- Every Agile team should have at least one compliance specialist as part of the team structure.

7.3 Resource Constraints

The implementation of Agile platforms requires specialist teams along with training and tool acquisition which might create financial difficulties. Address this by:

- Management of initiatives should focus on important projects for automation which reduce human errors. The organization benefits from using cloud-based platforms to decrease infrastructure expenses. Our organization uses open-source Agile tools as cost-saving instruments.

7.4 Integration with Legacy Systems

Agile adoption faces obstacles from legacy systems because these systems do not adapt well. Strategies to address this include:

- The implementation of APIs enables organizations to merge older systems with new Agile-developed solutions.
- A formal technique to replace legacy systems through modular replacements will be implemented gradually. Organizations should work with vendors who focus on legacy system modernization.

8. Best Practices for Implementation

Agile implementation in Medicare and Medicaid claims processing requires organizations to follow several best practices including:

Start Small: Start by automating eligibility verification since this pilot project will establish expertise while proving valuable outcomes.

Engage Stakeholders: Solutions should be designed by combining the requirements of providers and payers along with patients and compliance officers at an early stage.

Leverage Technology: Organizations need to use cloud platforms alongside artificial intelligence (AI) and robotic process automation (RPA) as modern solutions to increase productivity alongside better compliance.

Monitor Metrics: The tracking of important performance indicators known as KPIs evaluate how well the project is proceeding by monitoring claim error rates together with processing times as well as compliance audit results.

Foster a Culture of Agility: Organizations should support team collaboration together with experimental work and continuous knowledge acquisition at multiple team levels.

Iterate and Scale: Agile implementation should be modified through lessons learned from preliminary projects to enable organization-wide deployment.

9. Future Directions

The utilization of new technology along with Agile principles creates substantial benefits for the claims processing system. The implementation of artificial intelligence (AI) fits into automated systems to conduct predictive fraud detection and offer real-time coding support to healthcare facilities. Blockchain technology enhances patient health information security through transparent systems that maintain unalterable activity logs for PHI. The adaptable nature of Agile proves itself to be a perfect framework for implementing new technologies which supports regulatory compliance requirements during their changes.

The implementation of Agile helps healthcare organizations transform when CMS installs value-based care models through adaptations to bundled payment methods and accountable care organizations (ACOs) frameworks. Through its framework Agile facilitates quick development and stakeholders' team-

up which helps healthcare organizations remain ahead when faced with regulatory transformations and market fluctuations.

CONCLUSION

Agile methodologies provide organizations with an effective framework that transforms Medicare and Medicaid claims procedures to resolve longstanding problems in errors and delays and compliance issues. Healthcare organizations attain workflow streamlining and enhanced efficiency and better results for healthcare providers and insurers and their patients through iterative development and stakeholder collaboration and continuous improvement models.

Achieving HIPAA compliance needs an Agile environment to implement proactive approaches consisting of secure development practices and compliance integration as well as comprehensive training. The combination of research examples and industry best practices demonstrates how Agile brings substantial transformations to the healthcare sector. The future of healthcare industry development will greatly depend on Agile because it will lead to innovative approaches to efficiency and patient-focused care at every stage including claims processing.

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