

Abstract

An AI-powered software platform automates end-to-end management of healthcare insurance claims. Clinical data received as HL7 FHIR resources are transformed into draft billing claims, after which a multilayer engine (i) applies continuously-updated, payer-specific validation rules and code-pair checks, (ii) reconciles time-linked procedure and drug codes across episodes, and (iii) invokes a machine-learning model that predicts denial risk and recommends corrective actions before submission. Users see real-time flags, suggested fixes, and required document prompts via a web or SMART-on-FHIR interface. Approved claims are automatically rendered as X12 837 EDI files; payer responses (277/835) are parsed to post payments or launch AI-assisted appeal workflows. Supporting documents are stored with cryptographic hashes in an immutable audit ledger, enabling tamper-evident provenance from clinical event to remittance. Modular, event-driven micro-services and a FHIR-to-X12 integration layer allow cloud or embedded deployment, reducing technical denials, accelerating cash-flow, and simplifying regulatory audits.