Product Requirements Document (PRD)

Product: Aivida – AI Discharge Copilot

Version: MVP (Demo → Pilot) — v2 (meds, appointments, diet/activity added)

Owner: CEO (Anand Iyer)

Contributors: CTO (Advisor), Backend Engineer, Frontend Engineer, Clinical Advisor (CMO spouse)

Date: [Insert date]

1. Problem Statement

Patients often leave hospitals with discharge instructions they don't understand. Poor comprehension contributes to preventable 30-day readmissions ($17B annually). Hospitals face CMS penalties, lost capacity, and reputational risk. There is no lightweight, AI-enabled solution that produces patient-friendly, multilingual discharge instructions, consolidates the **medication list**, **scheduled follow-up appointments**, and **dietary/lifestyle activities**, and allows patients to ask follow-up questions post-discharge.

2. Objectives

• Demo Phase: Build demo with mock discharge notes; include meds list, follow-up appointments, diet/activity guidance; chatbot; multilingual output (no PHI). • Pilot Phase: Integrate with hospital systems (extract or FHIR); HIPAA-compliant deployment; measurable ROI.

3. Success Metrics

• Demo: summaries in ≤10s; 3 languages; ≥80% clinician feedback positive on clarity and completeness (meds/appointments/diet included). • Pilot: 2–3 point readmission reduction; ≥85% patient satisfaction; no compliance issues.

4. Target Users

Primary: Patients Secondary: Clinicians/Nurses Tertiary: Hospital Admin/IT

5. Scope

In Scope: AI discharge summaries; **medication list** consolidation; **scheduled follow-up appointments** display; **dietary and lifestyle activities** extraction; multilingual support; chatbot; web UI; HIPAA-ready hosting; read-only integration via extract/FHIR. Out of Scope (MVP): Deep EHR write-back; medication reconciliation tooling; automated SMS/email reminders with PHI; advanced Ops Command Center.

6. Functional Requirements

6.1 Backend

• Data Ingestion: – Accept discharge summaries (PDF/text), and optional structured feeds (HL7 v2 ADT/ORU; FHIR R4). – **Medications:** ingest via FHIR MedicationStatement/MedicationRequest or discharge summary sections; normalize to RxNorm; include dose, route, frequency, start/stop, PRN flags. – **Appointments:** ingest via FHIR Appointment/Encounter/ServiceRequest or CSV extract;

include clinic, provider, location, date/time, preparation notes. – **Diet/Lifestyle:** ingest via FHIR NutritionOrder/CarePlan/ServiceRequest or discharge plan sections (activity restrictions, wound care, diet). – Demo mode uses mocked data; Pilot mode uses read-only extracts (no write-back).

• AI Layer: – Generate plain-language, multilingual discharge instructions with sections: Summary, **Medications**, **Follow-up Appointments**, **Diet & Activity**, Warning Signs, Contact Info. – Grounded generation: restrict to ingested source; cite section references; block free-form medical advice outside source content. – Chatbot limited to document-grounded Q&A; (med dosing schedule, appointment prep, diet/activity).

• Business Rules & Validation: – Units normalization (mg/mL), frequency mapping (BID/TID → plain language), time-of-day schedule rendering. – Drug name policy: brand + generic; allergy cross-check (if provided in extract) — MVP displays and flags but does not reconcile. – Appointment conflict checks: timezone, date format, calendar export (ICS file) without PHI details. – Diet/Activity: convert clinical terms (e.g., NPO, partial weight bearing) into patient-friendly guidance with examples.

• Security & Compliance: – HIPAA-ready: encryption in transit (TLS 1.2+) and at rest (AES-256); RBAC; audit logs for PHI access; PHI minimization in logs. – BAAs with cloud vendor; read-only access to hospital data; least-privilege service roles. – Safety guardrails: disclaimers; urgent symptom detection prompts patients to contact provider or emergency services. – Data retention: configurable; default delete in 30–60 days for pilot unless hospital requests longer retention.

• Scalability & Infra (Multi-Cloud): – Start on **GCP** (HIPAA-eligible): Cloud Storage, Cloud SQL/Postgres, GKE, Secret Manager, Cloud Logging. – Portability via IaC (Terraform) and Kubernetes; target equivalents on AWS (S3, RDS, EKS, KMS, CloudWatch) and Azure (Blob, Azure SQL, AKS, Key Vault, Monitor). – Capacity: Pilot 100 discharges/day; scale path to 10,000/day by Year 2.

6.2 Frontend UI

Patient UI (Demo + Pilot): • Secure login (demo token; pilot lightweight auth/OTP). • Discharge instructions with tabs/anchors: Overview, **Medications**, **Appointments**, **Diet & Activity**, Warning Signs. • **Medications:** clear list with dose, frequency, timing (morning/noon/evening/bedtime), special instructions; printable checklist. • **Appointments:** list upcoming visits with date/time, clinic, location/map link, preparation notes; download **.ics** calendar file (PHI-minimized). • **Diet & Activity:** plain-language guidance and examples; iconography and do/don’t lists. • Language toggle (EN, ES, +1 regional); large fonts; mobile-first; accessibility (WCAG AA). • Chatbot for document-grounded Q&A; (meds, appointments, diet/activity); escalation message for urgent issues.

Clinician UI (Demo + Pilot): • Upload discharge summary or select patient (pilot) → AI-generated patient-friendly doc. • Side-by-side editor (Original vs Simplified) with required review of **Medications**, **Appointments**, **Diet & Activity** sections. • Edit/approve flow; ability to redact sensitive items; add free-text clarifications. • Publish to Patient UI; regenerate PDF; optional print-friendly handout.

IT/Admin UI (Demo + Pilot): • Data source config: toggle inputs (PDF extract, HL7, FHIR endpoints); mapping for FHIR resources (Medication*, Appointment, NutritionOrder, CarePlan). • Access control: manage clinician and patient roles; SSO readiness for pilot (SAML/OIDC). • Audit & logs: view access trails (who viewed/edited/published); export anonymized metrics. • Language packs management; content disclaimers; retention policy settings. • Dashboard: # discharges processed; % with meds/appointments/diet filled; patient feedback scores.

7. Non-Functional Requirements

• Availability: 99.5% uptime in pilot. • Latency: summary generation ≤10s; chatbot ≤3s; page load ≤2s on 4G. • Security: encryption E2E; RBAC; audit; PHI redaction in logs; secure secrets management. • Compliance: HIPAA; SOC 2 program kickoff post-pilot; BAAs in place; DPIA/Threat Model documented. • Observability: structured app logs; basic dashboards; alerting on error rates and latency.

8. Dependencies

• Cloud: GCP HIPAA services (initial); Terraform/K8s for portability. • LLM: OpenAI/Vertex AI or equivalent with PHI-handling configuration; prompt templates + grounding. • Translation: Google Healthcare/Vertex, or Azure Translator (PHI-safe config). • Code systems: RxNorm (meds), SNOMED/LOINC where applicable. • Hospital: sample templates, mock data for demo; read-only extracts/FHIR sandbox for pilot.

9. Risks & Mitigation

• AI hallucination → Grounded generation, clinician review required before publish. • Incomplete data feeds (missing meds/appointments) → Allow clinician manual entry; flag incomplete sections. • Integration delays → Start with batch extracts; defer live API integration until after demo sign-off. • PHI leakage in logs → strict redaction + log review; development datasets de-identified.

10. Open Questions

• Which appointment systems will we face first (Epic Cadence, Cerner Scheduling)? • Do we include a basic medication schedule visual (pill times) at MVP, or post-pilot? • Which languages beyond EN/ES are critical for pilot demographics? • Is calendar export (ICS) acceptable without protected details per hospital policy?