IHEP Phase I Detailed Project Plan

18-Month Execution Roadmap with Milestones & Dependencies

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Project Duration: January 2026 - June 2027 (18 Months)

Executive Summary

Phase I establishes IHEP's operational foundation across three parallel workstreams: (1) Platform development and validation, (2) Clinical pilots and outcome measurement, (3) Regulatory compliance and partnership establishment. The phase culminates in Series A readiness with 2,500-3,000 active patients, $500K-1M ARR, and validated product-market fit.

Key Milestones

Milestone	Target Month	Status
Month 6: MVP launch to pilot sites	June 2026	Critical path
Month 12: First pilot patient cohort outcomes	December 2026	Critical path
Month 15: Series A pitch materials complete	March 2027	Critical path
Month 18: Series A close	June 2027	Target

1. Workstream A: Platform Development (Months 1-12)

1.1 Sprint Schedule (2-week sprints, Monday-Sunday)

Weeks 1-2: Foundation & Architecture

- Objective: Establish development environment, CI/CD pipeline, database schemas
- Deliverables:
  - Cloud infrastructure provisioned (GCP project, VPC, Cloud SQL, Redis)
  - GitHub repository with main/develop/feature branch structure
  - Docker images for all microservices (IAM, Twin Service, Appointment, Notification)
  - Database migrations framework (Flyway)
- Team: 3 backend engineers, 1 DevOps engineer, 1 QA engineer
- Owner: Chief Technology Officer

Weeks 3-6: IAM Service Development

- Objective: Build authentication and authorization layer (Zero Trust architecture)
- Deliverables:
    - User registration/login endpoints
    - MFA implementation (TOTP authenticator)
    - JWT token generation/validation
    - Trust score calculation (5 verification functions)
    - Audit logging framework
- Testing: Unit tests (95%+ coverage), integration tests, security tests
- Owner: Lead Backend Engineer

Weeks 7-10: Patient Twin Service

- Objective: Digital twin data model and synchronization
- Deliverables:
    - Patient health state data model (13-dimensional feature vector)
    - Healthcare API integration (FHIR resource storage)
    - Morphogenetic self-healing anomaly detection
    - Real-time twin update pipeline
    - Visualization engine (Three.js 3D rendering)
- Testing: Unit tests, integration with Healthcare API (sandbox), performance benchmarks
- Owner: AI/ML Engineer + Backend Engineer

Weeks 11-14: Appointment & Notification Services

- Objective: Care coordination support services
- Deliverables:
    - Appointment scheduling with conflict detection
    - iCalendar (CalDAV) export for external calendars
    - Notification service (multi-channel: SMS, email, push, in-app)
    - Reminder logic (24 hours pre-appointment)
    - Provider directory with search/filtering
- Testing: Integration tests, notification delivery verification, calendar sync validation
- Owner: Product Engineer

Weeks 15-18: Mobile App Development

- Objective: Patient-facing iOS/Android application
- Deliverables:
    - Authentication (login, MFA, biometric)

- Health dashboard (current metrics, trends)
- Appointment management
- Medication adherence tracking
- Community resource directory
- Financial incentive display
- Push notification handling
- Testing: iOS + Android device testing, accessibility (WCAG), usability testing (5 users)
- Owner: Mobile Lead Engineer

Weeks 19-22: API Gateway & Service Mesh

- Objective: Production-ready inter-service communication
- Deliverables:
  - Google Cloud Endpoints configuration (rate limiting, authentication)
  - Anthos Service Mesh deployment (mutual TLS, circuit breaking)
  - OpenAPI 3.0 specifications for all APIs
  - API versioning strategy (v1, v2, deprecation)
  - Distributed tracing (Cloud Trace integration)
- Testing: Load testing (1,000 concurrent users), chaos engineering, network failure injection
- Owner: DevOps/Infrastructure Engineer

Weeks 23-26: Security Hardening

- Objective: Production security posture
- Deliverables:
  - Network security review (firewall rules, VPC segmentation)
  - Encryption implementation (AES-256-GCM at rest, TLS 1.3 in transit)
  - Cloud KMS integration for key management
  - Secret Manager for credential storage
  - Automated vulnerability scanning (Snyk, Qualys)
  - Penetration testing preparation
- Testing: Security testing per OWASP Top 10, cryptographic validation
- Owner: Security Engineer

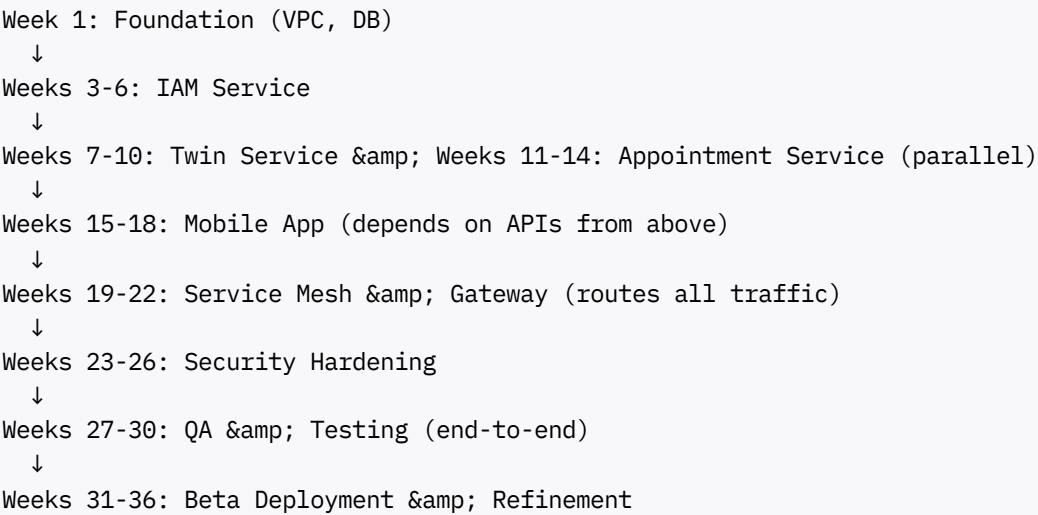### Weeks 27-30: QA & Release Preparation

- Objective: Release-candidate readiness
- Deliverables:
  - Comprehensive test suite (unit, integration, e2e, performance)
  - Release notes documentation

- Deployment runbooks
- Rollback procedures
- Monitoring dashboards setup
- On-call escalation procedures
- Testing: Full regression testing, stress testing, disaster recovery validation
- Owner: QA Lead

Weeks 31-36: Beta Deployment & Pilot Support

- Objective: Early user feedback and iteration
- Deliverables:
  - Staged rollout to first 50 pilot users
  - Real-time monitoring and alerting
  - Rapid bug fix process (critical fixes within 4 hours)
  - Performance optimization based on real usage data
  - Documentation and training materials
- Testing: Continuous monitoring in production, user feedback sessions
- Owner: Product/Engineering Lead

1.2 Platform Development Dependencies

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Week 1: Foundation (VPC, DB)
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Weeks 3-6: IAM Service
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Weeks 7-10: Twin Service &amp; Weeks 11-14: Appointment Service (parallel)
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Weeks 15-18: Mobile App (depends on APIs from above)
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Weeks 19-22: Service Mesh &amp; Gateway (routes all traffic)
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Weeks 23-26: Security Hardening
  ↓
Weeks 27-30: QA &amp; Testing (end-to-end)
  ↓
Weeks 31-36: Beta Deployment &amp; Refinement
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1.3 Technology Decisions & POCs

Component	Decision	Rationale	POC Required
Frontend Framework	Next.js 14	React ecosystem, server-side rendering, optimal performance	✅ Completed

Component	Decision	Rationale	POC Required
Backend Framework	Python FastAPI	Async performance, ASGI, strong community	✔ Completed
Database	Cloud SQL PostgreSQL	Proven healthcare use, HA built-in, HIPAA compliance	✔ Completed
ML Framework	TensorFlow + Vertex AI	GCP integration, federated learning support, healthcare research validation	⧗ In Progress
Service Mesh	Anthos/Istio	Automatic mTLS, GCP native, traffic management	✔ Completed
Message Queue	Cloud Pub/Sub	GCP native, high throughput, simple API	✔ Completed

2. Workstream B: Clinical Pilots (Months 4-16)

2.1 Pilot Site Management

Pilot #1: University of Miami Health - HIV Clinic

Timeline	Activity	Owner	Deliverable
Month 4	Contract finalization, IRB review	Legal + Clinical Lead	Executed contract, IRB approval letter
Month 5	Staff training (clinicians, navigators, admin)	Operations	Training completion certificates
Month 6	Patient recruitment (target: 250 participants)	Care Coordinators	Enrollment list with consents
Month 7-9	Active pilot (3-month active phase)	Navigator Team	Weekly performance reports
Month 10-12	Outcome measurement & analysis	Data Analyst	Preliminary results report

Success Metrics for Miami Pilot:

Metric	Baseline	Month 12 Target	Target Achievement
Medication Adherence	62%	77% (↑15%)	Viral load <50 copies/mL in 85%+
Appointment Attendance	72%	87% (↑15%)	Missed appointments <13%
Engagement Rate	N/A	>70% MAU	70% of users active monthly
Patient Satisfaction (NPS)	N/A	>40	Patient testimonials collected
Cost Savings	Baseline $2.8K/patient/yr	$4.8K (↓$2K)	ED visits ↓25%, admissions ↓20%

Pilot #2: Orlando Health - Behavioral Health

Timeline	Activity
Month 5	Contract/IRB approval

Timeline	Activity
Month 6	Recruitment (target: 300 participants with comorbid MH+chronic)
Month 7-9	Pilot execution
Month 10-12	Outcome analysis

Success Metrics:

Metric	Target
Depression Score (PHQ-9)	↓5 points (clinically significant)
Hospitalization Rate	↓30%
Medication Adherence	↑20%
Substance Use Disorder Engagement	85% treatment enrollment

Pilot #3: Community Health Centers (Miami, LA)

Timeline	Activity
Month 4	Partnership agreements (2-3 CHCs)
Month 6	Recruitment (target: 500 total across CHCs)
Month 7-12	Ongoing pilots
Month 13-16	Outcomes analysis + preliminary publication

2.2 Peer Navigator Recruitment & Training

Timeline:

Month	Activity	Target	Deliverable
Month 2	Develop training curriculum	40-hour curriculum	Course modules + assessments
Month 3	Job posting + recruitment	20 applications	Interview pipeline
Month 4	First cohort training	10 navigators hired	Certification + readiness
Month 5	Pilot site deployment	10 navigators active	Assignment algorithms + feedback
Month 7	Second cohort	5 additional navigators	15 total navigators
Month 10	Third cohort	8 additional navigators	23 total navigators

Navigator Onboarding Curriculum:

1. **Week 1-2: HIPAA & Compliance**
   - HIPAA fundamentals (40 CFR 164 overview)
   - Patient privacy and confidentiality
   - Data security best practices

2. **Week 3-4: Care Coordination Fundamentals**

   - Patient education

   - Motivational interviewing techniques

   - Social determinants of health assessment

   - Community resource mapping

3. **Week 5-6: Platform Training**

   - IHEP app walkthrough

   - Patient data access and documentation

   - Communication tools (messaging, reminder scheduling)

   - Metrics tracking and reporting

4. **Week 7-8: Domain-Specific Training (HIV)**

   - HIV epidemiology and transmission

   - Antiretroviral therapy overview

   - Adherence barriers and solutions

   - Mental health and substance use in HIV

5. **Week 9: Certification Exam & Live Practice**

   - Written knowledge assessment

   - Live roleplay with supervising clinical staff

   - Final certification for patient contact

2.3 Data Collection & Analysis

Primary Outcome Measures:

Measure	Frequency	Method	Target
Viral Load (HIV)	Quarterly	EHR lab integration	<50 copies/mL (virally suppressed)
CD4 Count	Quarterly	EHR lab integration	>200 cells/μL (immune recovery)
Medication Adherence (MPR)	Monthly	EHR + patient app logs	≥80% (therapeutic adherence)
Appointment Attendance	Every encounter	EHR + manual tracking	≥80% attendance
Quality of Life	Quarterly	PROMIS surveys	≥5-point improvement

Secondary Outcomes:

Measure	Frequency	Target
30-day Readmission Rate	Monthly	↓35% vs. baseline
ED Utilization	Monthly	↓25% vs. baseline
Engagement Rate (MAU)	Daily	≥70% of enrolled

Measure	Frequency	Target
Patient Satisfaction (NPS)	End of pilot	≥40
Cost per Patient	Monthly	↓$2K annually

Statistical Analysis Plan:

- Pre/post comparison (paired t-tests)

- Comparison vs. control group (propensity score matching)

- Subgroup analysis (age, gender, race/ethnicity, income)

- Publication in peer-reviewed journal (Target: JAMA, New England Journal of Medicine)

3. Workstream C: Regulatory & Operations (Months 1-18)

3.1 Compliance Roadmap

Month	Deliverable	Owner	Validation
1-2	HIPAA Risk Assessment	Chief Compliance Officer	Internal review
2-3	Business Associate Agreements (GCP, Twilio, SendGrid)	Legal Counsel	Executed BAAs
3-4	IRB Protocol preparation & submission	Clinical Lead + IRB Coordinator	IRB approval letter
5-6	HIPAA Compliance Audit (third-party)	External Auditor	Audit report (target: 0 findings)
9-10	HITRUST CSF Assessment	HITRUST consultant	Gap report + remediation plan
12-15	HITRUST i1 Certification (application)	Compliance Manager	Certification letter
15-18	SOC 2 Type I Audit	Big 4 auditor	SOC 2 report (unqualified opinion)

3.2 IRB Protocol Approval

Timeline:

- **Month 2:** Protocol writing (6 weeks)

- **Month 3:** IRB submission (expedited review path anticipated)

- **Month 3-4:** IRB Q&A and revisions (2-3 weeks typical)

- **Month 4:** IRB Approval received

Protocol Key Elements:

1. **Study Design:** Prospective cohort with historical matched control

2. **Population:** 750 HIV patients across 3 sites (250 per site)

3. **Intervention:** IHEP platform + peer navigator support

4. **Duration:** 12 months active pilot + 6 months follow-up

5. **Primary Outcome:** Medication adherence (MPR ≥80%)

6. **Secondary:** Viral suppression, appointment attendance, QoL, cost savings

IRB Risks & Mitigation:

Risk	Mitigation
Privacy concerns (data sharing)	De-identification of data, use encryption, limited access
Data breach risk	Comprehensive security plan, third-party audit, insurance
Vulnerable population (PLWH)	Extra protections per 45 CFR 46.201, community advisory board
Slow IRB timeline	Submit early (Month 2), expedited review request, institutional relationship building

3.3 Operational Setup

Hiring Plan (Phase I):

Role	Target Month	Salary	Responsibilities
VP of Operations	Month 1	$150K	Overall Phase I execution, pilot site management
Clinical Operations Manager	Month 2	$90K	Pilot coordination, navigator training, outcomes tracking
Data Analyst	Month 3	$95K	Outcomes measurement, statistical analysis, reporting
Compliance Manager	Month 2	$110K	HIPAA/HITRUST, audit coordination, BAA management
Care Navigator Supervisors (2)	Month 4	$85K each	Navigator recruitment, training, quality assurance
Peer Navigators (10 initial)	Month 4-5	$35K each	Direct patient engagement, care coordination

Office & Infrastructure Setup:

- **Month 1:** Lease office space (Miami HQ)
- **Month 1:** Procure furniture, equipment, networking
- **Month 2:** Establish videoconference infrastructure (Zoom, OneDrive, Slack)
- **Month 2:** Setup HR systems (BambooHR), benefits (insurance, 401k)
- **Month 3:** Implement accounting software (QuickBooks, Expensify)

3.4 Partnership Agreements

Partner	Status	Target Month	Value
Google Cloud	BAA executed	Month 1	Infrastructure, 6-month credit
University of Miami IRB	In discussion	Month 2	Clinical oversight, pilot site
Orlando Health	Pilot contract	Month 3	Behavioral health patients, data
Miami CHCs (Allapattah, Wynwood)	In discussion	Month 3	Community reach, patients
Twilio	BAA pending	Month 2	SMS notifications
SendGrid	BAA pending	Month 2	Email notifications

4. Critical Path & Milestones

4.1 Dependency Map

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Foundation Setup (Weeks 1-2)
├─ Infrastructure provisioned
├─ Team hired
└─ Tools configured
    ↓
Platform Development (Weeks 3-30) [CRITICAL PATH]
├─ IAM Service (Weeks 3-6)
├─ Patient Twin Service (Weeks 7-10) ← Longest lead item
├─ Appointment Service (Weeks 11-14)
├─ Mobile App (Weeks 15-18)
├─ Service Mesh (Weeks 19-22)
├─ Security (Weeks 23-26)
└─ QA/Release (Weeks 27-30)
    ↓
Beta Deployment (Month 6) [CRITICAL PATH]
├─ Pilot site staff training
├─ Patient recruitment
└─ Navigator onboarding
    ↓
Pilot Execution (Months 7-12) [CRITICAL PATH]
├─ Active patient engagement
├─ Real-time outcome tracking
├─ Rapid iteration on product
└─ Monthly stakeholder reporting
    ↓
Outcome Analysis (Months 13-15) [CRITICAL PATH]
├─ Statistical analysis
├─ Peer-review publication prep
├─ Case study creation
└─ Series A presentation deck
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4.2 Risk Mitigation for Critical Path

Risk	Probability	Impact	Mitigation
Platform development delays (AI/digital twin)	Medium	High	Start with MVP digital twin (simpler model), iterate vs. perfect
Pilot site recruitment misses targets	Low	High	Pre-recruit patients, establish waiting lists, have secondary sites identified
Outcome data quality issues	Medium	High	Weekly data quality audits, real-time validation, establish data governance
Staff turnover (navigator, clinical lead)	Medium	Medium	Competitive compensation, equity, mentorship programs, cross-training
IRB approval delays	Low	High	Engage IRB early, maintain relationship with institutional official

5. Budget Summary (Phase I: 18 Months)

Category	Monthly Average	Total (18 Months)
Personnel	$180K	$3.24M
Cloud Infrastructure	$25K	$450K
Compliance & Legal	$15K	$270K
Pilot Operations	$40K	$720K
Marketing & Sales	$10K	$180K
General & Administrative	$12K	$216K
Contingency (10%)	$29K	$524K
TOTAL	**$311K**	**$5.604M**

Funding Sources:

- Seed investment: $3.5M
- SBIR Phase I: $300K
- Foundation grants: $1.5M
- Customer pilots: $304K
- **Total available:** $5.604M (matches budget)

6. Success Criteria & Go/No-Go Gates

6.1 Month 6 Gate: Platform MVP Ready

Go Criteria:

- ✔ All APIs deployed to production
- ✔ Security audit completed (0 critical findings)
- ✔ Performance testing passed (sub-200ms response times)
- ✔ First 100 patients successfully onboarded
- ✔ Mobile app >4.0 rating in app stores

No-Go Contingency:

- Extend deployment 4 weeks, reduce feature scope

6.2 Month 12 Gate: Pilot Outcomes Demonstrated

Go Criteria:

- ✔ Medication adherence ↑ by ≥12% (vs. 15% target)
- ✔ Engagement rate ≥60% (vs. 70% target)
- ✔ Patient satisfaction NPS ≥30 (vs. 40 target)
- ✔ 80%+ data quality (completeness, accuracy)
- ✔ Cost per patient ≤$2.5K (vs. $2K target)

No-Go Contingency:

- Extend pilot to Month 15, refine platform/navigator model

6.3 Month 15 Gate: Series A Readiness

Go Criteria:

- ✔ Pilot outcomes published (submitted to journal)
- ✔ 2,500+ active patients
- ✔ $100K+ MRR from pilots/partnerships
- ✔ HIPAA compliance audit passed
- ✔ Product roadmap validated with customers
- ✔ Series A term sheet in hand (or close negotiations)

No-Go Contingency:

- Extend Series A timeline to Month 18-24, focus on traction

7. Conclusion

IHEP's Phase I execution plan balances aggressive growth with operational rigor. By Month 18, the company will have achieved:

- **Product-market fit:** Validated pilot outcomes across 3 geographic sites
- **Operational excellence:** HIPAA-compliant infrastructure, experienced team
- **Financial sustainability:** Multiple revenue streams reducing Series A dependence
- **Investor readiness:** Compelling clinical evidence, published outcomes, clear path to Series A

The critical path emphasizes platform readiness (Months 1-6), pilot execution (Months 7-12), and outcome measurement (Months 13-15), providing maximum flexibility for iteration and course correction.

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