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DESA HEALTH ENABLEMENT PROGRAMME

INTEGRATE LAWFUL, INTEROPERABLE DIGITAL HEALTH SYSTEMS FOR RESILIENT PRIMARY CARE AND EPIDEMIC RESPONSE.

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DESA Health Enablement Programme

Chapter 1. Programme Title and Acronym

The Programme shall be known as the DESA Health Enablement Program and may be referenced by the acronym DHEP. Its Short Title Line is: Mandate: Integrate lawful, interoperable digital health systems for resilient primary care and epidemic response. Scope: Telemedicine, AI-assisted diagnostics, electronic medical records, stock and supply monitoring, outbreak analytics. Instruments: Health data standards; DPIAs; clinical validation protocols; sovereign or approved hybrid hosting. Outcomes: Reduced referral delays, improved diagnostic accuracy, stock-out reductions, faster public health alerts.

For the avoidance of doubt, this Programme Title and Acronym shall be used across all instruments, annexes, schedules, operating circulars, and communications within the DESA portfolio.

Table 1 — Programme Header

Field	Entry
Programme Name	DESA Health Enablement Program
Acronym	DHEP
One-Line Mission	Integrate lawful, interoperable digital health systems for resilient primary care and epidemic response.
Scope	Telemedicine; AI-assisted diagnostics; EMR; stock & supply monitoring; outbreak analytics.
Principal Instruments	Health data standards; Data Protection Impact Assessments (DPIAs); clinical validation protocols; sovereign or approved hybrid hosting.
Intended Outcomes	Reduced referral delays; improved diagnostic accuracy; stock-out reductions; faster public health alerts.

Chapter 2. Legal Mandate and Purpose

2.1. Status under DESA.

DHEP is hereby constituted as a compulsory Programme within the DESA portfolio where a Host Government, Regional Economic Community (REC), or designated DESA unit elects to deploy national or regional digital health infrastructure under a sovereign or delegated mandate. In jurisdictions that implement DESA on a modular basis, DHEP shall be elective only where an existing lawful, interoperable digital health architecture demonstrably meets the minimum compliance and resilience thresholds established by DESA operating circulars and audit standards. The compulsory status pertains to the establishment of baseline capabilities in primary care digitisation, health data governance, clinical decision support, logistics monitoring, and epidemic intelligence; elective deployment may be authorised for advanced modules exceeding baseline capability.

2.2. Purpose.
The Programme's purpose is to enable lawful, interoperable, resilient digital health systems across primary care and public health functions, assuring continuity of essential services, evidence-based clinical decision-making, timely epidemic alerts, and reliable supply-chain visibility. DHEP operationalises these objectives through standards-based health information exchange, risk-based data protection, sovereign or approved hybrid hosting, transparent algorithmic assurance, and clinical validation protocols aligned with recognised international and regional frameworks.

2.3. Alignment with external frameworks and standards.
DHEP shall be interpreted and implemented in conformity with, and as an instrument that advances, the following frameworks and standards:

1. **World Health Organization — Global Strategy on Digital Health 2020–2025.** The Programme adopts the WHO strategy's implementation principles—including people-centred systems, national strategy anchoring, governance, and monitoring—to guide institutionalisation of digital health at national and regional level.

2. **African Union — Agenda 2063.** DHEP contributes to Agenda 2063 aspirations on inclusive prosperity, good governance, and improved quality of life, including the flagship ambitions that depend on a pan-African digital data network and resilient health systems.

3. **African Development Bank — High 5 priorities and 2024–2033 Ten-Year Strategy.** DHEP supports "Improve the Quality of Life for the People of Africa" and enables "Integrate Africa" through harmonised health data markets and cross-border alerting; it aligns with AfDB's Ten-Year Strategy emphasis on inclusive green growth and resilience.

4. **COMESA — Regional digitalisation initiatives.** DHEP is designed to interoperate with COMESA's Inclusive Digitalisation of Eastern and Southern Africa (IDEA) programme—particularly components on regional harmonisation, trusted transactions, and secure data hosting—and to leverage COMESA's medium-term strategies for cybersecurity capacity and ICT governance.

5. **SADC — Digital Transformation Strategy and Health Workforce Strategy.** DHEP harmonises with the SADC Digital Transformation Strategy (DTS) on secure infrastructure, legal/regulatory harmonisation, e-government, digital skills, and monitoring via a regional observatory; it further supports the SADC Health Workforce Strategic Plan 2020–2030 through digital tools for workforce planning, training, and performance.

6. **EAC — Regional Health Sector Strategic Plan and digital health initiatives.** DHEP integrates with EAC's Regional Health Sector Strategic Plan (2024–2030) and supports the Secretariat's direction on regional digital health scorecards, pooled procurement platforms, and data governance for cross-border health programmes.

7. **Interoperability standards and data governance.** DHEP mandates conformance to HL7® FHIR® for health information exchange; adopts OECD Recommendation on Health Data Governance for lawful access, linkage, and secondary use; and requires an ISO/IEC 27001:2022 compliant Information Security Management System for hosting and operations.

8. **Smart Africa — Digital Health Agenda.** In countries engaging via Smart Africa platforms, DHEP's architecture is compatible with the 2023/2025 Digital Health Agenda emphasis on interoperability, health data governance, and capacity.

2.4. Regional strategies and Agenda 2074.
Where applicable, DHEP shall be integrated into Agenda 2074 and associated regional strategies to ensure sovereign ownership, ethical deployment, and scalability consistent with DESA portfolio objectives and REC harmonisation instruments. Alignment shall be evidenced through Operating Circulars and Host Country Agreements that cross-reference the above frameworks and stipulate the minimum compliance thresholds for governance, education, market activation, and social equity.

2.5. Legal bases and instrument hierarchy.
DHEP shall derive authority from its Programme Charter, Host Country Agreement, and relevant DESA Operating Circulars; shall recognise national law and REC instruments; and shall embed binding obligations for data protection, clinical safety, and fiduciary controls as specified in the Programme's compliance annexes and audit schedules. International standards and recommendations cited herein shall be incorporated by reference for implementation guidance and conformity assessment.

Chapter 3. Strategic Objectives

3.1. Policy Orientation and Legal Basis.

The DESA Health Enablement Program (DHEP) is established to deliver lawful, interoperable, and resilient digital health capabilities in primary care and public health, with integrated telemedicine, electronic medical records (EMR), AI-assisted diagnostics, stock and supply monitoring, and outbreak analytics. Its strategic objectives are framed to operationalise internationally recognised guidance on digital health and health data governance, align with continental and regional development agendas, and incorporate mandatory security and interoperability standards. In particular, implementation shall be guided by the World Health Organization's Global Strategy on Digital Health 2020–2025, which requires that national digital health initiatives be institutionalised with robust governance, financing, and monitoring arrangements. The lawful processing and trusted exchange of personal health data shall be governed by the OECD Recommendation on Health Data Governance, which sets technology-neutral principles for privacy, security, accountability, and cross-border statistical and research use. Interoperability requirements shall be satisfied through adoption of HL7® FHIR® resources for electronic health information exchange, and information security management shall be certified against ISO/IEC 27001:2022 to assure confidentiality, integrity, and availability of health systems. Regionally, objectives will contribute to Agenda 2063 aspirations on inclusive prosperity and quality of life and are harmonised with the AfDB High 5 priorities—especially "Improve the Quality of Life for the People of Africa" and "Integrate Africa"—and the Bank's 2024–2033 strategy. Alignment with REC strategies will be maintained through COMESA's Inclusive Digitalisation of Eastern and Southern Africa (IDEA) programme and Medium-Term Strategic Plan, the SADC Digital Transformation Strategy (DTS) and health workforce plans, and the EAC Regional Health Sector Strategic Plan (2024–2030)

3.2. Objective I — Continuity of Primary Care via Integrated Telemedicine and Clinical Workflows.
DHEP shall establish nationwide, lawful telemedicine services integrated with primary care workflows to secure continuity of essential services, reduce referral delays, and extend equitable access to underserved populations. Teleconsultation, triage, and referral pathways shall be embedded within EMR systems and supported by multilingual natural-language interfaces, inclusive accessibility features, and clinical escalation protocols; these services must conform to WHO's strategic implementation principles for people-centred digital health and national institutionalisation. Governance benefits include measured reductions in service backlogs and documented improvements in first-contact resolution at primary facilities, reported through public dashboards consistent with

OECD's transparency and accountability requirements for health data systems. Social equity is advanced by universal-design provisions and inclusive digital channels under REC strategies that emphasise access, secure infrastructure, and skills, notably the SADC DTS's goals on e-government and digital skills and the EAC's regional scorecard for service tracking.

3.3. Objective II — Interoperable Clinical Data Infrastructure (EMR/HIE) with Security Assurance. DHEP shall deploy EMR and health information exchange (HIE) platforms based on HL7 FHIR resources, enabling lawful, standards-based exchange of clinical documents, laboratory results, medications, and encounter data across facilities and regions. Interoperability obligations include resource profiling, terminology services, consent and provenance logging, and audit trails; security obligations include implementing and certifying an ISO/IEC 27001:2022-compliant information security management system, with role-based access controls, encryption, and incident management procedures. Governance outcomes include improved data quality, reduced duplicate testing, and timely exchange for referrals; market outcomes include local ecosystem participation in standards-compliant health-tech products. Alignment with Agenda 2063 and AfDB priorities is evidenced by contributions to quality of life and integration across national systems through digital data networks.

3.4. Objective III — AI-Assisted Diagnostics and Clinical Decision Support with Ethical Safeguards. DHEP shall introduce AI-assisted diagnostics and decision support in primary care and frontline facilities, limited to clinically validated use cases (e.g., triage support, referral prioritisation, image-based detection for defined conditions), and operated within transparent, human-in-the-loop workflows. Ethical bases include pre-deployment bias audits, explainability reports, and continuous performance monitoring; data processing must follow OECD governance principles, and all systems must be integrated into national institutional frameworks envisaged by WHO's strategy. In DESA jurisdictions, AI integration shall further comply with DAIP — DESA AI Integration Programme, a mandatory sub-programme that institutionalises applied AI with governance dashboards, accessibility by design, and tiered certification for public and private actors. Education benefits include faculty enablement and adaptive learning for clinical training; market benefits include SME participation in validated AI health tools under REC digitalisation initiatives, such as COMESA's enabling environment for interoperable, trusted data platforms.

3.5. Objective IV — Stock, Supply, and Facility Readiness Monitoring.
DHEP shall institute end-to-end visibility over essential medicines, diagnostics, and consumables through integrated stock management and supply-chain analytics, linked to facility readiness indicators in EMR/HIE. Analytics will forecast demand, flag stock-outs, and optimise redistribution within and across districts; public reporting shall be exposed through dashboards aligned with REC observatories and national monitoring cycles, consistent with WHO's call for integrated governance and the AfDB's priorities on improving people's quality of life. Regional harmonisation shall leverage COMESA's IDEA platform for secure hosting and interoperable data services and will coordinate with SADC DTS objectives on secure infrastructure and e-government services.

3.6. Objective V — Outbreak Analytics and Early Warning for Epidemic Response.
DHEP shall operationalise lawful outbreak analytics by consolidating syndromic surveillance, laboratory result streams, and facility utilisation metrics into near-real-time dashboards, with early-warning thresholds, alerting protocols, and cross-border information exchange where permitted. Implementation shall align with WHO strategic principles on institutionalisation and monitoring, EAC's regional scorecard and cross-border health strategies, and SADC and COMESA initiatives for secure,

harmonised digital platforms. Security, privacy, and accountability shall follow ISO/IEC 27001 and OECD governance requirements

Table 2 — Contribution of Objectives to Governance, Education, Markets, and Social Equity (Policy Orientation)

Strategic Objective	Governance Contribution	Education Contribution	Market Contribution	Social Equity Contribution
I. Telemedicine integrated with primary care	Institutional dashboards and lawful reporting improve service oversight and referral timeliness, consistent with WHO's implementation and monitoring guidance.	Clinical training incorporates remote consultation protocols and patient safety standards.	Local providers deliver compliant telehealth services and devices under REC digitalisation enabling environments.	Rural and underserved populations gain equitable access via multilingual channels and inclusive design.
II. EMR/HIE interoperability	Standardised exchange reduces duplication and strengthens accountability through audit trails and consent records.	Faculty and TVET curricula include standards-based health informatics and consent management.	Vendors and SMEs build interoperable modules for national markets; integration supports cross-border services.	Secure records for vulnerable groups reduce exclusion and improve continuity of care.
III. AI-assisted diagnostics	Bias audits, explainability, and human-in-the-loop enhance lawful decision-making and trust.	DAIP certification builds clinician and faculty competence in applied, ethical AI.	Ethical, validated AI tools expand SME opportunities in health analytics and devices.	Accessibility by design supports persons with disabilities and language minorities.
IV. Stock and supply monitoring	Real-time stock visibility and lawful reporting reduce leakages and stock-outs.	Health management training integrates logistics analytics and facility readiness.	Demand forecasting and pooled procurement lower costs and stimulate local logistics services.	Improved availability of essential medicines advances quality of life under AfDB priorities.
V. Outbreak analytics and early warning	Legally grounded early-warning dashboards and alerts enable timely, accountable responses.	Training embeds surveillance analytics and cross-border	Health-tech market activation for compliant analytics	

Strategic Objective	Governance Contribution	Education Contribution	Market Contribution	Social Equity Contribution
		protocols under REC guidance.	platforms and services.	

3.7. Institutional Objectives.

The DESA Health Enablement Program (DHEP) shall translate policy-level goals into binding operational targets across national and regional health systems. Institutional objectives are established as follows, each with mandatory minimums, verification methods, and lawful processing requirements:

Objective A — Telemedicine and Continuity of Primary Care.

Establish nationwide telemedicine capability integrated with triage, referral, and follow-up workflows; embed multilingual interfaces and accessibility by design; ensure lawful processing and audit trails for every encounter; measure reductions in referral delays and unresolved case backlogs and disclose performance through public dashboards.

Objective B — Interoperable Clinical Data Infrastructure.

Deploy EMR/HIE platforms using recognised interoperability standards; enforce consent, provenance, auditability, and clinical safety checks; certify information security under a recognised ISMS; measure duplicate-test reduction, data-availability uptime, and referral-exchange timeliness.

Objective C — Ethical AI-Assisted Diagnostics and Decision Support.

Introduce clinically validated AI decision-support in defined use cases; require pre-deployment bias audits, model explainability dossiers, and human-in-the-loop oversight; verify diagnostic-accuracy uplift and patient-safety incidents; enforce grievance redress and corrective action protocols.

Objective D — Stock, Supply, and Facility Readiness Monitoring.

Institutionalise end-to-end stock visibility for essential medicines, diagnostics, and consumables; integrate facility readiness indicators with clinical and logistics data; set thresholds for stock-out reduction and replenishment lead-time; publish conformity statements and exception logs.

Objective E — Outbreak Analytics and Early Warning.

Consolidate lawful syndromic surveillance, laboratory streams, and utilisation metrics into near-real-time dashboards; implement threshold-based alerting and cross-border coordination under applicable regional instruments; verify alert timeliness and response mobilisation.

3.8. Implementation Framework (Three-Tier Model).

DHEP shall be executed through a three-tier implementation model, binding on all participating institutions.

Table 3 — Three-Tier Model and Binding Targets

Tier	Definition	Binding Targets	Verification
Infrastructure	Hosting, connectivity, security controls, identity and access, observability.	National health cloud or sovereign/hybrid hosting certified under an ISMS; role-based access; encryption at rest/in transit; observability	Independent security certification; uptime and audit-log inspection; penetration-test reports;

Tier	Definition	Binding Targets	Verification
		stack with audit trails; minimum facility connectivity baselines.	facility connectivity reports.
Application	EMR/HIE, telemedicine, logistics, surveillance, analytics, accessibility tooling.	EMR/HIE live in ≥70% public primary facilities in Phase II; telemedicine integrated in triage/referral; logistics dashboards active for essential lines; surveillance dashboards with threshold alerts.	Functional acceptance tests; clinical-safety sign-offs; accessibility conformance statements; analytics-accuracy and alert-latency reports.
Capacity	Workforce training, adoption support, certification, change-management.	Clinical and managerial training cohorts certified; trainer-of-trainers pipelines; departmental champions appointed; adoption plans executed with quick wins and coaching.	Certification registry checks; adoption metrics; user-support and remediation logs; quarterly compliance reports.

3.9. Time Horizon and Phasing.
DHEP shall be implemented over thirty-six months, divided into three phases preceded by preparatory initiation.

Table 4 — Phase Milestones and Exit Criteria

Phase	Horizon	Milestones (illustrative, binding at national approval)	Exit Criteria
Initiation	Months 0–3	National scoping and baseline; Host Country Resolution adopting DHEP; Operating Circulars for data governance, security, accessibility; facility mapping and connectivity baselines; vendor-neutral procurement framework; clinical governance committee constituted.	Instruments enacted; budgets approved; pilot institutions designated; minimum infrastructure baselines confirmed; grievance mechanism operational.
Scale-Up	Months 3–18	EMR/HIE deployment in priority districts; telemedicine live in primary facilities; AI decision-support pilots with bias/explainability dossiers; stock dashboards across essential lines; surveillance dashboards operating with threshold alerts; capacity cohorts certified;	Facility coverage thresholds met; referral delay reduction documented; duplicate testing reduced; stock-out reduction verified; alert-latency within thresholds; adoption metrics achieved.

Phase	Horizon	Milestones (illustrative, binding at national approval)	Exit Criteria
		accessibility feature set hardened and user-tested.	
Consolidation	Months 18–36	National rollout to remaining districts; cross-border data exchange protocols activated per REC guidance; institutionalisation in civil-service training; maintenance and support SLAs; regional hubs engaged for shared services; annual public report published.	National institutionalisation evidenced by budgets, standards, and performance results; independent audit confirms compliance and effectiveness; resolutions confirm continuity.

3.10. Minimum Performance Thresholds and Service Levels.
The following thresholds shall be binding unless superseded by national instrument adopting higher standards. Thresholds are measured quarterly and disclosed publicly.

Table 5 — Minimum Thresholds

Domain	Indicator	Minimum Threshold (binding)	Notes
Telemedicine	Median referral delay from teleconsultation to scheduled in-person visit	≤ 72 hours in Phase II; ≤ 48 hours in Phase III	Excluding emergency referrals; measured at district level.
EMR/HIE	Standards-compliant exchange success rate (clinical summary, lab result, medication)	≥ 95% successful transactions	Includes consent/provenance checks and audit logs.
Security	Information security certification status	Current ISMS certification; major findings remediated within 90 days	Annual surveillance audits; incident reporting within 48 hours.
AI decision-support	Bias/explainability compliance	Pre-deployment bias audit and explainability dossier filed; human-in-the-loop documented	Critical decisions require human validation; grievance redress available.
Stock & supply	Stock-out rate for essential medicines	≥ 40% reduction from baseline by end Phase II; ≥ 60% by end Phase III	Facility-level dashboards; replenishment lead-time tracked.

Domain	Indicator	Minimum Threshold (binding)	Notes
Outbreak analytics	Alert latency (facility to district dashboard)	≤ 6 hours in Phase II; ≤ 2 hours in Phase III	Includes lab stream ingestion where applicable.
Accessibility	Public portal and clinical UX conformance	Accessibility conformance statements published; remediation logs closed within 60 days	Universal design enforced; disability cohort testing documented.

3.11. Operating Instruments and Compliance Mechanisms.
DHEP shall be governed by a hierarchy of binding instruments and compliance processes:

1. **Operating Circulars.** Data governance, privacy, security, accessibility, interoperability, and algorithmic accountability circulars adopted by the national steering committee and filed with the DESA Central Unit.
2. **Data Protection Impact Assessments (DPIAs) and Privacy Notices.** DPIAs shall be mandatory for EMR/HIE, telemedicine, logistics, and surveillance systems; privacy notices must be accessible and multilingual.
3. **Algorithmic Accountability Statement.** Required for every AI deployment; includes intended use, validation method, bias-audit results, explainability summary, human-in-the-loop protocol, and grievance mechanism.
4. **Accessibility Conformance Statement.** Published for public portals and clinical UIs; must include user testing summaries, remediation logs, and conformance level.
5. **Interoperability Implementation Guide (IIG).** National profiles, terminology services, consent models, and testing criteria for standards-based exchange; repository maintained by the Programme Office.
6. **Information Security Certification Cycle.** ISMS certification maintained with annual surveillance audits; incident reporting and corrective actions time-bound.
7. **Grievance Redress and Audit Obligations.** Public grievance channels for patients and staff; independent audits of compliance and performance; corrective action protocols enforced with publishable status updates.

3.12. Cross-Walk to External Frameworks.
DHEP's institutional objectives align with recognised international and regional frameworks. The cross-walk below defines the principal contributions and reporting obligations.

Table 6 — Alignment and Reporting Cross-Walk

DHEP Objective	International Alignment	Continental/Regional Alignment	Reporting Interface
Telemedicine continuity	WHO Global Strategy on Digital Health (institutionalisation; monitoring; people-centred design)	Agenda 2063 (quality of life); AfDB High 5 (Improve QoL); SADC DTS (e-government; digital skills)	National dashboards; annual public report; REC observatory inputs
Interoperable EMR/HIE	HL7 FHIR; OECD Health Data Governance (privacy; accountability)	COMESA IDEA (trusted platforms; secure hosting); EAC Health Sector Plan (regional scorecard)	Interoperability test reports; consent/provenance audit trails
Ethical AI decision-support	WHO strategic principles; OECD governance (lawful processing; transparency)	DESA DAIP (mandatory AI capacity and ethics); Agenda 2063 innovation	Bias/explainability dossiers; certification registry
Stock & supply readiness	WHO strategy (integrated governance; monitoring)	AfDB High 5 (Improve QoL); SADC DTS (secure infrastructure; e-government)	Logistics dashboards; stock-out and lead-time metrics
Outbreak analytics and alerts	WHO strategy (monitoring and evaluation)	COMESA/EAC cross-border coordination; MTSP pillars (knowledge and skills)	Alert-latency reports; cross-border protocol logs

3.13. Workstreams and Integration Logic.
To sustain coherence and scalability, DHEP shall operate concurrent workstreams: clinical integration (telemedicine, EMR/HIE, decision-support); data governance and lawful processing (consent, DPIA, auditability); infrastructure and security (hosting, connectivity, identity, observability); logistics and facility readiness (stock dashboards, replenishment workflows); surveillance and analytics (syndromic and lab streams, threshold alerts); capacity and adoption (training, certification, departmental champions, coaching). Each workstream maintains documented deliverables, service-level agreements, and adoption metrics, reported quarterly.

3.14. Change-Management and Adoption.
Participating institutions shall maintain executive sponsorship; appoint departmental champions; execute communication and user-support plans; prioritise early quick wins tied to daily tasks; track resistance and remediate through targeted coaching and refresher sessions; escalate persistent adoption risks to the Programme Office for resolution.

3.15. Dependencies and Preconditions.
Execution requires enacted policy instruments, minimum connectivity baselines, lawful data-access arrangements, clinical governance approvals, mapped facility identifiers, licensure and credentialing for telemedicine, laboratory interface specifications for surveillance, and procurement lead-times

resolved under vendor-neutral principles. Where infrastructural constraints exist, DHEP mandates phased deployment, offline/edge patterns, and low-bandwidth modalities.

3.16. Success Criteria and Verification.
Success shall be evidenced by certified cohorts and trainers; standards-compliant exchange; documented reductions in referral delays and duplicate testing; verified stock-out reductions and improved replenishment; lawful and timely outbreak alerts; accessibility conformance; and independent audits confirming compliance and effectiveness. Verification occurs through quarterly compliance reports, biannual reviews, and annual public disclosure.

3.17. Governance Architecture and Legal Sufficiency
The governance structure of the DESA Health Enablement Program (DHEP) is designed to ensure institutional legitimacy, operational accountability, and compliance with ethical and regulatory standards. It establishes a multi-tiered system integrating oversight, implementation, and certification functions within the broader DESA governance framework, while maintaining alignment with national laws, REC protocols, and international best practices.

3.18. Multi-Tiered Governance Structure
DHEP governance shall be constituted under the following tiers:

a) **Central Oversight**
The DESA Central Unit shall serve as the supreme governing authority for DHEP, responsible for policy formulation, standard-setting, and accreditation. It shall maintain direct accountability to the Creativa Center Board and operate under the provisions of the Institutional Governance Manual. The Central Unit shall also coordinate strategic partnerships with continental and regional bodies, including the African Union Commission (AUC), African Development Bank (AfDB), and COMESA Secretariat.

b) **National Programme Office**
Each Host Country shall establish a DHEP Programme Office under its national DESA steering committee. This office shall be responsible for programme execution, localisation of standards, procurement of health-tech solutions, and coordination with ministries of health, ICT, finance/planning, and education. It shall report to the DESA Central Unit through quarterly compliance and performance reviews.

c) **Advisory Board**
A DHEP Advisory Board shall be constituted to provide strategic guidance and technical validation. Membership shall include representatives from AfDB, COMESA, national governments, academia, and private sector partners. The Advisory Board shall convene biannually to review progress, approve major policy adjustments, and validate compliance with ethical, security, and accessibility standards.

3.19. Programme Office Structure
The Programme Office shall maintain the following directorates:

- **Legal and Compliance Directorate**: Responsible for drafting and enforcing Operating Circulars, DPIAs, algorithmic accountability statements, and accessibility conformance reports.
- **Technical Integration Directorate**: Oversees EMR/HIE deployment, telemedicine integration, AI decision-support systems, and interoperability testing.

- **Capacity and Adoption Directorate**: Manages training cohorts, certification processes, and change-management plans.
- **Monitoring and Evaluation Directorate**: Maintains KPI dashboards, conducts audits, and publishes quarterly and annual performance reports.
- **Finance and Fiduciary Directorate**: Administers budget envelopes, procurement protocols, and cost-control measures under DESA fiduciary standards.

3.20. Steering Committees and Reporting Lines

The national steering committee shall include senior representatives from health, ICT, finance/planning, and education ministries, alongside civil society and private sector observers. Reporting lines are as follows:

- Programme Office → National Steering Committee → DESA Central Unit.
- Quarterly compliance reports submitted to DESA Central Unit; biannual Advisory Board reviews; annual public performance report published on DESA's unified Monitoring, Evaluation, and Learning (MEL) dashboard.

3.21. Compliance Mechanisms and Enforcement

Compliance shall be enforced through:

- **Independent Audits**: Covering ethical AI, data governance, accessibility, and security.
- **Bias and Accessibility Audits**: Mandatory for all AI deployments and public interfaces.
- **Grievance Redress Mechanism**: Public channels for complaints; escalation protocols for unresolved issues.
- **Corrective Action Plans**: Time-bound remediation for non-compliance; persistent failure triggers suspension of certification privileges and funding reallocation.

3.22. Institutional Safeguards

Risk management is embedded in governance through:

- **Preventive Orientation**: Mandatory DPIAs, bias audits, and security certifications prior to deployment.
- **Transparency and Auditability**: Public disclosure of compliance status and performance metrics.
- **Alignment with Continental and Regional Safeguards**: Conformance to AfDB safeguard policies, COMESA interoperability standards, and Agenda 2074 ethical principles.

3.23. Legal Bases and Normative Instruments

Compliance under DHEP is grounded in a hierarchy of binding instruments:

- **Programme Charter and Host Country Agreement**, which confer sovereign authority and define obligations for lawful processing, interoperability, and fiduciary controls.
- **Operating Circulars**, adopted by the national steering committee and filed with the DESA Central Unit, covering data governance, algorithmic accountability, accessibility, and security.

- **International and Regional Standards**, incorporated by reference, including WHO's Global Strategy on Digital Health, OECD Health Data Governance principles, HL7 FHIR interoperability specifications, ISO/IEC 27001 security standards, and REC digitalisation frameworks.

3.24. Data Protection and Privacy Compliance

All personal health data processed under DHEP shall comply with national data protection laws and regional interoperability protocols. Mandatory safeguards include:

- **Data Protection Impact Assessments (DPIAs)** for EMR/HIE, telemedicine, logistics, and surveillance systems.
- **Encryption** of sensitive data at rest and in transit; role-based access controls; and secure hosting within approved jurisdictions.
- **Audit Trails and Provenance Logging** for all clinical transactions and algorithmic outputs. Cross-border data exchange shall be subject to harmonised standards validated by the Advisory Board and REC instruments.

3.25. Algorithmic Transparency and Ethical AI

AI systems deployed under DHEP must adhere to principles of fairness, transparency, and accountability:

- **Bias Audits** prior to deployment;
- **Explainability Reports** detailing model logic and decision pathways;
- **Human-in-the-Loop Protocols** for all critical clinical decisions;
- **Grievance Redress Mechanism** for patients and staff, with escalation to the Programme Office and DESA Central Unit.

  Compliance shall be verified through independent audits and public disclosure of algorithmic accountability statements.

3.26. Accessibility and Inclusion Safeguards

Universal design principles shall be institutionalised across all public portals, clinical interfaces, and telemedicine platforms. Mandatory obligations include:

- **Accessibility Conformance Statements** published for each interface;
- **Assistive Technologies** integrated for dyslexia, dyscalculia, and mobility impairments;
- **User Testing** with disability cohorts and remediation logs closed within 60 days. Compliance shall be measured against WCAG standards and DESA benchmarks.

3.27. Grievance Redress and Audit Obligations

A multi-channel grievance mechanism shall be maintained for patients, staff, and stakeholders. Independent audits shall cover:

- Ethical AI compliance;
- Data governance and security;
- Accessibility integration;

- Fiduciary stewardship.
  Audit findings and corrective actions shall be disclosed through DESA's unified Monitoring, Evaluation, and Learning (MEL) dashboard.

3.28. Risk Management and Contingency Protocols

Risk categories include ethical and algorithmic risks, data privacy breaches, accessibility failures, institutional adoption gaps, financial shortfalls, and operational constraints. Mandatory safeguards:

- **Preventive Orientation** through policy instruments and technical standards;
- **Institutional Accountability** via documented risk registers and corrective action plans;
- **Transparency and Auditability** through public disclosure of risk indicators and remediation status.
  Persistent non-compliance may trigger suspension of certification privileges, funding reallocation, or intervention by the DESA Central Unit.

References

1. WHO Global Strategy on Digital Health 2020–2025:
   • https://www.who.int/publications/i/item/9789240020924
2. OECD Recommendation on Health Data Governance:
   • https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0433
3. HL7 FHIR Standard:
   • https://fhir.hl7.org/fhir/overview.html
4. ISO/IEC 27001:2022:
   • https://www.iso.org/standard/27001
5. Agenda 2063 and AfDB High 5 priorities:
   • https://www.agenda2063.africa/
   • https://www.afdb.org/en/high5s
6. COMESA Digitalisation Strategy and MTSP:
   • https://www.comesa.int/inclusive-digitalisation-of-eastern-and-southern-africa-idea-program-documents/
7. SADC Digital Transformation Strategy:
   • https://www.sadc.int/sadc-strategic-documents
8. EAC Health Sector Strategic Plan:
   • https://rcc.eac.int/index.php/node/129
9. DESA DAIP Programme Document:
   • (User-provided: DESA DAIP.pdf)

Chapter 4. Implementation Framework (Infrastructure, Application, Capacity, and Sequencing)

4.1. Framework Overview
The DHEP implementation framework is structured to ensure legal sufficiency, operational feasibility, and measurable impact across governance, clinical workflows, and public health systems. It adopts a **three-tier model**—Infrastructure, Application, and Capacity—executed through phased sequencing and supported by compliance instruments, fiduciary safeguards, and monitoring protocols.

4.2. Tier I — Infrastructure
Infrastructure obligations form the foundation for lawful and resilient digital health operations. Mandatory components include:

- **Hosting and Security**: Sovereign or approved hybrid hosting certified under ISO/IEC 27001:2022; encryption at rest and in transit; role-based access controls; observability stack with audit trails.
- **Connectivity Baselines**: Minimum bandwidth thresholds for primary facilities; offline/edge patterns for low-connectivity environments; redundancy protocols for critical nodes.
- **Identity and Access Management**: Federated identity systems integrated with national e-ID frameworks; multi-factor authentication for clinical users; consent and provenance logging for all transactions.

Verification: Independent security audits; penetration-test reports; compliance certificates filed with DESA Central Unit.

4.3. Tier II — Application
Application tier delivers functional capabilities across clinical, logistics, and surveillance domains:

- **EMR/HIE Deployment**: Standards-compliant exchange using HL7 FHIR profiles; interoperability testing and certification; integration with laboratory and pharmacy systems.
- **Telemedicine Integration**: Embedded triage and referral workflows; multilingual interfaces; accessibility features for dyslexia, dyscalculia, and mobility impairments.
- **AI Decision-Support**: Clinically validated use cases (triage, referral prioritisation, image-based diagnostics); bias audits and explainability dossiers; human-in-the-loop protocols.
- **Logistics and Stock Monitoring**: Real-time dashboards for essential medicines and consumables; predictive analytics for demand forecasting and replenishment.
- **Outbreak Analytics**: Syndromic surveillance and lab data ingestion; threshold-based alerting; cross-border coordination under REC protocols.

Verification: Functional acceptance tests; accessibility conformance statements; algorithmic accountability reports; interoperability certification logs.

4.4. Tier III — Capacity
Capacity tier institutionalises skills, adoption, and sustainability:

- **Training and Certification**: Tiered curricula for clinicians, administrators, and technical staff; DAIP integration for AI literacy and applied competencies; trainer-of-trainers pipelines.
- **Change-Management**: Executive sponsorship; departmental champions; quick-win deliverables tied to daily tasks; structured communication and user-support plans.
- **Institutionalisation**: Integration of DHEP modules into civil-service training standards and university curricula; accreditation of training institutions; maintenance of a public credential registry.

Verification: Certification registry checks; adoption metrics; compliance audits; quarterly performance reports.

4.5. Sequencing and Phasing

Implementation shall proceed through three operational phases, preceded by preparatory initiation:

Phase 0 — Initiation (Months 0–3)
Legal and operational readiness: Host Country Resolution; Operating Circulars enacted; facility mapping; procurement pre-qualification; baseline connectivity confirmed.

Phase 1 — Scale-Up (Months 3–18)
Deployment of EMR/HIE in priority districts; telemedicine live in primary facilities; AI decision-support pilots; logistics dashboards operational; accessibility features hardened and user-tested; Tier-1 certification cohorts completed.

Phase 2 — Consolidation (Months 18–36)
National rollout; cross-border interoperability activated; institutionalisation in civil-service training; regional hubs operational; annual public performance report published.

4.6. Minimum Service Levels

Binding thresholds include:

- EMR/HIE exchange success rate ≥95%;
- Telemedicine referral delay ≤48 hours by Phase III;
- Stock-out reduction ≥60% from baseline;
- Outbreak alert latency ≤2 hours;
- Accessibility conformance statements published and remediation logs closed within 60 days.

Chapter 5. Fiduciary Architecture and Financing Instruments

5.1. Narrative Overview

The financial architecture of the DESA Health Enablement Program (DHEP) is conceived as a structural guarantee for adequacy, predictability, and sustainability of resources throughout the programme's lifecycle. It is not an ancillary component but a binding pillar of governance, ensuring that every operational obligation—whether infrastructural, clinical, or capacity-building—is underpinned by lawful, transparent, and resilient financing arrangements. This chapter sets out the principles, instruments, and safeguards that govern the mobilisation, allocation, and stewardship of funds, embedding fiduciary integrity as a normative requirement under DESA's Institutional Governance Manual.

5.2. Financing Principles and Legal Mandate

All financial flows under DHEP shall adhere to principles of transparency, accountability, and value for money. These principles are codified in Operating Circulars and enforced through independent audits and public disclosure obligations. Financing instruments must align with continental and regional development agendas, notably Agenda 2063, the AfDB High 5 priorities, and REC digitalisation strategies, ensuring that resource mobilisation is not merely transactional but strategically contributive to Africa's long-term integration and resilience objectives.

5.3. Sources of Financing

The programme's financing model is deliberately diversified to mitigate dependency risk and secure continuity beyond the initial implementation horizon. The primary source is the DESA Development Fund, which allocates earmarked resources for health digitalisation under its portfolio. This is complemented by second-lien participation from the African Development Bank (AfDB) through concessional loans, grants, and technical assistance windows, reinforcing alignment with the Bank's Ten-Year Strategy and its emphasis on innovation and quality of life. Additional streams include private sector co-financing, mobilised through strategic partnerships with technology providers, telecom operators, and health-tech innovators, often structured as Corporate Social Responsibility (CSR) contributions or in-kind support such as software licenses and cloud credits. Development Finance Institutions (DFIs) and bilateral donors provide further augmentation, particularly for inclusion and accessibility components targeting vulnerable populations. Finally, cost-recovery mechanisms—principally through tuition and certification fees for advanced training tiers—are introduced to sustain operations without imposing prohibitive costs on beneficiaries.

5.4. Fiduciary Instruments and Safeguards

Financial governance under DHEP is institutionalised through a suite of binding instruments. These include budget envelopes approved by national steering committees, procurement protocols anchored in vendor-neutrality and competitive bidding, and audit schedules integrated into DESA's unified Monitoring, Evaluation, and Learning (MEL) system. All transactions are subject to dual-layer verification: internal compliance reviews by the Programme Office and independent audits commissioned by the DESA Central Unit. Risk mitigation measures—such as contingency reserves within the DESA Development Fund and hedging instruments for currency exposure—are mandatory, ensuring resilience against fiscal shocks and delayed disbursements.

5.5. Sustainability Strategy

Sustainability is not deferred to post-implementation but embedded from inception. DHEP mandates integration of its financial model into national systems through recurrent budget lines and civil-service training standards, thereby institutionalising cost obligations as part of sovereign commitments. Regional hubs—strategically located in COMESA corridors—operate under a shared-services model, pooling procurement and technical support to achieve economies of scale. Performance-based financing is enforced, linking future allocations to verified compliance and measurable outcomes under the MEL framework. This approach ensures that financing is not static but dynamically responsive to efficiency, accountability, and impact.

5.6. Risk Management in Financing

Financial risk categories—ranging from funding shortfalls and currency volatility to cost overruns—are addressed through preventive and corrective protocols. Diversification of sources, maintenance of contingency reserves, and strict adherence to fiduciary standards constitute the first line of defense. Persistent non-compliance or materialisation of high-impact risks triggers escalation to the DESA

Central Unit, which may impose remedial measures including reallocation of funds, suspension of disbursements, or restructuring of financial instruments.

Chapter 6. Compliance and Ethics in Operational Deployment

6.1. Narrative Overview

Compliance and ethics within the DESA Health Enablement Program (DHEP) are not discretionary elements but binding obligations that permeate every operational layer—from infrastructure and application deployment to capacity building and cross-border interoperability. This chapter articulates the normative framework that governs lawful processing, algorithmic accountability, accessibility, and fiduciary integrity, ensuring that digital health transformation is executed in a manner that is transparent, equitable, and resilient.

6.2. Legal Foundations and Normative Hierarchy

The compliance regime under DHEP is anchored in a hierarchy of instruments: the Programme Charter and Host Country Agreement confer sovereign authority; Operating Circulars codify technical and ethical standards; and international and regional frameworks provide normative benchmarks. WHO's Global Strategy on Digital Health establishes principles of institutionalisation and monitoring, while the OECD Recommendation on Health Data Governance prescribes lawful access, privacy, and accountability. Interoperability obligations derive from HL7 FHIR specifications, and security requirements are enforced through ISO/IEC 27001 certification. These instruments collectively ensure that operational deployment is not only technologically sound but legally defensible.

6.3. Data Governance and Privacy Compliance

All personal health data processed under DHEP must comply with national data protection laws and regional interoperability protocols. Mandatory safeguards include encryption at rest and in transit, role-based access controls, and secure hosting within approved jurisdictions. Data Protection Impact Assessments (DPIAs) are required for EMR/HIE, telemedicine, logistics, and surveillance systems, and audit trails must be maintained for every clinical transaction. Cross-border data exchange is permissible only under harmonised standards validated by the Advisory Board and REC instruments.

6.4. Algorithmic Transparency and Ethical AI

AI deployments within DHEP—such as triage support and diagnostic assistance—must adhere to principles of fairness, transparency, and accountability. Pre-deployment bias audits and explainability reports are mandatory, and human-in-the-loop protocols must govern all critical clinical decisions. Grievance redress mechanisms shall be accessible to patients and staff, with escalation pathways to the Programme Office and DESA Central Unit. Compliance is verified through independent audits and public disclosure of algorithmic accountability statements.

6.5. Accessibility and Inclusion

Universal design principles are institutionalised across all public portals, clinical interfaces, and telemedicine platforms. Accessibility conformance statements must be published for each interface, and assistive technologies integrated for dyslexia, dyscalculia, and mobility impairments. User testing with disability cohorts is mandatory, and remediation logs must be closed within 60 days. Compliance is measured against WCAG standards and DESA benchmarks, ensuring that digital health transformation advances social equity rather than exacerbating exclusion.

6.6. Grievance Redress and Audit Obligations

A multi-channel grievance mechanism shall be maintained for patients, staff, and stakeholders. Independent audits will cover ethical AI compliance, data governance, accessibility integration, and

fiduciary stewardship. Findings and corrective actions are disclosed through DESA's unified Monitoring, Evaluation, and Learning (MEL) dashboard, reinforcing transparency and institutional accountability.

6.7. Risk Management and Contingency Protocols

Risk categories—ethical, algorithmic, privacy, accessibility, adoption, financial, and operational—are addressed through preventive and corrective measures. Mandatory safeguards include documented risk registers, time-bound remediation plans, and escalation protocols for persistent non-compliance. Significant risk events and remediation outcomes are disclosed publicly to maintain stakeholder confidence.

Table 7 — Compliance Domains and Verification Mechanisms

Compliance Domain	Mandatory Instrument	Verification Method
Data Governance	DPIAs; Operating Circulars; Audit Trails	Independent audits; MEL dashboard disclosure
Algorithmic Ethics	Bias Audit; Explainability Report; Human-in-the-Loop Protocol	Pre-deployment certification; Public accountability statement
Accessibility	Accessibility Conformance Statement; WCAG Compliance	Disability cohort testing; Remediation logs
Security	ISO/IEC 27001 Certification; Incident Reporting	Annual surveillance audits; Penetration tests
Fiduciary Integrity	Budget Envelopes; Procurement Protocols	Dual-layer audits; Public financial disclosure

Chapter 7. Regional Replication and Integration

7.1. Narrative Overview

Regional replication under the DESA Health Enablement Program (DHEP) is framed as a lawful, standards-driven expansion of national digital health capabilities into coordinated regional systems. The objective is to secure continuity of primary care and epidemic response across borders through interoperable clinical data exchange, harmonised surveillance protocols, and shared services for hosting and support. Integration is achieved by aligning national deployments with the treaty-consistent instruments and strategic plans of the Regional Economic Communities (RECs), notably COMESA, SADC, and the EAC, and by embedding international guidance on digital health governance, interoperability, and security. The approach recognises sovereign control while establishing region-wide conventions for trusted data flows, accountability, and resilience consistent with WHO's global digital health strategy and OECD's health data governance principles.

7.2. Harmonisation with COMESA

Within COMESA jurisdictions, DHEP shall be synchronised with the Inclusive Digitalisation of Eastern and Southern Africa (IDEA) programme and the COMESA Medium-Term Strategic Plan (MTSP). Harmonisation is pursued through three instruments. First, national Operating Circulars for data governance and interoperability will cross-reference the IDEA platform's emphasis on secure hosting

markets, trusted transactions, and interoperable data services, ensuring that health data platforms conform to regional expectations for quality and safety. Second, public health surveillance and customs-relevant health information exchange will be implemented with data-sharing protocols that recognise COMESA's coordination role and the legal requirements for cross-border exchange, with Advisory Board validation prior to activation. Third, shared services and pooled procurement will be routed through regional hubs situated on COMESA corridors, enabling economies of scale for EMR/HIE tooling, observability stacks, and accessibility components while preserving national oversight of clinical safety and privacy. This model draws directly on COMESA's programme documentation and strategic pillars for regional harmonisation, knowledge transfer, and secure infrastructure.

7.3. Harmonisation with SADC

In the SADC region, DHEP shall be aligned with the Digital Transformation Strategy and Action Plan (DTS) and the Health Workforce Strategic Plan. Alignment has two practical dimensions. The first is legal and regulatory consistency: DHEP Operating Circulars on e-government integration, security controls, and digital skills shall reflect the DTS's objectives for regionally harmonised legal frameworks and secure infrastructure, ensuring that telemedicine, EMR/HIE, and surveillance systems meet SADC's expectations for interoperability and resilience. The second is human-capacity continuity: clinical training, data governance competencies, and accessibility practices shall be integrated with the Health Workforce Strategic Plan to support mobility of skills and cross-border service readiness. This ensures that frontline deployment of telemedicine and outbreak analytics can be maintained during cross-border health events and that staff certification remains portable and verifiable within the region. Shared services will be co-located with SADC members that meet the hosting and security certification requirements, permitting hosted applications and analytics to operate lawfully across jurisdictions while retaining sovereign control of patient data and auditability.

7.4. Harmonisation with the EAC

EAC alignment emphasises cross-border public health coordination, digital health scorecards, and pooled procurement. DHEP deployments shall integrate with the EAC Regional Health Sector Strategic Plan (2024–2030), ensuring that national dashboards feed into regional scorecard mechanisms for monitoring progress on service delivery, readiness, and epidemic alerts. Cross-border protocols—covering syndromic surveillance, laboratory result exchange, and alert thresholds—will be formalised through Operating Circulars that articulate consent models, lawful processing requirements, and incident notification procedures compatible with EAC's guidance on strong digital systems and governance of shared health data. Procurement of interoperable EMR/HIE modules and accessibility components may be coordinated through EAC structures to reduce fragmentation, with verification of standards compliance and the publication of national conformance statements to support trust and accountability.

7.5. Shared Infrastructure and Knowledge Platforms

Replication is operationalised through shared infrastructure and knowledge platforms that anchor national systems to regional support functions. Sovereign or approved hybrid hosting remains a national decision; however, regional hubs will provide shared observability (audit logs, latency monitoring, incident triage), interoperability testing environments, and catalogue services for standards-compliant profiles and terminology. A knowledge platform will curate implementation guides, accessibility conformance templates, algorithmic accountability statements, and case studies, enabling ministries and clinical institutions to adopt proven patterns without redundancy. These platforms are designed to meet WHO's requirements for institutionalisation and monitoring and OECD's requirements for transparency, quality assurance, and cross-border research and statistical use,

thereby ensuring that replication delivers lawful and measurable improvements in health system performance.

7.6. Regional Interoperability and Security Assurance

Interoperability across jurisdictions is governed by national profiles derived from HL7 FHIR, consolidated into a regional implementation guide with common resource constraints, consent and provenance models, and testing criteria. Security assurance is maintained through ISO/IEC 27001 certification for hosting environments and operational teams, with annual surveillance audits and incident reporting obligations. National and regional entities shall agree on a minimum security baseline—including encryption, access control, and auditability—that is recognised by the Advisory Board as sufficient for trusted cross-border exchange. The governance logic avoids centralisation of personal health data; instead, it establishes a federation of trusted nodes, each maintaining sovereign custody while exposing standards-compliant interfaces for lawful, accountable exchange.

7.7. Economic Rationale and Social Equity Implications

Regional replication provides demonstrable economic and social returns. Pooled procurement and shared services reduce unit costs of EMR/HIE deployment, observability stacks, and accessibility tooling. Cross-border outbreak analytics shorten alert latency and reduce the scale of epidemiological shock, with downstream savings in emergency mobilisation and service disruptions. Harmonised skills and certification pipelines increase mobility of clinicians and technicians, supporting continuity of care during cross-border events and strengthening workforce resilience. Social equity is advanced through the standardisation of inclusive design obligations and accessibility testing, ensuring that vulnerable populations across regions benefit equally from telemedicine, digital records, and public health alerts. These outcomes are measured and disclosed through national dashboards, regional scorecards, and unified MEL instruments, meeting international expectations for monitoring and accountability.

Table 8 — Regional Harmonisation Matrix (Design Obligations and Verification)

REC	Legal/Policy Instrument (Design Obligation)	Operational Focus	Verification and Reporting
COMESA	Cross-referenced Operating Circulars aligned to IDEA platform and MTSP pillars; Advisory Board validation of cross-border protocols	Secure hosting markets; interoperable data services; pooled procurement and shared services	Conformance statements; interoperability test logs; MEL dashboard disclosure; hub audit reports
SADC	Operating Circulars reflecting DTS legal harmonisation and secure infrastructure; workforce integration with Health Workforce Plan	E-government integration; security baselines; portable skills and certification	Security certification registry; training and adoption metrics; accessibility conformance statements
EAC	Operating Circulars for scorecard integration and cross-border alerting; pooled procurement procedures	Regional health scorecards; syndromic/lab surveillance;	National-to-regional dashboard feeds; alert-latency reports; procurement conformance records

REC	Legal/Policy Instrument (Design Obligation)	Operational Focus	Verification and Reporting
		procurement coordination	

7.8. Institutional Commitments and Replication Protocol

Replication is formalised through a protocol that binds participating states to publish their conformance statements, interoperability profiles, accessibility declarations, and security certifications. States undertake to implement grievance channels and cross-border incident notification within the established thresholds, and to participate in Advisory Board reviews of major policy adjustments. The DESA Central Unit will maintain accreditation of regional hubs, oversee the fidelity of shared services, and enforce corrective actions where persistent non-compliance is observed. This protocol ensures that replication is not informal diffusion but a structured, legally defensible expansion of national systems into a regional operating context.

Chapter 8. Programme Benefits and Economic Rationale

8.1. Narrative Overview

The DESA Health Enablement Program (DHEP) is not merely a technological intervention; it is an economic and social investment designed to yield measurable returns in efficiency, equity, and competitiveness. This chapter articulates the benefits of DHEP in terms of cost savings, productivity gains, job creation, and systemic resilience, while situating these outcomes within the broader objectives of national development and regional integration. The rationale is grounded in evidence from global and continental frameworks, demonstrating that digital health systems—when lawfully implemented and ethically governed—reduce operational inefficiencies, enhance service delivery, and stimulate market activation.

8.2. Governance and Service Efficiency Gains

By institutionalising interoperable EMR/HIE platforms and telemedicine services, DHEP eliminates redundancies such as duplicate testing and manual record handling. Predictive analytics embedded in resource allocation workflows reduce fiscal leakage and optimise budget planning. These efficiencies translate into quantifiable savings for ministries of health and finance, while improving patient throughput and reducing referral delays. Public dashboards and algorithmic accountability statements reinforce transparency, thereby strengthening governance legitimacy and donor confidence.

8.3. Economic Impact and Market Activation

DHEP catalyses the health-tech market by creating demand for interoperable EMR modules, telemedicine platforms, and AI-enabled diagnostic tools. Local SMEs benefit from procurement opportunities and capacity-building programmes, while regional hubs enable pooled procurement and shared services, reducing unit costs and stimulating cross-border trade in health technologies. The integration of AI decision-support systems—under the mandatory DAIP framework—further accelerates innovation, positioning participating states as competitive actors in Africa's emerging digital economy.

8.4. Job Creation and Workforce Development

The programme generates employment across multiple tiers: technical roles in EMR/HIE deployment and maintenance; clinical positions enhanced by telemedicine and AI integration; and administrative functions in data governance and compliance. Capacity-building initiatives, including DAIP's tiered certification system, institutionalise new competencies in AI, health informatics, and accessibility design, creating a skilled workforce aligned with continental priorities under Agenda 2063 and AfDB's High 5 objectives. These roles are not transient but embedded within civil-service structures and private sector ecosystems, ensuring sustainability beyond the initial implementation horizon.

8.5. Social Equity and Accessibility Outcomes

DHEP advances social equity by embedding universal design principles and assistive technologies into all public portals and clinical interfaces. Persons with dyslexia, dyscalculia, and mobility impairments gain equitable access to telemedicine and digital health records, reducing structural barriers to care. Multilingual interfaces and inclusive design obligations ensure that rural and marginalised populations are not excluded from the benefits of digital health transformation. These outcomes are codified in accessibility conformance statements and verified through disability cohort testing, reinforcing compliance with global norms and regional ESG commitments.

8.6. Cost Savings and Fiscal Resilience

The economic rationale for DHEP is underscored by projected cost savings in procurement, logistics, and emergency response. Real-time stock monitoring and predictive analytics reduce wastage and prevent stock-outs, lowering expenditure on emergency replenishment and mitigating the fiscal impact of supply chain disruptions. Outbreak analytics shorten alert latency, enabling early containment and reducing the scale of epidemiological shocks, which translates into significant savings in emergency mobilisation and hospital surge capacity.

Table 9 — Indicative Economic and Social Impact Metrics

Impact Dimension	**Indicator**	**Projected Outcome by Phase III**
Governance Efficiency	Reduction in duplicate testing	≥ 40% decrease
Service Delivery	Median referral delay	≤ 48 hours
Market Activation	SMEs engaged in health-tech procurement	≥ 250 per jurisdiction
Workforce Development	Certified professionals under DAIP	≥ 5,000 across tiers
Accessibility	Compliance with WCAG and DESA benchmarks	100% of public portals and clinical UIs
Fiscal Resilience	Reduction in emergency procurement costs	≥ 30% from baseline
Outbreak Response	Alert latency	≤ 2 hours

8.7. Strategic Contribution to National Competitiveness

By embedding lawful, interoperable, and ethically governed digital health systems, DHEP enhances national competitiveness in multiple dimensions: governance credibility, investor confidence, and human capital development. These benefits extend beyond the health sector, creating spill-over effects in ICT, education, and logistics, and reinforcing Africa's trajectory toward integrated, innovation-driven growth as envisaged in Agenda 2063 and Agenda 2074.

Chapter 9. Measurement, Reporting, and Verification (MRV)

9.1. Narrative Overview

The Measurement, Reporting, and Verification (MRV) framework under the DESA Health Enablement Program (DHEP) is established as a binding instrument to ensure transparency, accountability, and continuous performance improvement. It is not an auxiliary mechanism but a structural component of governance, designed to validate compliance with programme objectives, monitor alignment with continental and regional development agendas, and provide evidence-based insights for decision-making at both national and regional levels. The MRV system operates under the unified DESA Monitoring, Evaluation, and Learning (MEL) architecture, ensuring consistency across all DESA programmes and interoperability with REC observatories and donor reporting frameworks.

9.2. Purpose and Principles

The MRV framework serves three primary purposes:

- **Performance Measurement**: To assess the extent to which DHEP achieves its stated objectives in governance, service delivery, and social equity.
- **Compliance Assurance**: To verify adherence to ethical AI standards, data governance protocols, and accessibility obligations.
- **Strategic Alignment**: To ensure that DHEP contributes to Agenda 2063's Second Ten-Year Implementation Plan, advances AfDB's High 5 priorities, and supports REC digitalisation strategies, while embedding the normative principles of Agenda 2074.

The framework is guided by principles of objectivity, independence, and data integrity, and mandates public disclosure of key indicators through dashboards accessible to citizens, development partners, and oversight bodies.

9.3. KPI Families and Indicator Logic

Key Performance Indicators (KPIs) are structured across five dimensions, each linked to measurable outcomes and compliance thresholds:

a) **Capacity Development**
   Indicators include the number of individuals certified under DAIP tiers (Foundational, Applied, Advanced), the number of accredited institutions delivering DHEP curricula, and the volume of trainers certified under the Train-the-Trainer programme.

b) **Institutional Integration**
   Metrics cover the number of AI-enabled governance dashboards deployed, the percentage of ministries and agencies with operational EMR/HIE systems, and the number of DHEP Implementation Labs established and functional.

c) **Private Sector Adoption**
Indicators measure SME adoption of AI tools for operations and market engagement, documented productivity gains (e.g., reduction in processing time, error rates, and cost savings), and participation in pooled procurement frameworks.

d) **Accessibility and Inclusion**
KPIs include the number of AI-driven assistive technologies deployed for dyslexia, dyscalculia, and mobility impairments; compliance rate with WCAG and DESA benchmarks; and beneficiary feedback scores from disability cohorts.

e) **Strategic Impact**
Metrics assess contribution to Agenda 2063 indicators (innovation, governance efficiency, education access), alignment with AfDB High 5 targets (Feed Africa, Industrialize Africa, Improve Quality of Life), and regional interoperability achieved within COMESA, SADC, and EAC corridors.

Table 10 — KPI Framework and Reporting Cadence

Dimension	Indicator	Reporting Frequency	Verification Method
Capacity Development	Certified professionals under DAIP tiers	Quarterly	Certification registry audit
Institutional Integration	EMR/HIE coverage in public facilities	Quarterly	Functional acceptance tests
Private Sector Adoption	SMEs using AI tools	Biannual	Adoption metrics and case studies
Accessibility	WCAG compliance rate	Quarterly	Accessibility audit reports
Strategic Impact	Regional interoperability achieved	Annual	REC observatory validation

9.4. Reporting Cadence and Disclosure Obligations

Reporting obligations are codified as follows:

- **Quarterly Reports** submitted by national DHEP units to the DESA Central Unit, covering KPIs, compliance status, and corrective actions.
- **Biannual Advisory Board Reviews** to validate progress and strategic alignment, including independent audits of ethical compliance and fiduciary stewardship.
- **Annual Public Performance Report** published on DESA's unified MEL dashboard, cross-referenced with Agenda 2063 and AfDB reporting frameworks, and accessible to citizens, donors, and oversight bodies.

9.5. Verification and Audit Protocols

Verification is conducted through a combination of automated data collection from EMR/HIE and telemedicine systems, independent compliance audits, and beneficiary surveys. Audit protocols cover

ethical AI, data governance, accessibility, and financial integrity. Findings are disclosed publicly, and corrective actions are time-bound and monitored through the MEL system.

9.6. Feedback and Continuous Learning

The MRV framework incorporates a structured feedback loop to inform continuous improvement. Lessons learned are codified into the DESA Knowledge Repository and disseminated across regional hubs to promote best practices and interoperability. Recommendations for curriculum updates, policy refinements, and technology enhancements are issued following each evaluation cycle.

Chapter 10. Stakeholder Engagement and Capacity Building

10.1. Narrative Overview

Stakeholder engagement under the DESA Health Enablement Program (DHEP) is conceived as a structured, legally enforceable process that ensures inclusivity, accountability, and operational coherence. It is not a peripheral activity but a core governance function, binding ministries, academia, private sector actors, civil society, and development partners into a unified implementation ecosystem. This chapter delineates the engagement architecture, capacity-building pathways, and certification mechanisms that institutionalise participation and competence across all tiers of the programme.

10.2. Engagement Architecture and Legal Basis

Engagement obligations are codified in Host Country Agreements and Operating Circulars, which stipulate the roles, responsibilities, and reporting lines of participating entities. Ministries of Health, ICT, Finance/Planning, and Education constitute the primary public sector stakeholders, supported by national steering committees that provide policy oversight and resource allocation. Academic institutions—universities and technical vocational education and training (TVET) centres—are mandated to deliver structured curricula and practicum environments under DAIP, ensuring that capacity building is embedded in formal education systems. Private sector actors, including SMEs and strategic industries, participate through procurement frameworks, innovation partnerships, and adoption sprints, while civil society organisations contribute to advocacy, accessibility audits, and grievance redress mechanisms. Development partners such as AfDB and regional bodies (COMESA, SADC, EAC) provide financing, technical assistance, and harmonisation support, reinforcing alignment with continental and regional strategies.

10.3. Capacity Building and Certification Pathways

Capacity building under DHEP is operationalised through a tiered certification system integrated with DAIP. This system ensures that competencies in digital health, AI ethics, and accessibility are not episodic but institutionalised as permanent features of national development frameworks. Training pathways include foundational literacy for civil servants and clinicians, applied modules for technical and managerial staff, and advanced integration tracks for specialists in AI and health informatics. Certification is co-endorsed by DESA and national authorities, recorded in a unified credential registry, and recognised by regional bodies to guarantee portability and legitimacy. Practicum environments—DHEP Implementation Labs—serve as the operational nexus for experiential learning, enabling participants to translate theoretical knowledge into measurable outcomes through supervised projects in governance, education, and private sector domains.

10.4. Engagement Tiers and Operational Roles

Stakeholder engagement is structured into tiers that reflect the depth of participation and accountability:

Tier I — Policy and Governance
Comprising ministries, national steering committees, and development partners, this tier is responsible for legal enactment, resource mobilisation, and strategic oversight. Engagement instruments include Host Country Agreements, Operating Circulars, and fiduciary protocols.

Tier II — Implementation and Technical Integration
This tier includes Programme Offices, academic institutions, and private sector actors tasked with operational deployment of EMR/HIE systems, telemedicine platforms, and AI decision-support tools. Engagement is formalised through Memoranda of Understanding (MoUs), procurement contracts, and accreditation agreements.

Tier III — Community and Civil Society
Civil society organisations, patient advocacy groups, and accessibility auditors operate at this tier, ensuring inclusivity, transparency, and responsiveness. Engagement instruments include grievance redress frameworks, accessibility conformance audits, and public disclosure obligations.

Table 11 — Stakeholder Engagement Matrix

Tier	Stakeholder Category	Core Responsibilities	Engagement Instrument
I	Ministries, Steering Committees, Development Partners	Policy enactment; resource allocation; strategic oversight	Host Country Agreement; Operating Circulars
II	Programme Offices, Academia, Private Sector	Technical deployment; capacity building; innovation partnerships	MoUs; Accreditation Agreements; Procurement Protocols
III	Civil Society, Advocacy Groups	Accessibility audits; grievance redress; public accountability	Compliance Reports; Audit Certificates

10.5. Advocacy and Communication Strategy
A structured advocacy and communication plan shall be maintained to ensure stakeholder awareness, trust, and participation. This includes multilingual public portals, periodic stakeholder briefings, and publication of compliance and performance reports on DESA's MEL dashboard. Civil society engagement is reinforced through participatory audits and grievance mechanisms, ensuring that programme legitimacy is grounded in transparency and responsiveness.

10.6. Institutionalisation of Capacity Building
Capacity building is not confined to initial implementation but embedded into civil-service training standards and university curricula. This institutionalisation guarantees continuity beyond the programme horizon, creating a permanent pipeline of certified professionals and accredited institutions. Regional hubs will coordinate trainer-of-trainers programmes and maintain a public registry of certified instructors, reinforcing interoperability and harmonisation across jurisdictions.

Chapter 11. Participation and Partnership Framework

11.1. Narrative Overview
The Participation and Partnership Framework under the DESA Health Enablement Program (DHEP) is designed as a legally enforceable structure that governs the entry, obligations, and rights of all actors

engaged in programme implementation. It ensures that partnerships are not ad hoc arrangements but formalised through instruments that guarantee compliance, accountability, and alignment with the programme's strategic objectives. This chapter sets out the modalities for participation, the legal instruments that codify engagement, and the mechanisms for partnership governance, including calls to action for investors, development finance institutions (DFIs), and technology providers.

11.2. Legal Instruments for Participation

Participation in DHEP is formalised through a hierarchy of instruments that confer rights and impose obligations on partners:

- **Memoranda of Understanding (MoUs)**: Establish the general framework for collaboration between the Programme Office and external entities, defining scope, responsibilities, and dispute resolution mechanisms.
- **Operating Circulars**: Codify technical and compliance standards, including data governance, algorithmic accountability, and accessibility obligations, binding on all partners.
- **Accreditation Agreements**: Apply to academic institutions and training providers, stipulating curriculum standards, certification protocols, and audit requirements.
- **Procurement Contracts**: Govern the acquisition of EMR/HIE systems, telemedicine platforms, and AI tools, embedding vendor-neutrality and compliance with interoperability and security standards.
- **Public-Private Partnership (PPP) Frameworks**: Structure co-financing arrangements with private sector actors and DFIs, ensuring fiduciary integrity and alignment with development objectives.

11.3. Entry Conditions for Partners

Entry into the DHEP ecosystem is contingent upon demonstrable compliance with programme standards and legal obligations. Technology providers must certify interoperability with HL7 FHIR specifications and security conformity under ISO/IEC 27001. Academic institutions seeking accreditation must demonstrate capacity to deliver DAIP curricula and maintain accessibility compliance. Private sector actors participating in procurement or adoption sprints must adhere to ethical AI principles and data governance protocols. DFIs and investors are required to align financing instruments with fiduciary safeguards and performance-based disbursement conditions.

11.4. Partnership Governance and Accountability

Partnership governance is institutionalised through the Advisory Board, which validates major policy adjustments, adjudicates compliance disputes, and authorises strategic partnerships. All partners are subject to periodic audits covering ethical compliance, accessibility integration, and fiduciary stewardship. Non-compliance triggers corrective action plans with time-bound remediation; persistent failure may result in suspension of privileges or termination of agreements.

11.5. Calls to Action for Strategic Partners

DHEP invites participation from investors, DFIs, and technology providers under a structured engagement model that prioritises transparency, sustainability, and impact. Investors and DFIs are encouraged to co-finance infrastructure and capacity-building components, leveraging blended finance instruments to mitigate risk and enhance scalability. Technology providers are invited to contribute interoperable solutions and accessibility innovations under vendor-neutral procurement frameworks.

Academic institutions and civil society organisations are called upon to strengthen capacity building and inclusivity, ensuring that digital health transformation advances social equity alongside efficiency.

Table 12 — Partnership Modalities and Compliance Obligations

Partner Category	Engagement Instrument	Core Obligation	Verification
Technology Providers	Procurement Contract; MoU	Interoperability (HL7 FHIR); Security (ISO/IEC 27001); Ethical AI compliance	Functional tests; Security audits; Bias audit reports
Academic Institutions	Accreditation Agreement	Delivery of DAIP curricula; Accessibility compliance; Trainer certification	Curriculum audit; Accessibility conformance statements
Private Sector Actors	PPP Framework; MoU	Adoption of AI tools; Compliance with data governance and ethics	Adoption metrics; Compliance audit
DFIs and Investors	PPP Framework; Financing Agreement	Alignment with fiduciary safeguards; Performance-based disbursement	Financial audits; MEL dashboard disclosure

11.6. Institutionalisation of Partnership Framework

The framework is embedded within DESA's governance architecture, ensuring that partnerships are not episodic but sustained through legal instruments, compliance audits, and public disclosure. Regional hubs will maintain registries of accredited partners and certified trainers, reinforcing transparency and interoperability across jurisdictions.

Chapter 12. Estimated Data Usage and National Fibre Optic Requirement

12.1. Purpose and Scope.

This chapter establishes a formal, quantitatively defensible estimate of data usage arising from lawful, interoperable digital health operations under DHEP and demonstrates the necessity of a terrestrial fibre optic backbone for sovereign health delivery in South Sudan. It models service-level demand across primary care telemedicine, EMR/HIE, logistics and stock monitoring, outbreak analytics, and accessibility services. It then converts sustained backbone throughput into daily, monthly, and annual volumes, and quantifies national concurrency and per-user allocation under conservative assumptions.

12.2. Throughput–to–Volume Conversion.

A sustained backbone capacity of 16 Gb/s equates to 2 GB/s, 7.2 TB/hour, 172.8 TB/day, and ≈ 63.07 PB/year. The determinism of this carriage (low latency, minimal jitter and loss) is critical to clinical safety and lawful data exchange, and is more material than headline peak speed.

Table 12-A — Volume Equivalents for 16 Gb/s Sustained

Interval	Calculation	Result
Per second	16 Gb/s ÷ 8	**2 GB/s**

Interval	Calculation	Result
Per hour	2 GB/s × 3,600	**7.2 TB/hour**
Per day	7.2 TB/hour × 24	**172.8 TB/day**
Per year	172.8 TB/day × 365	**≈ 63.07 PB/year**

12.3. Facility-Level Operational Budgets. Service-level compliance requires symmetric bandwidth with low latency and loss. The table below sets conservative minimums for routine clinical operations, including concurrent teleconsultations, EMR/HIE, logistics dashboards, outbreak reporting, and accessibility features.

Table 12-B — Illustrative Per-Facility Bandwidth Budget (Operational Day)

Facility Type	Typical Concurrent Activities	Minimum Sustained Throughput	Notes
Primary Health Care Centre (PHCC)	Teleconsultations; EMR/HIE; logistics dashboard; outbreak reporting	10–15 Mb/s symmetric	Budget accommodates HD telemedicine, EMR/EHR concurrency, and accessibility streams.
County/District Hospital	8–15 teleconsultations; EMR/HIE; lab interfaces; periodic imaging transfer	100–250 Mb/s symmetric	Includes real-time image transfer and continuous monitoring; fibre latency is essential.
Teaching/Referral Hospital	25–50 sessions; EMR/HIE; PACS exchange; training/streaming; research pulls	1,000 Mb/s symmetric	Academic operations require gigabit capacity; scalable to multi-gigabit as imaging and AI grow.
Public Health Laboratory Hub	Lab result streams; EMR/HIE; outbreak dashboards; cross-border alerts	50–100 Mb/s symmetric	Threshold-based alerting with strict latency expectations.

12.4. National Aggregate Demand (Phase II DHEP).

Assuming moderate national coverage in Phase II:

Table 12-C — National Sustained Bandwidth (Illustrative)

Asset Class	Count (indicative)	Per-Asset Throughput	National Sustained Bandwidth
PHCCs (rural/peri-urban)	250	10 Mb/s	2.50 Gb/s
County/District Hospitals	50	150 Mb/s	7.50 Gb/s
Teaching/Referral Hospitals	5	1,000 Mb/s	5.00 Gb/s
Public Health Laboratory Hubs	10	75 Mb/s	0.75 Gb/s
Subtotal	—	—	**≈ 15.75 Gb/s sustained**

This subtotal lies just below the 16 Gb/s sustained backbone reference, exclusive of burst capacity. It is modest by global standards but cannot be reliably satisfied through high-latency or contended backbones. It is engineered to be deterministic, not merely "fast."

12.5. Concurrency and Per-User Allocation.

Two interpretive lenses are provided: concurrent clinical sessions and annual volume per user.

a) **Concurrent telemedicine sessions.** A conservative per-session budget of **~3 Mb/s symmetric** for HD clinical video is reserved from backbone capacity while preserving headroom for EMR/HIE, surveillance, logistics, and accessibility:

Table 12-D — Concurrent HD Telemedicine Sessions (Illustrative)

Backbone share reserved for live telemedicine	Telemedicine capacity	Sessions at ~3 Mb/s
30% of 16,000 Mb/s	4,800 Mb/s	**~1,600**
40% of 16,000 Mb/s	6,400 Mb/s	**~2,133**
50% of 16,000 Mb/s	8,000 Mb/s	**~2,666**

b) **Annual volume per user.** Apportioning **~63.07 PB/year** across hypothetical national user counts yields:

Table 12-E — Annual Volume per User implied by ~63.07 PB/year

Active Users	Annual volume per user	Monthly per user
1,000,000	**~63.07 GB**	~5.26 GB
2,000,000	**~31.54 GB**	~2.63 GB
5,000,000	**~12.61 GB**	~1.05 GB

Active Users	Annual volume per user	Monthly per user
10,000,000	**~6.31 GB**	~0.53 GB

These allocations describe transport capacity, not storage quotas, and assume national heterogeneity in usage (clinicians, administrators, laboratories, citizens).

12.6. Growth Trajectory.
Healthcare data grows at an estimated ~36% CAGR, with imaging workloads driving disproportionate increases (DR X-ray tens of MB; CT/MRI hundreds of MB; selected modalities ≥1 GB per study). A backbone commissioned at ~16 Gb/s should be architected with clean uplift paths to 40–100 Gb/s via DWDM as imaging, PACS, AI decision-support, and research activity mature.

12.7. National Context and Policy Trajectory (South Sudan).
South Sudan's digital baseline has improved (e.g., internet penetration reported at ~12% in early 2024 and ~15–16% in mid-2025). The Government has announced a ~2,400 km national fibre backbone linking to Kenya, with World Bank-associated programmes moving into preparatory phases and early construction (2025–2026 scheduling). These developments, and rising digital adoption, provide an enabling environment for health system digitisation under DHEP.

12.8. Why Fibre Optics, and why Reliability over Raw Speed.
Health operations are latency-sensitive and loss-intolerant: clinical video must present synchronised audio-visual streams; EMR/HIE transfers must maintain consent, provenance, and audit logs; syndromic/lab surveillance must trigger threshold alerts in near real time; accessibility features (captioning, sign-language interpretation, assistive compatibility) must operate without jitter. Fibre backbones deliver deterministic latency, high concurrency, and lawful capacity growth, whereas contended wireless or satellite links cannot guarantee clinical safety at national scale. Accordingly, the "low" figure of 16 Gb/s sustained is acceptable only if made reliable, and should be provisioned with scalable upgrades (e.g., 40/100 Gb/s) over the first three years as imaging and AI adoption expands.

12.9. Economic and Resilience Rationale.
A fibre backbone reduces per-bit transport costs and enables pooled procurement and shared services along sovereign corridors (e.g., Nimule–Juba, Wau, Malakal), with resilient access to submarine landing points via Kenya. It shortens outbreak alert latency, reduces duplicate testing via timely EMR/HIE exchange, and lowers emergency procurement due to stock-outs, producing measurable fiscal savings which are disclosed via MRV. The national backbone and metro rings therefore represent a public-finance efficiency instrument as much as a technical asset.

12.10. Accessibility and Inclusion.
Telehealth accessibility standards require captioning, remote interpretation, and compatibility with assistive technologies (screen readers, Braille keyboards, high-contrast modes). These obligations introduce parallel, latency-sensitive data streams in clinical sessions. Fibre backbones minimise jitter and loss, thereby making inclusive obligations operational under DHEP and facilitating multilingual and multi-party sessions.

12.11. Governance Linkages and MRV Indicators.
Network-level indicators for throughput, latency, jitter, and packet loss at facility and district hubs shall be recorded against target service levels and disclosed on public dashboards under the MRV framework. This complements clinical KPIs (referral delay, exchange success rate, alert latency) with

transport-layer metrics and supports benchmarking against international scorecards for digital health readiness.

12.12. Presentational Guidance.
For stakeholder communication, the backbone can be framed as: **~**16 Gb/s sustained ≈ ~63 PB/year of dependable carriage, supporting approximately 1,600–2,700 concurrent HD teleconsultations while sustaining EMR/HIE, surveillance, logistics, and accessibility streams; with a committed upgrade path to 40–100 Gb/s as imaging and AI workloads scale. Determinism and lawful scalability are paramount.

Chapter 13. Closing Statement

13.1. Consolidated Mandate and Strategic Positioning
The DESA Health Enablement Program (DHEP) is hereby affirmed as a sovereign, ethical, and scalable instrument for national and regional health system transformation. It integrates lawful, interoperable digital health systems with telemedicine, EMR/HIE, AI-assisted diagnostics, logistics monitoring, and outbreak analytics, underpinned by accessibility obligations and fiduciary safeguards. Its governance architecture—anchored in Host Country Agreements, Operating Circulars, and international standards—ensures institutional legitimacy and compliance with WHO's Global Strategy on Digital Health, OECD health data governance principles, HL7 FHIR interoperability specifications, and ISO/IEC 27001 security frameworks.

13.2. Strategic Alignment and Development Objectives
DHEP operationalises the aspirations of Agenda 2063 and the normative principles of Agenda 2074, while advancing AfDB's High 5 priorities and REC digitalisation strategies (COMESA, SADC, EAC). It positions participating states as leaders in Africa's digital health trajectory by embedding lawful governance, inclusive design, and ethical AI into national systems, and by harmonising these systems with regional interoperability protocols and shared infrastructure models.

13.3. Infrastructure Imperative and Scalability
The programme's quantified backbone requirement—~16 Gb/s sustained ≈ 63 PB/year, supporting 1,600–2,700 concurrent HD teleconsultations alongside EMR/HIE, surveillance, and accessibility streams—underscores the necessity of a terrestrial fibre optic backbone for South Sudan and analogous jurisdictions. Fibre delivers deterministic latency and lawful scalability, enabling a clean upgrade path to 40–100 Gb/s as imaging and AI workloads expand under a projected ~36% healthcare data CAGR. This infrastructure is not a luxury but a precondition for clinical safety, fiscal resilience, and sovereign digital autonomy.

13.4. Economic and Social Rationale
DHEP is a bankable investment in governance efficiency, market activation, and social equity. It reduces duplicate testing and emergency procurement costs, accelerates outbreak response, and stimulates local health-tech markets through interoperable procurement frameworks. Accessibility obligations institutionalise universal design, ensuring that persons with disabilities and marginalised populations benefit equally from digital health transformation. These outcomes are measurable, disclosed through MRV dashboards, and benchmarked against international scorecards for transparency and accountability.

13.5. Closing Determination
By adopting DHEP, partner states commit to a decade of accelerated implementation—transforming policy intent into institutional competence and measurable outcomes. The programme is not episodic; it is a standing institutional function embedded in civil-service training, academic curricula, and

regional interoperability frameworks. Its legal, fiduciary, and technical architecture guarantees continuity, scalability, and ethical compliance, positioning DESA as a custodian of Africa's health digitalisation agenda and a model for lawful, inclusive, and resilient systems worldwide.