

Note: Charts below are illustrative placeholders and should be replaced with official series before publication.

CHAPTER 17

Adult Non-vectorored Diseases (Ethiopia + global lens)

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CONTENT

1. **Concepts, Framing & the Epidemiologic Transition**
— Define “non-vectorized adult diseases”; double burden; demographic aging; DALYs, YLL/YLD.
2. **Measurement & Data Sources**
— HMIS/DHIS2, STEPS, GBD, cancer registries, hospital discharges, pharmacy data; age-standardization & key indicators.
3. **Cardiovascular Diseases (CVD) — Burden & Care Pathways**
— Ischemic heart disease, stroke; acute vs. chronic care; rehab.
4. **Hypertension, Dyslipidemia & Atherosclerotic Risk**
— Prevalence, thresholds, PEN protocols, risk-based treatment (SCORE/WHO risk charts).
5. **Diabetes & Metabolic Syndrome**
— Type 1/Type 2, diagnosis (FPG, HbA1c), complications, foot care, renal protection.
6. **Chronic Respiratory Diseases**
— COPD, adult asthma; spirometry access; household/ambient air pollution links.
7. **Cancers — Overview of Burden & System Readiness**
— Incidence/mortality, registries, pathology/radiology capacity, palliative services.
8. **Priority Site-Specific Cancers**
— Breast & cervical (screening/treatment), colorectal, prostate, liver (HBV/HCV), head & neck; practical screening algorithms.
9. **Chronic Kidney Disease (CKD) & Hypertension/Diabetes Interface**
— Screening (eGFR, UACR), dialysis access, transplantation pathways.
10. **Mental, Neurological & Substance-Use (MNS) Disorders in Adults**
— Depression, anxiety, epilepsy, alcohol/tobacco/Khat; mhGAP in PHC; integration with NCD clinics.
11. **Musculoskeletal Disorders & Chronic Pain**
— Low back pain, osteoarthritis; occupational risks; rehabilitation/assistive tech.

12. **Oral, Eye & Hearing Health**

— Periodontal disease and diabetes links; cataract/diabetic retinopathy screening; adult hearing loss.

13. **Older Adults, Multimorbidity & Frailty**

— Comprehensive geriatric assessment, polypharmacy, falls prevention, social care linkages.

14. **Behavioral & Metabolic Risk Factors**

— Diet (salt, fats, ultra-processed), physical inactivity, tobacco, alcohol, Khat; obesity, BP, glucose, lipids; PAF concepts.

15. **Environmental & Occupational Exposures**

— Household/ambient air pollution, heat, chemicals, mining/factory risks; urban design for health.

16. **Screening, Early Detection & Risk Stratification**

— Evidence-based packages for PHC; task-sharing; opportunistic vs. population screening; equity safeguards.

17. **Primary Care Models (HEP/PEN/PEN-Plus)**

— Ethiopia's PHC integration for NCDs; standardized care bundles; referral triggers.

ACCRONYMS

PHC (Primary Health Care) — People-centred first-contact care with continuity, coordination, and community linkages.

HEWs/CHWs — Health Extension Workers / Community Health Workers supporting outreach and follow-up.

HTN/DM/DLP — Hypertension / Diabetes Mellitus / Dyslipidemia — key cardiometabolic risks.

ASCVD — Atherosclerotic cardiovascular disease (e.g., MI, stroke, peripheral disease).

COPD/CRD — Chronic obstructive pulmonary disease / Chronic respiratory disease.

CKD (G/A staging) — Chronic kidney disease staged by eGFR (G1–G5) and albuminuria (A1–A3).

UACR — Urine albumin-to-creatinine ratio (mg/g), albuminuria measure.

mhGAP — WHO Mental Health Gap Action Programme for non-specialist care.

ART (dentistry) — Atraumatic Restorative Treatment — minimally invasive restorative care.

MSK — Musculoskeletal conditions (e.g., low back pain, osteoarthritis).

ICOPE — Integrated Care for Older People (WHO).

Polypharmacy — Concurrent use of ≥ 5 medications; assess appropriateness and harms.

PM2.5 — Particulate matter $\leq 2.5 \mu\text{m}$; deep lung penetration and systemic effects.

LMIS — Logistics Management Information System for medicines/supplies.

DHIS2/HMIS — Health Management Information Systems for routine indicators.

CRVS — Civil Registration and Vital Statistics — births/deaths, cause of death.

CFR — Case fatality rate = $100 \times (\text{deaths among cases} / \text{total cases})$.

DALY — Disability-adjusted life year: YLL + YLD burden metric.

YLL/YLD — Years of life lost / Years lived with disability.

PEN/HEARTS — WHO primary care packages for NCD risk and disease management.

AQG — WHO Air Quality Guidelines.

17.1) Concepts, Framing & the Epidemiologic Transition

Ethiopia faces a persistent double—shifting to triple—burden: communicable/maternal/neonatal conditions remain material while noncommunicable diseases (NCDs) and injuries grow. This section defines key metrics (DALY, YLL, YLD), explains age-standardization, and proposes a pragmatic tracer indicator set for primary care and referral planning.

Figure . Epidemiologic transition — schematic

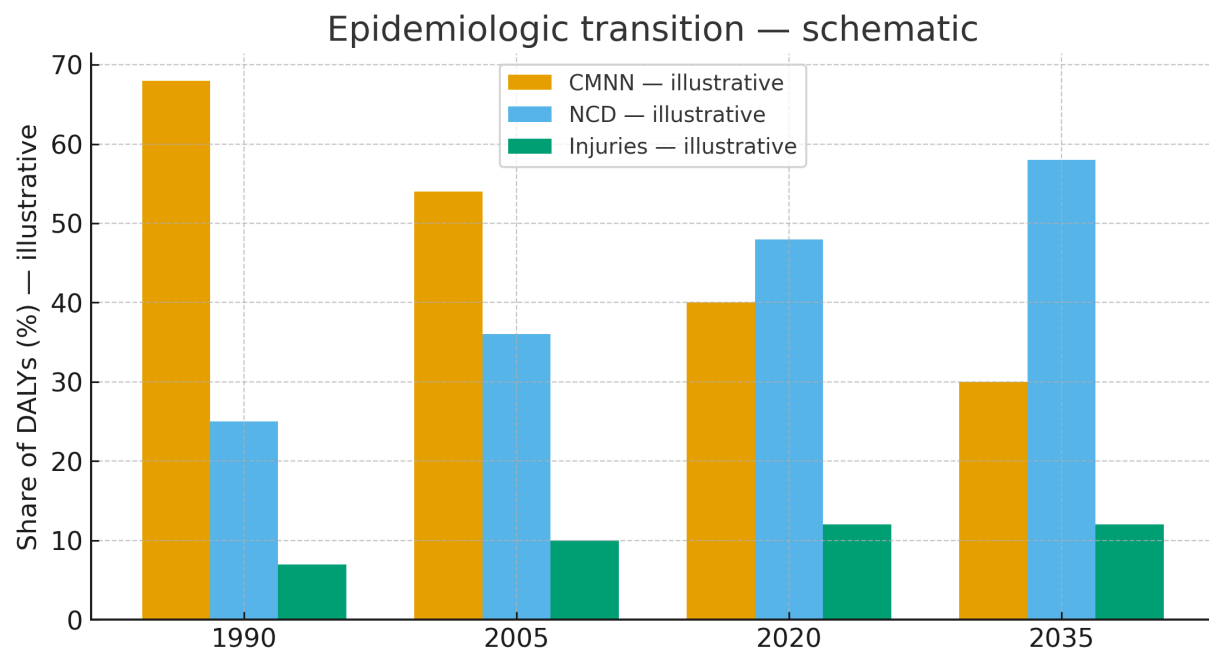
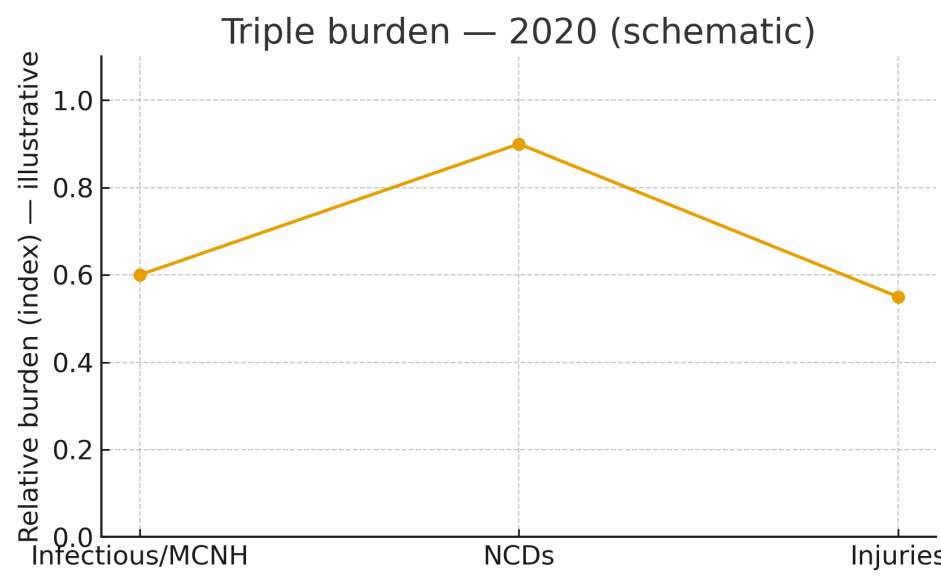
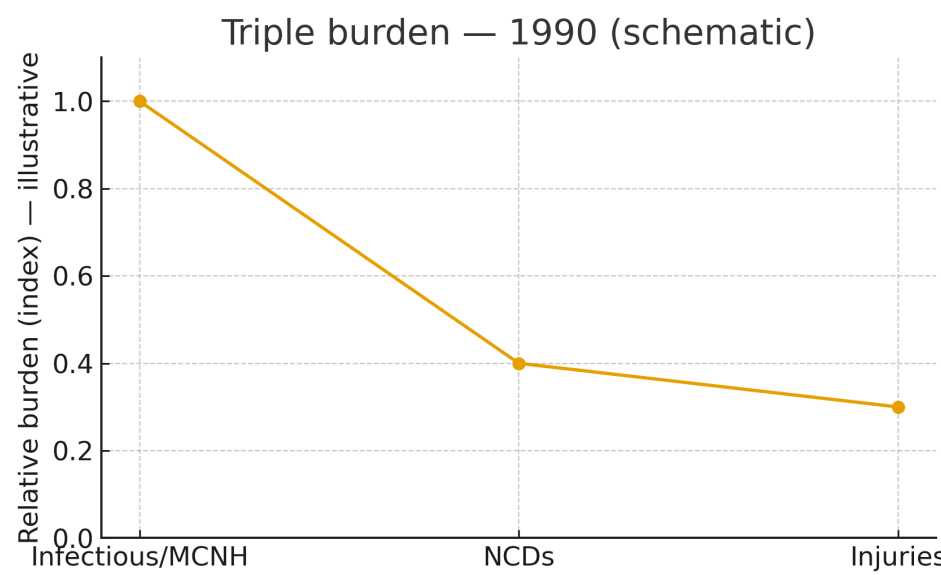


Figure . Triple burden profiles (1990, 2020, 2035) — schematic



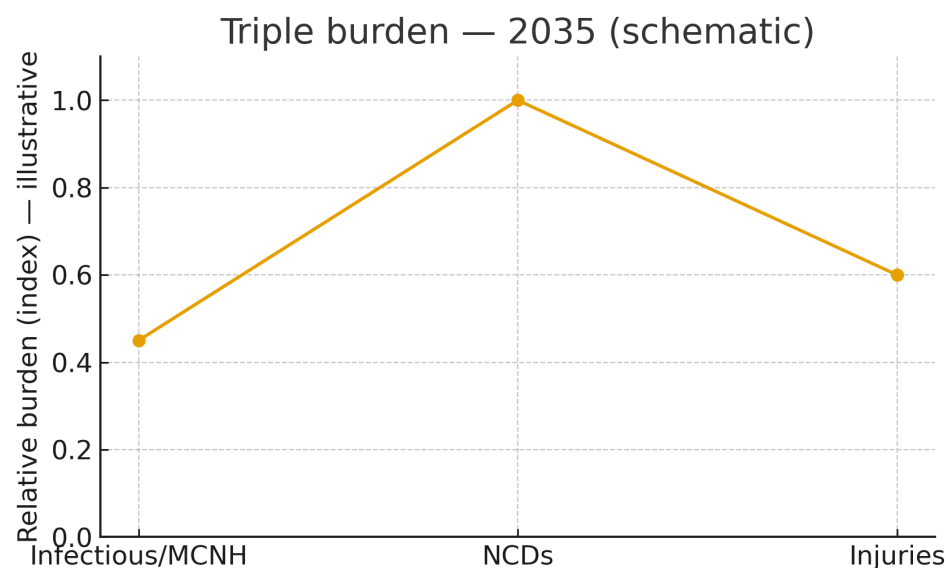


Table 17.1-A. Core definitions & formulas

Term / Formula	Meaning / Use
DALY	$DALY = YLL + YLD$
YLL	$\sum (\text{Deaths}_x \times \text{Standard life expectancy at age } x)$
YLD	$\sum (\text{Prevalence} \times \text{Disability weight} \times \text{Duration})$
Age-standardized rate	$\sum (\text{age-specific rate} \times \text{standard population weight})$
Case fatality (%)	$100 \times (\text{Deaths from condition} / \text{Cases})$
PAF	$(p(RR-1)) / (1 + p(RR-1))$
WHO CVD risk	10-year risk from age/sex/BP/smoking/diabetes

Table 17.1-B. Transition signals for Ethiopia

Domain	Signals for Ethiopia
Demography	Fertility decline; aging; urbanization; larger at-risk adult base.
Exposure shifts	Diet change; inactivity; tobacco/alcohol/khat; air pollution.
Health system	HEP/PEN/PEN-Plus; diagnostics; referral pathways.
Data maturation	STEPS, HMIS/DHIS2, cancer registries (nascent), GBD.
Equity	Urban-led rise with diffusion to rural/pastoralist & poor groups.

Table 17.1-C. Tracer indicators for Chapter 17

Indicator	Operational definition / note
Hypertension control	% diagnosed with <140/90
Diabetes control	% with HbA1c <7% (or fasting target)
CVD risk treatment	% 40–74y high risk on statin ± antihypertensive
Tobacco use	% current users
Clean cooking	% HH using clean fuels/tech
Cancer screening	VIA/HPV coverage (30–49); breast/other per policy
Respiratory care	% COPD/asthma diagnosed via spirometry on maintenance
Renal health	% DM/HTN with annual eGFR & UACR

Table 17.1-D. Measurement data sources

Source	What it provides
STEPS (WHO)	Risk-factor survey (BP, BMI, tobacco, alcohol, diet, glucose, lipids)
HMIS/DHIS2/eCHIS	Routine diagnoses/treatment/supplies; needs DQR
GBD (IHME)	Incidence, prevalence, mortality, DALYs with uncertainty
Cancer registries	Population-based (emerging) and hospital pathology
Facility datasets	Discharge abstracts; cath/stroke registries; dialysis/oncology stats

Table 17.1-E. Vocabulary

Term	Definition
HEP	Health Extension Program
PEN / PEN-Plus	WHO NCD primary-care protocols; district-level advanced NCDs
DQR	Data Quality Review
LMIS	Logistics Management Information System
PROMs/PREMs	Patient-reported outcomes/experience measures

References — Section 17.1 (URLs)

- **WHO — NCDs & PEN/PEN-Plus** — <https://www.who.int/teams/noncommunicable-diseases>
- **WHO STEPS — NCD risk-factor surveillance** — <https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps>
- **IHME — Global Burden of Disease (GBD)** — <https://www.healthdata.org/gbd>
- **Ethiopia FMoH — NCD resources** — <https://www.moh.gov.et/>
- **Ethiopian Public Health Institute (EPHI)** — <https://www.ephi.gov.et/>

17.2) Measurement & Data Sources

A robust NCD measurement stack in Ethiopia blends routine facility data (DHIS2/HMIS), population risk-factor surveys (STEPS), household surveys (DHS/MICS), registries (cancer, stroke, dialysis), and supply/diagnostics data (LMIS/LIS). This section outlines what each source contributes, how to triangulate indicators, and practical data-quality checks. Figures and series are schematic placeholders to be replaced with official data prior to publication.

Figure . Coverage/availability by data source — schematic

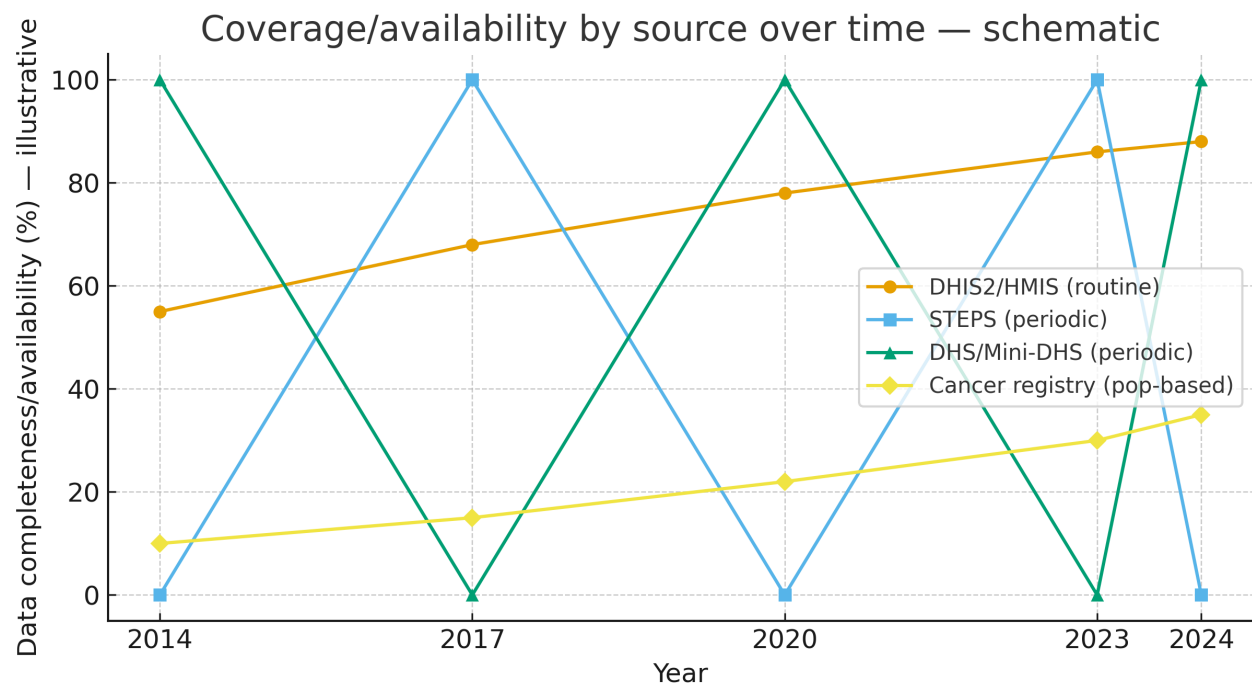


Figure . Concordance: STEPS HTN vs HMIS HTN visits — schematic

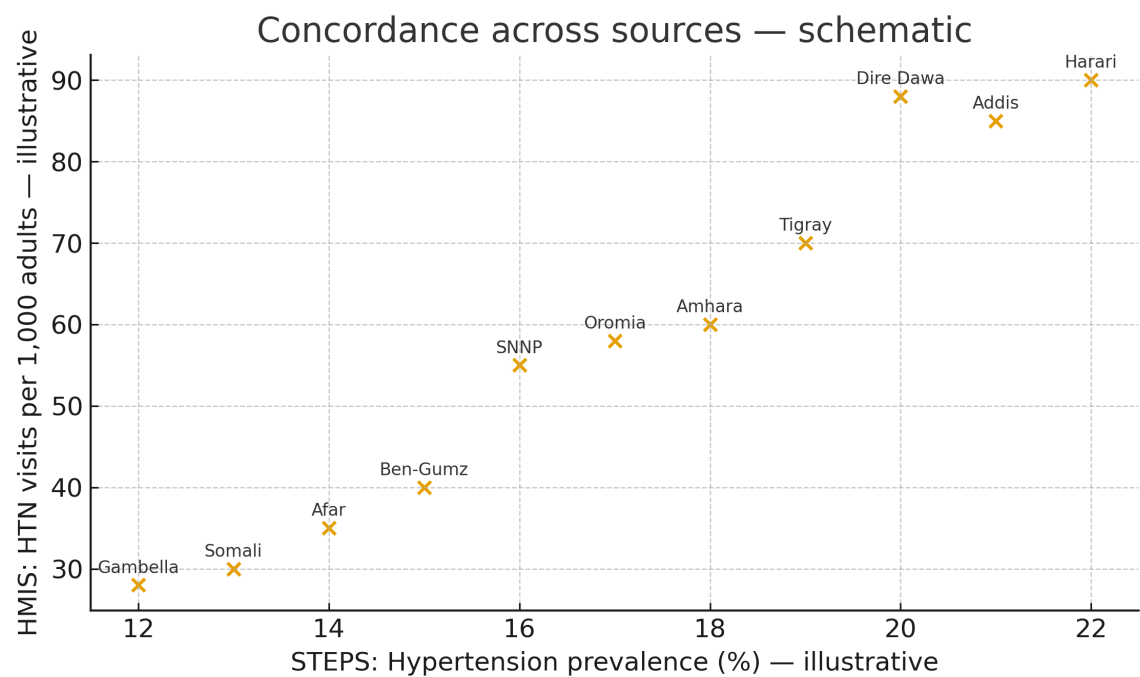


Figure . Example: age-standardization effect — schematic

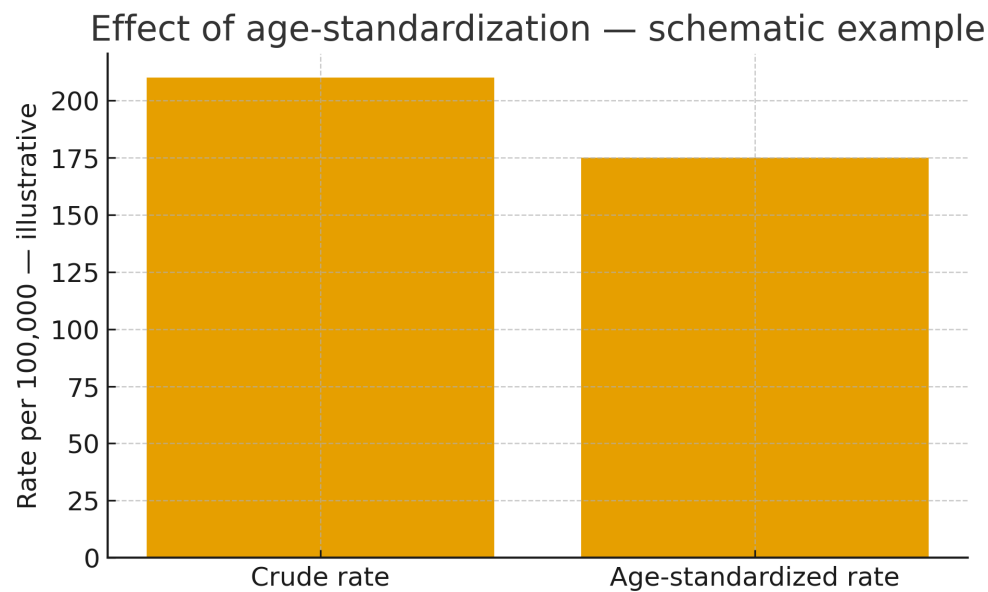


Table 17.2-A. Ethiopia NCD data source catalogue

Source	Type	Cadence	Strengths	Limitations
DHIS2/HMIS	Facility-based routine	Monthly/quarterly	High frequency, subnational	Case definition drift; private sector gaps; data quality needs DQR
STEPS	Population risk-factor survey	3–5 yearly	Biometrics, labs, representative	Not annual; cost/logistics; limited disease outcomes
DHS/Mini-DHS	Household survey	5 yearly / 3–4 yearly	Demographics, NCD knowledge/behaviors, some biometrics	Periodic; self-report bias; limited labs
Cancer registry	Population-based registry	Continuous	Incidence by site/stage	Coverage, pathology capacity, completeness mature over time
Vital stats / VA	CRVS or sample VA	Continuous / periodic	Cause-of-death structure	Completeness; misclassification; evolving
Facility discharges	Hospital abstracts	Continuous	Procedures, diagnoses, length-of-stay	Coding quality; coverage; linkage to mortality limited
Pharmacy/LMIS	Supply chain	Monthly/quarterly	Stock & consumption of NCD meds/diagnostics	Utilization proxies; not outcomes

Table 17.2-B. Indicator → primary source with triangulation

Indicator	Primary source(s)	Triangulation/fallback
Hypertension control (<140/90)	DHIS2 NCD clinics; facility cohorts	STEPS (population control proxy)
Diabetes control (HbA1c<7%)	Facility cohorts; lab info systems	STEPS fasting glucose/HbA1c (if included)
CVD risk treatment (statin ± antihypertensive)	DHIS2 visit data + pharmacy dispensing	STEPS medication use modules
Cancer screening coverage (VIA/HPV)	DHIS2 service stats	DHS/MICS self-report; special studies
COPD/asthma maintenance	DHIS2 visits + essential meds availability	STEPS symptoms; spirometry studies

CKD testing (eGFR/UACR)	Lab info systems; facility audits	STEPS creatinine (if measured); special studies
Tobacco & alcohol use	STEPS core modules	DHS (tobacco)

Table 17.2-C. Core calculations and working formulas

Measure	Working formula / note
Age-standardized rate (ASR)	$ASR = \sum (\text{age-specific rate}_i \times \text{standard pop weight}_i)$
Prevalence (survey)	$100 \times (\text{number with condition} / \text{number assessed})$
Incidence (registry/cohort)	$100,000 \times (\text{new cases in period} / \text{population at risk})$
Control rate (facility)	$100 \times (\text{patients meeting target} / \text{patients with measurement})$
Visit rate	$1,000 \times (\text{NCD visits} / \text{adult population})$
Concordance check	Compare rank/order and correlation across sources (e.g., STEPS vs DHIS2)

Table 17.2-D. Data governance, privacy & access layers

Domain	Practice
Data stewardship	Named owners (FMoH/EPHI/Regions); SOPs for updates; versioning
Access tiers	Public dashboards; authenticated facility/region views; de-identified microdata requests
Confidentiality	Cell suppression; small-number rules; secure servers; DUA for researchers
Interoperability	Master facility list; common codes; APIs between HMIS, LMIS, eCHIS and registries
Quality assurance	Routine DQR cycles; feedback loops; on-site mentorship

Table 17.2-E. Routine DQR checks and suggested thresholds

Check	Suggested threshold/example
Completeness	% facilities reporting $\geq 95\%$ months
Timeliness	% reports submitted by deadline $\geq 90\%$
Internal consistency	Indicator pairs (e.g., HTN visits vs drugs dispensed) within tolerance
External consistency	Concordance with STEPS/DHS levels and trends
Outliers/anomalies	Spike/drop detection with review notes

Measurement plan (narrative)

Start with a core tracer set—hypertension/diabetes control, risk-based CVD treatment, tobacco use, clean cooking, key cancer screening—and assign a primary source for each. Use concordance checks to align trends between surveys and routine data (e.g., rank correlation of STEPS prevalence vs HMIS visit rates by region). Institutionalize quarterly DQRs for completeness, timeliness, internal/external consistency, and outlier review, and publish annotated “known issues.” Invest in registries where they are high-leverage (cancer, stroke, dialysis) and link LMIS with DHIS2 to validate service statistics against commodity flows. Always report age-standardized rates alongside crude values; provide uncertainty where available (GBD), and document methodology in technical notes.

References — Section 17.2 (URLs)

- **WHO STEPS — NCD risk-factor surveillance —**
<https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps>
- **The DHS Program — Ethiopia —** <https://www.dhsprogram.com/>
- **UNICEF MICS —** <https://mics.unicef.org/>
- **IHME — Global Burden of Disease (GBD) —** <https://www.healthdata.org/gbd>
- **Health Data Collaborative — Data Quality Review —**
<https://www.healthdatacollaborative.org/working-groups/data-quality-review/>
- **IARC — Cancer registries —** <https://gicr.iarc.fr/>
- **Ethiopia FMoH — DHIS2/HMIS resources —** <https://www.moh.gov.et/>

17.3) Cardiovascular Diseases (CVD): Burden & Care Pathways

CVD is a leading source of adult DALYs in Ethiopia, driven by ischemic heart disease and stroke. Primary care should scale risk-based detection and long-term control, while hospitals ensure acute stroke and ACS readiness. Replace schematic figures with GBD, STEPS, DHIS2/HMIS, hospital registry, and LIS/LMIS data before publication.

Figure 17.3-1. DALYs — IHD vs Stroke (schematic)

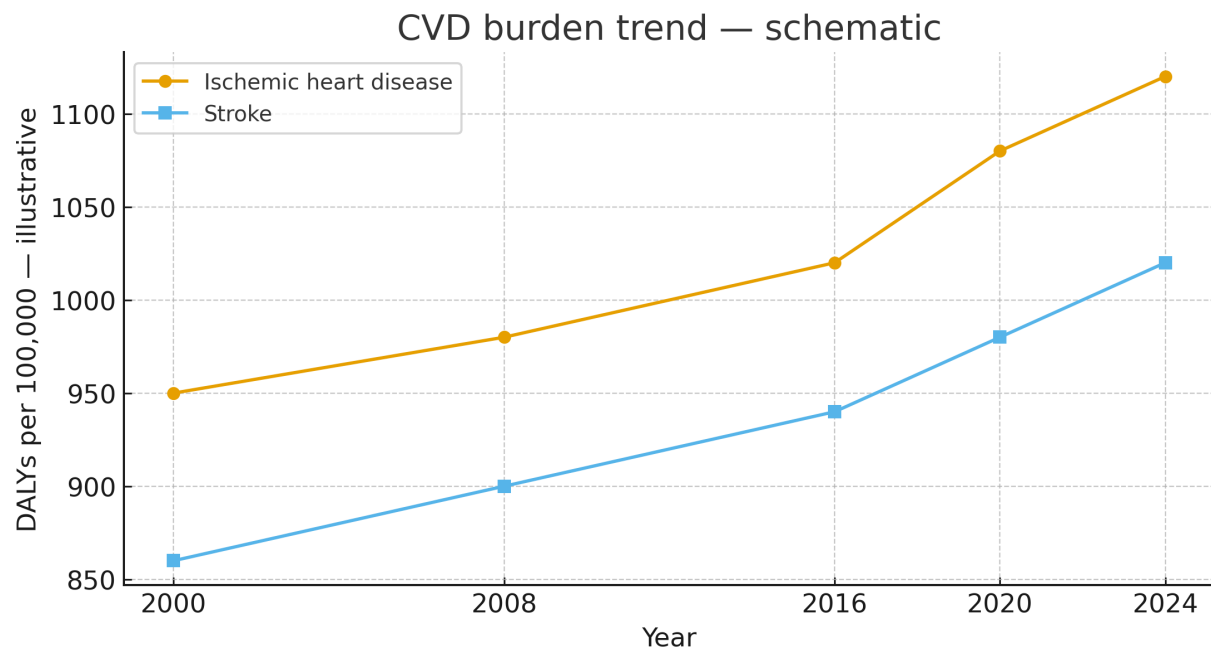


Figure . Age-standardized mortality — CVD (schematic)

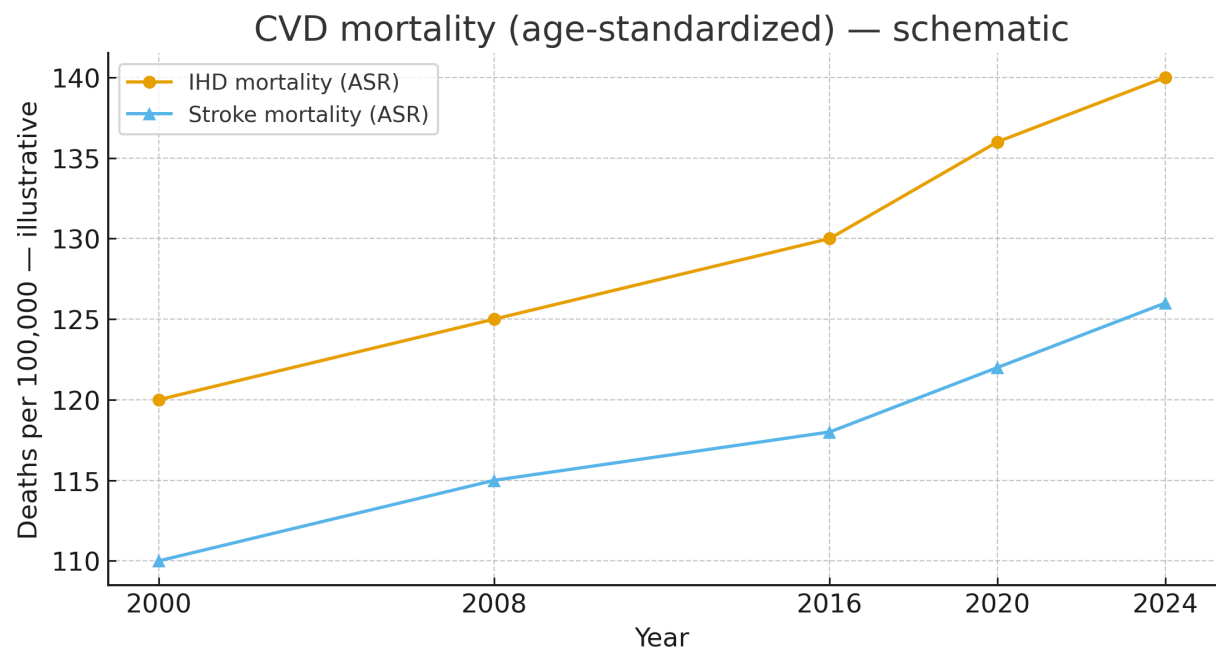


Figure . Risk-based therapy coverage (schematic)

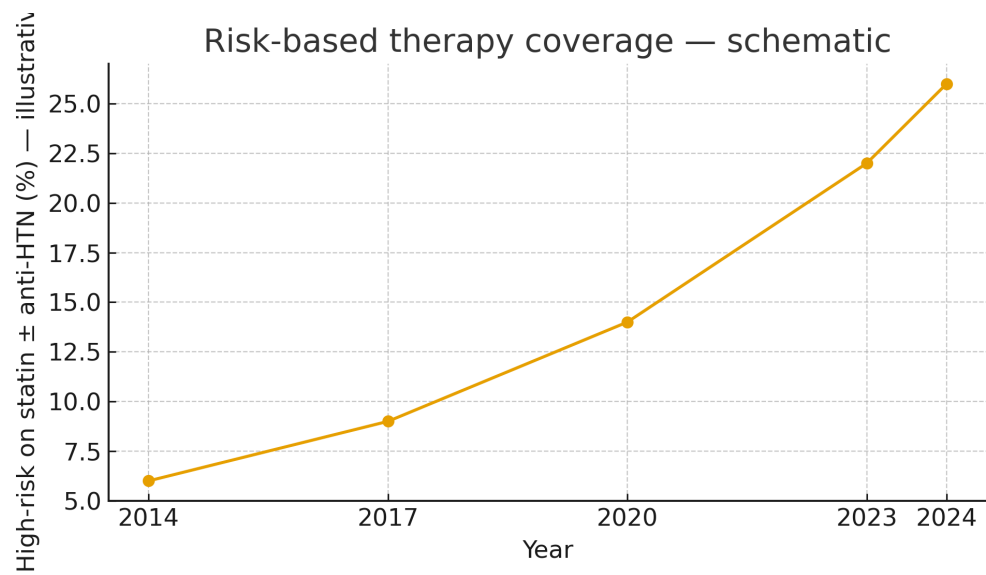


Table 17.3-A. Definitions & clinical formulas

Term/Formula	Meaning/Use
Hypertension	BP $\geq$ 140/90 mmHg or on antihypertensives (WHO)
Diabetes	FPG $\geq$ 7.0 mmol/L or HbA1c $\geq$ 6.5% or on meds
ASCVD 10-yr risk	WHO charts (age, sex, SBP, smoking, diabetes)
BP control	% diagnosed hypertensives with BP <140/90
LDL goal (sec. prev)	LDL-C <70 mg/dL (policy-aligned)

Table 17.3-B. WHO PEN-aligned PHC CVD bundle

Component	Operational content in Ethiopia PHC
Risk assessment	Opportunistic screening 40–74y; WHO risk charts
Core meds	Thiazide-like diuretic, ACEi/ARB, CCB; statin; low-dose aspirin for established ASCVD
Diabetes interface	Metformin first-line; renal protection; advanced agents where available
Monitoring	BP each visit; A1c; lipids; eGFR/UACR for DM/HTN
Lifestyle	Salt reduction; activity; tobacco/alcohol cessation
Follow-up	Panels, recall lists, group visits; adherence support

Table 17.3-C. Acute stroke & ACS — minimum hospital signal functions

Domain	Minimum signal functions
Imaging	CT within 24h or rapid transfer
ACS readiness	ECG <10 min; troponin; antiplatelets; referral
Thrombolysis	Eligibility protocol; door-to-needle metrics
BP & glucose	Acute control; monitoring
Rehabilitation	Early mobilization; swallow screen; rehab plan

Table 17.3-D. Indicators & illustrative targets

Indicator	Illustrative target
HTN control	≥50% of diagnosed achieve <140/90 (progressive)
DM control	≥60% A1c <7% (individualized)
High-risk treatment	≥70% very-high-risk on statin ± anti-HTN
Stroke processes	≥80% CT 24h; ≥90% antiplatelet; ≥90% dysphagia screen
Post-ACS secondary prevention	≥80% on standard bundle unless contraindicated

Table 17.3-E. Data sources & triangulation

Source	What it provides / note
STEPS	Prevalence, risk behaviors, meds use
HMIS/DHIS2	Clinic volumes, control rates; dispensing (LMIS link)
Hospital registries	Stroke/ACS processes & outcomes
Laboratory IS	Lipids, A1c, troponin
GBD/IHME	DALYs, mortality (with uncertainty)

Care model narrative

Use WHO risk charts for adults 40–74 to target statins and antihypertensives; build patient panels and recall systems to close adherence gaps. Ensure district/regional hospitals have CT access or organized transfer, standardized stroke protocols, and early rehabilitation. Align LMIS (statins, antihypertensives, insulin, consumables) with DHIS2 service statistics to detect supply-demand mismatches. Embed equity: mobile clinics, workplace/school-gate screening for urban poor, and pastoralist-tailored outreach for rural risk diffusion.

References — Section 17.3 (URLs)

- **WHO PEN & PEN-Plus** — <https://www.who.int/teams/noncommunicable-diseases/management/pen>
- **WHO CVD Risk Charts** — <https://www.who.int/publications/i/item/9789240024832>
- **IHME — GBD Results** — <https://vizhub.healthdata.org/gbd-results/>
- **Ethiopia FMoH — NCD resources** — <https://www.moh.gov.et/>

17.4) Hypertension, Dyslipidemia & Atherosclerotic Risk

Atherosclerotic risk in Ethiopia is rising as hypertension remains under-diagnosed and under-controlled, while lipid management is not yet routine in many primary-care settings. This section aligns with WHO HEARTS/PEN guidance to present a practical algorithm, tracer indicators, and data sources for monitoring. Figures are schematic placeholders.

Figure . Hypertension prevalence & control — schematic

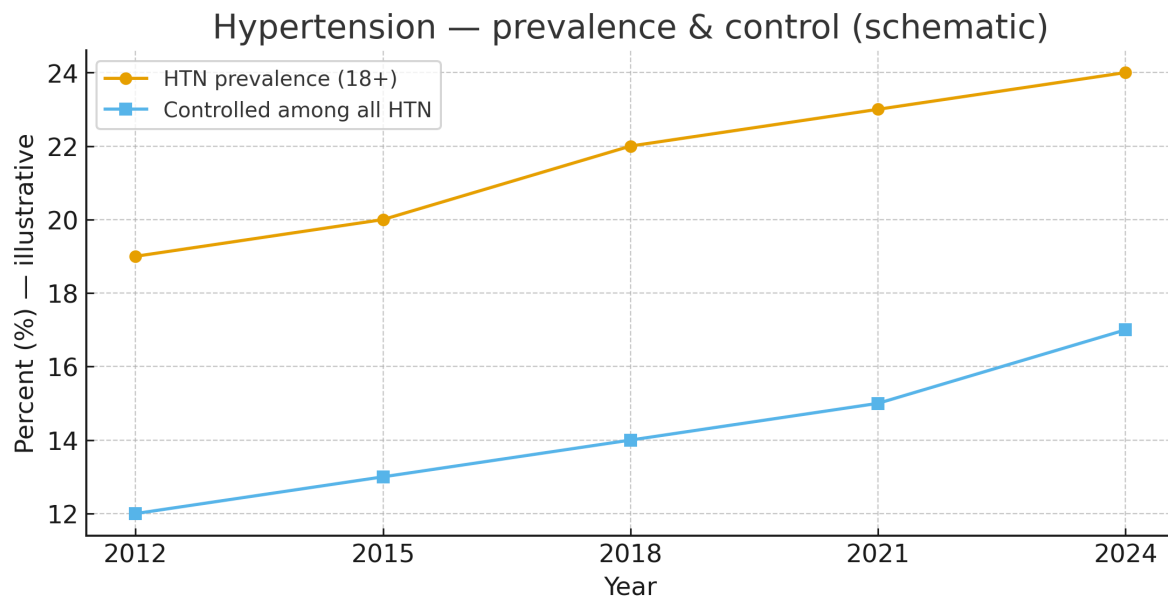


Figure . Hypertension care cascade — schematic

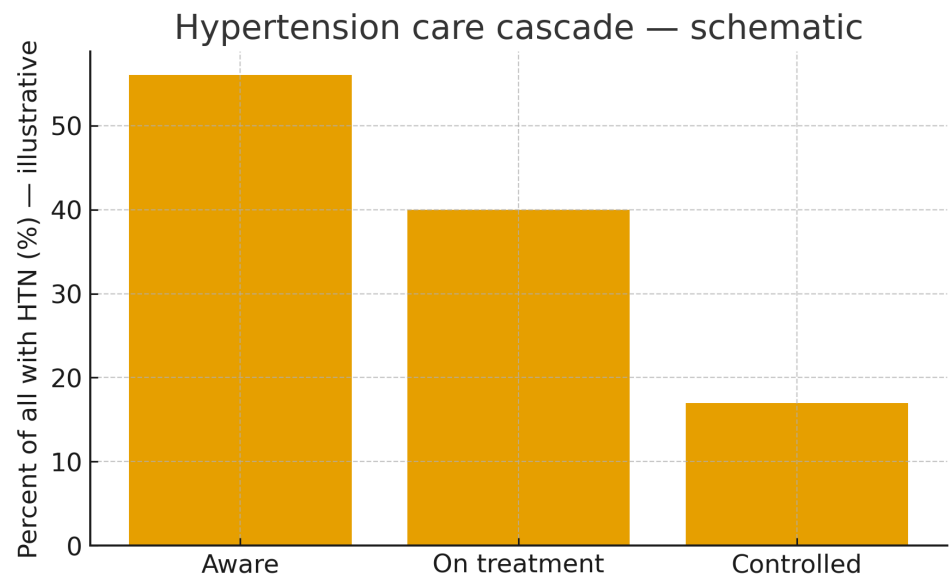


Figure . LDL-cholesterol distribution (40–74y) — schematic

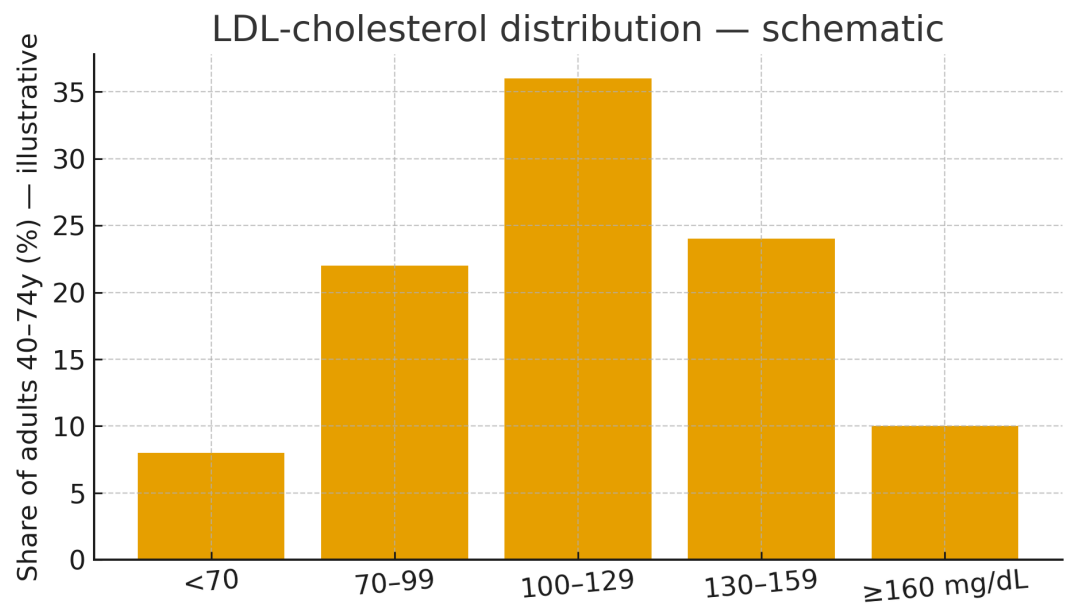


Figure . Statin coverage among high-risk adults — schematic

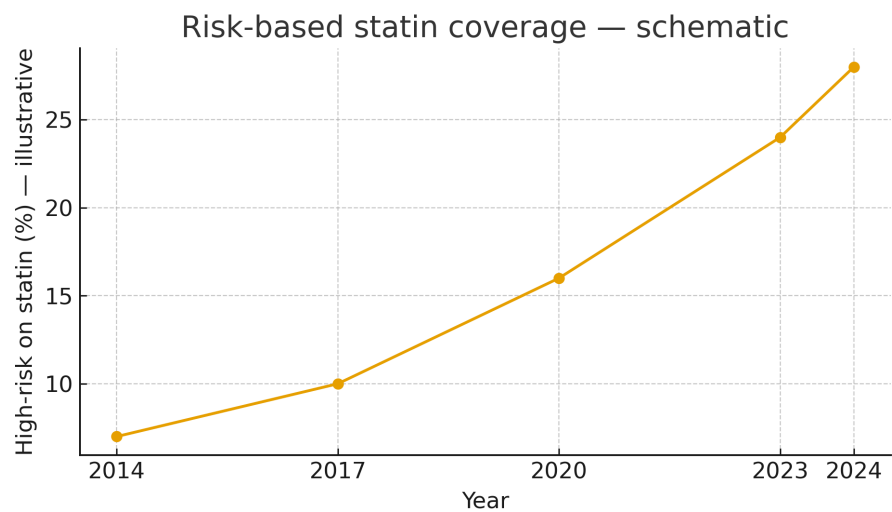


Figure . Population salt intake — schematic

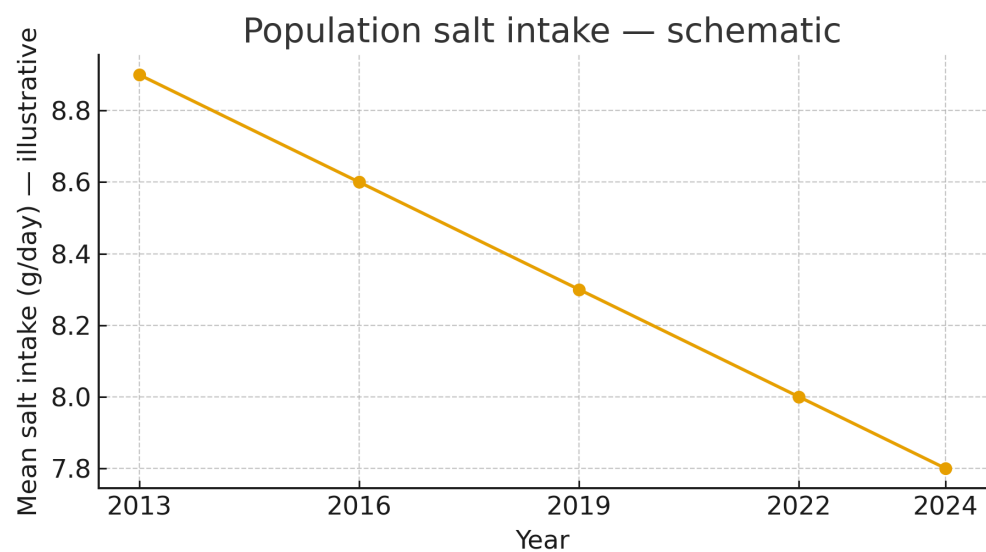


Table 17.4-A. Definitions & thresholds

Term / Threshold	Definition / note
Hypertension (adult)	BP ≥140/90 mmHg or on antihypertensives (WHO).
Stage 2 HTN	SBP ≥160 or DBP ≥100 mmHg.
Dyslipidemia	Elevated LDL-C, low HDL-C, or high triglycerides per lab cutoffs.
High ASCVD risk (10-y)	WHO risk charts; risk threshold per national policy (e.g., ≥10% or ≥20%).
LDL-C targets	Primary prevention (high risk): <100; Secondary/very-high risk: <70 mg/dL.

Table 17.4-B. Ethiopia PHC algorithm (WHO HEARTS/PEN-aligned)

Step	Operational content
Screening	BP for all adults ≥ 40 (earlier if risk factors); confirm; calculate 10-yr risk.
Lifestyle	Salt reduction; activity; tobacco/alcohol cessation; weight management.
Pharmacotherapy — HTN	Thiazide-like or CCB first-line; add ACEi/ARB; combination for stage 2/high-risk.
Pharmacotherapy — lipids	Statin for high/very-high risk; consider ezetimibe if targets unmet.
Follow-up	Recall lists; team-based care; home BP; adherence support; group visits.
Comorbidities	For DM/CKD: ACEi/ARB; periodic eGFR/UACR; eye/foot checks for DM.

Table 17.4-C. Indicators & formulas

Indicator	Formula / definition
HTN prevalence (%)	$100 \times (\text{Adults with HTN} / \text{Adults assessed})$
HTN control (%)	$100 \times (\text{Diagnosed HTN with BP} < 140/90 / \text{Diagnosed HTN})$
High-risk on statin (%)	$100 \times (\text{Adults 40–74y at high risk on statin} / \text{Adults 40–74y at high risk})$
LDL controlled (%)	$100 \times (\text{High/very-high risk with LDL below target} / \text{High/very-high risk measured})$
Low-salt households (%)	$100 \times (\text{HH using low-sodium salt or meeting salt criteria} / \text{HH assessed})$

Table 17.4-D. Data sources & triangulation

Source	What it provides / note
STEPS	BP, lipids (if biomarker), tobacco/alcohol, weight, sodium proxies
HMIS/DHIS2	HTN/DM clinic volumes, control rates; missed-visit panels
LIS/LMIS	Lipids (LIS) and statin/anti-HTN stock & dispensing (LMIS)
Hospital registries	Stroke/ACS outcomes for coherence with risk-factor control
GBD/IHME	Burden trends for IHD/stroke

Table 17.4-E. Quality, safety & equity practices

Domain	Operational practice
Accuracy	Validated BP devices; cuff size; two readings; calibration
Standardization	WHO HEARTS protocols; fixed-dose combinations
Safety	Renal function & potassium for ACEi/ARB; liver enzymes for statins per policy
Equity	Rural/pastoralist/IDP outreach; fee waivers; generics; task-sharing
Counselling	Salt reduction; tobacco quit; activity prescriptions; tailored messages

Care model narrative

Treat elevated overall risk, not just single numbers: use WHO 10-year risk charts to target statins and combination antihypertensives. Adopt fixed-dose combos when available; integrate LIS/LMIS with DHIS2 to close stock and monitoring gaps; and empower community follow-up and home BP. Pair clinical care with population salt reduction and tobacco-control policies to shift risk at scale.

References — Section 17.4 (URLs)

- **WHO HEARTS Technical Package** — <https://www.who.int/initiatives/heart/technical-package>
- **WHO CVD Risk Charts** — <https://www.who.int/publications/i/item/9789240024832>
- **WHO STEPS — NCD risk factors** — <https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps>
- **The DHS Program — Ethiopia** — <https://www.dhsprogram.com/>
- **Ethiopia FMoH — NCD resources** — <https://www.moh.gov.et/>

17.5) Diabetes & Metabolic Syndrome

Diabetes and metabolic risk are rising in Ethiopia amid urbanization and lifestyle change. This section presents a primary-care-ready algorithm, tracer indicators, and practical system checks aligned with WHO PEN/HEARTS. Figures are schematic placeholders and should be replaced with STEPS, DHIS2/HMIS, LIS/LMIS, and registry data prior to publication.

Figure . Diabetes & obesity trends — schematic

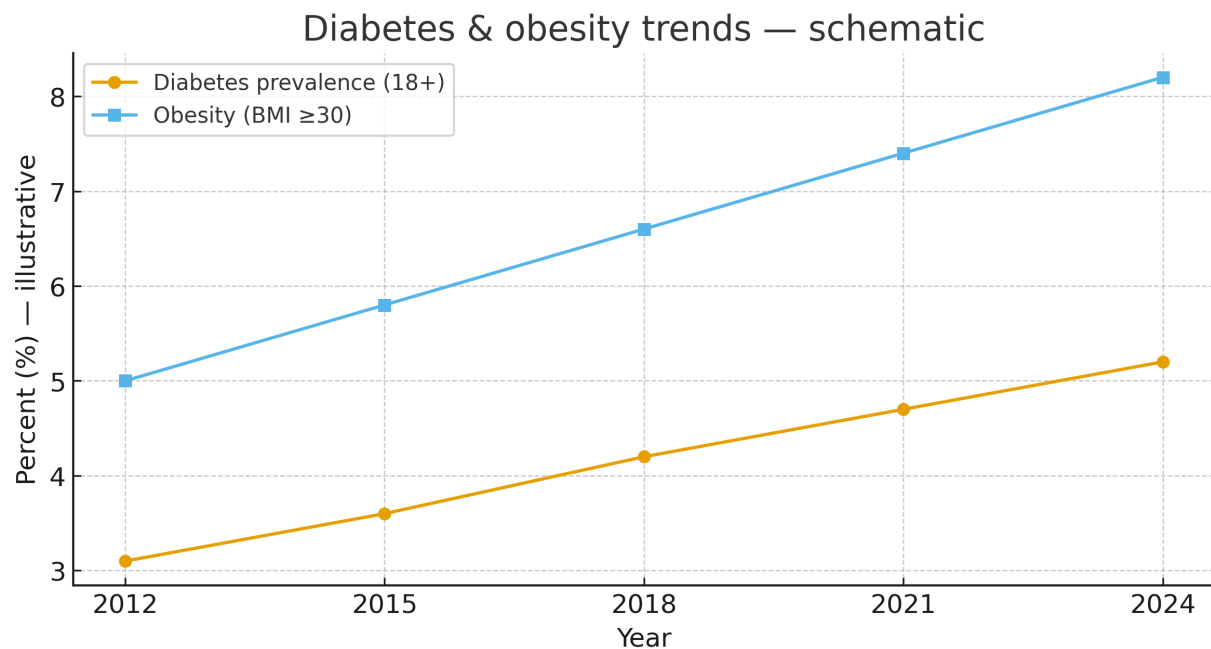


Figure . Insulin availability — schematic

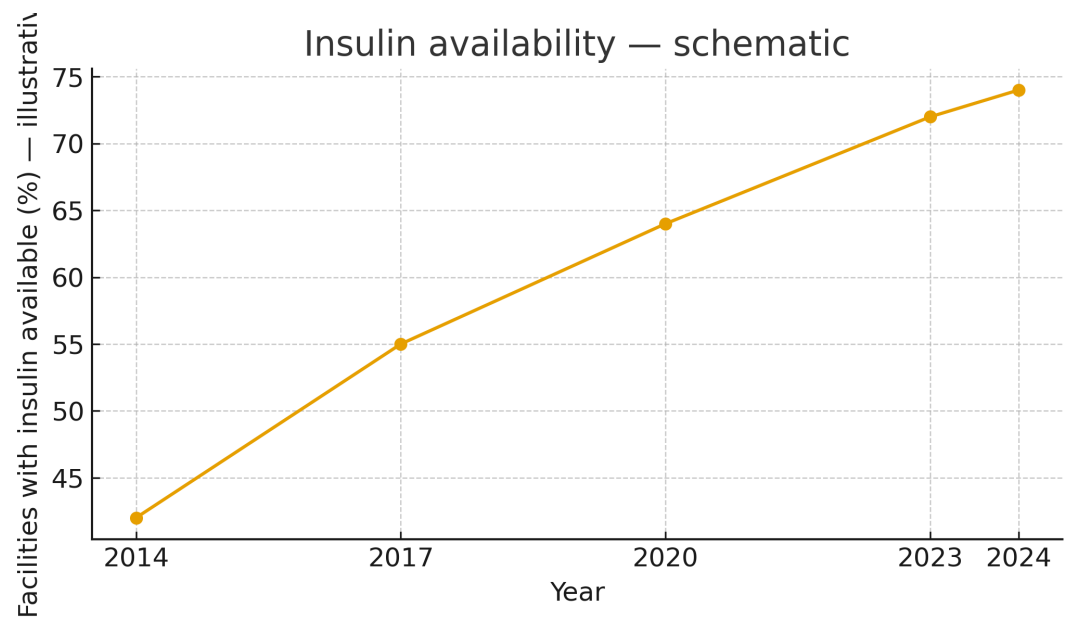


Table 17.5-A. Definitions & diagnostic thresholds

Term / Threshold	Definition / note
Diabetes (adult)	FPG ≥7.0 mmol/L (126 mg/dL) or HbA1c ≥6.5% or 2-h OGTT ≥11.1 mmol/L; or on diabetes meds.
Prediabetes	FPG 5.6–6.9 mmol/L (100–125 mg/dL) or HbA1c 5.7–6.4% (policy-aligned).
Metabolic syndrome (example)	Any 3 of: central obesity, elevated TG, low HDL-C, elevated BP, elevated fasting glucose (use regional cutoffs).
Glycemic control target	HbA1c <7% for most adults (individualize for age/comorbidity/pregnancy).
Kidney monitoring	Annual eGFR and UACR for adults with diabetes.

Table 17.5-B. Ethiopia PHC algorithm (WHO PEN/HEARTS-aligned)

Step	Operational content
Screening	Opportunistic screening for age ≥ 40 or risk factors; fasting glucose or HbA1c where available.
Initial management	Lifestyle counseling; metformin as first-line unless contraindicated.
Intensification	Add second agent if target unmet; insulin for symptomatic hyperglycemia or treatment failure.
Cardiovascular risk	Assess 10-yr risk; statin for high-/very-high risk; ACEi/ARB for kidney protection.
Complication prevention	Annual eye exam, UACR/eGFR, foot checks; BP and lipid control; vaccines per policy.
Follow-up	Panel management; recall lists; peer groups; self-monitoring where feasible.

Table 17.5-C. Indicators & formulas

Indicator	Formula / definition
Diabetes prevalence (%)	$100 \times (\text{Adults with diabetes} / \text{Adults assessed})$.
Control among diagnosed (%)	$100 \times (\text{Diagnosed diabetes with HbA1c} < 7\% / \text{Diagnosed diabetes})$.
Complication screening (%)	$100 \times (\text{Adults with diabetes receiving annual eye/kidney/foot checks} / \text{Adults with diabetes})$.
Insulin availability (%)	$100 \times (\text{Facilities with any insulin in stock} / \text{Facilities assessed})$.
Statin use among high-risk (%)	$100 \times (\text{Adults with diabetes at high ASCVD risk on statin} / \text{Adults with diabetes at high risk})$.

Table 17.5-D. Data sources & triangulation

Source	What it provides / note
STEPS	Glucose/HbA1c where available; BMI/waist; behaviors; medication use.
HMIS/DHIS2	Clinic volumes; retention; control rates; quarterly DQR required.
LIS/LMIS	Lab results (glucose/HbA1c, lipids); insulin/oral agents stock and dispensing.
Facility audits/registries	Diabetes clinics; complications; referrals; admissions.
GBD/IHME	DALYs/mortality attributable to diabetes and CKD.

Table 17.5-E. Quality, safety & equity practices

Domain	Operational practice
Medication safety	Metformin renal thresholds; hypoglycemia risk with insulin/sulfonylureas; sick-day rules.
Diagnostics quality	External quality assurance for labs; glucometer calibration; standardized HbA1c assays.
Equity	Lower screening/control in rural/pastoralist/IDP; address with outreach and fee waivers.
Self-management	Simple diet/activity plans; peer groups; family engagement; literacy-appropriate tools.
Integrated care	Hypertension/lipids exams; pregnancy screening; TB/HIV bidirectional considerations where relevant.

Care model narrative

Prioritize metformin-based initiation with lifestyle support; escalate in stepwise fashion with periodic A1c checks. Integrate cardiovascular risk management (statin for high-risk adults) and kidney protection (ACEi/ARB) into every diabetes visit. Use LMIS to track insulin and oral agents, aligning with DHIS2 panels for missed visits and control rates. Deploy task-sharing, peer groups, and home glucose/BP where feasible to lift adherence and control, and ensure complication screening is part of routine care.

References — Section 17.5 (URLs)

- **WHO PEN/HEARTS — Diabetes & CVD integration —**
<https://www.who.int/initiatives/heartst/technical-package>
- **WHO STEPS — NCD risk factors —** <https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps>
- **The DHS Program — Ethiopia —** <https://www.dhsprogram.com/>
- **IHME — Global Burden of Disease (GBD) —** <https://www.healthdata.org/gbd>
- **Ethiopia FMoH — NCD resources —** <https://www.moh.gov.et/>

17.6) Chronic Respiratory Diseases (CRDs): COPD & Adult Asthma

in Ethiopia are shaped by household biomass smoke, ambient PM2.5, tobacco/occupational exposures, and post-infectious airway disease. Asthma remains common among adults, while COPD rises with aging and cumulative exposures. This section provides a PEN-aligned PHC algorithm, tracer indicators, and pragmatic supply/diagnostics guidance. Figures are schematic and should be replaced with official data before publication.

Figure . Adult asthma vs COPD prevalence — schematic

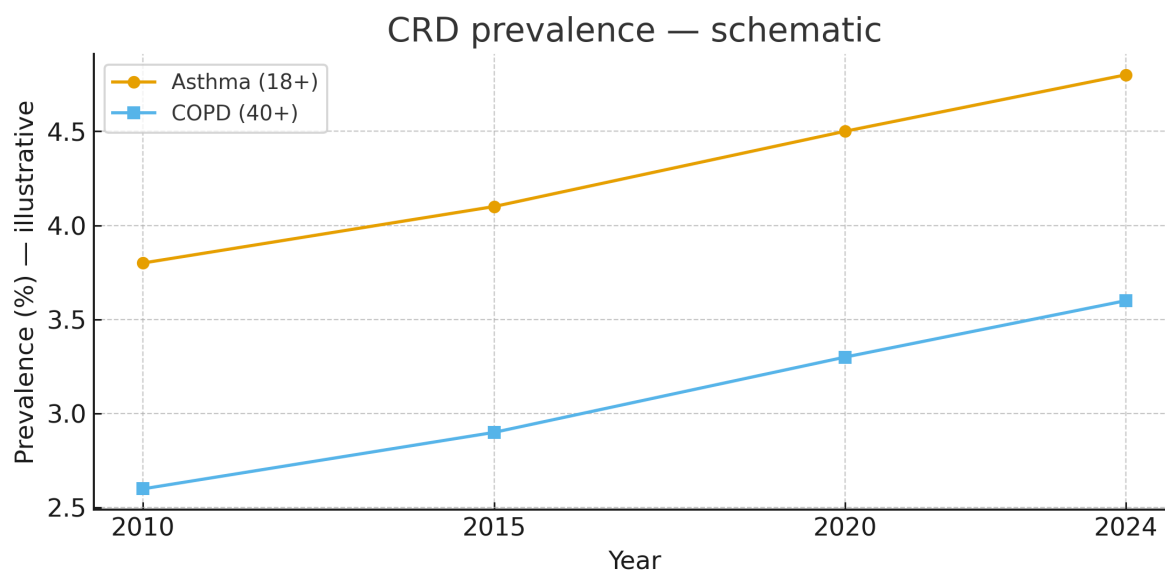


Figure . Exacerbation admissions — schematic

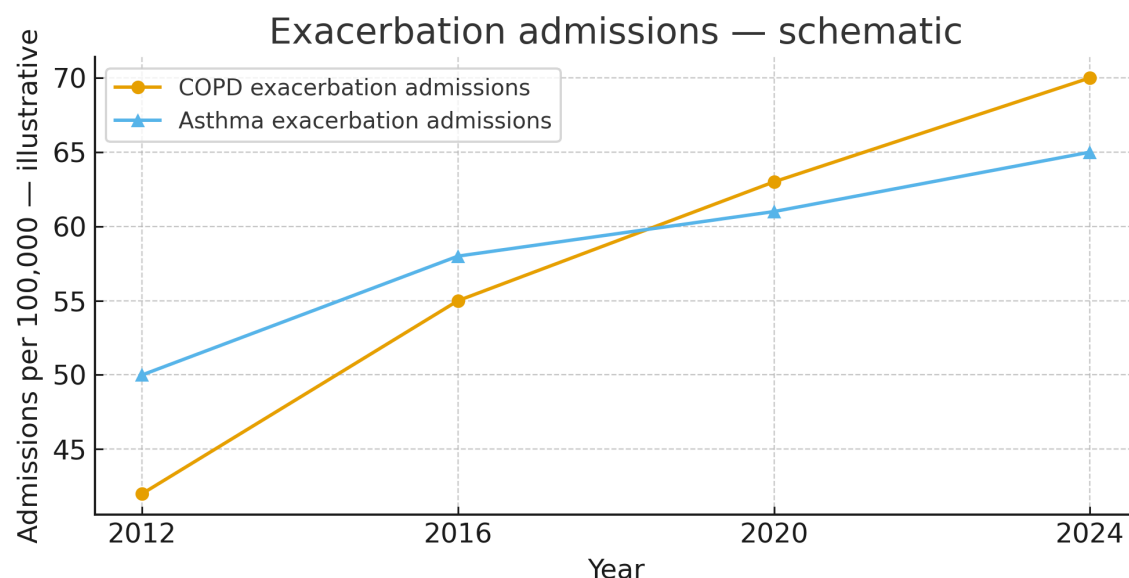


Table 17.6-A. Definitions & diagnostics

Term / Definition	Operational note
Asthma (adults)	Variable respiratory symptoms + variable airflow limitation; reversibility when tested.
COPD	Persistent symptoms + airflow limitation (post-BD FEV1/FVC <0.70).
Exacerbation	Acute worsening needing steroids, nebulization, ED visit, or admission.
Peak flow	Useful where spirometry unavailable; supports self-management.
Severity control	Symptoms + risk of exacerbations; step-wise therapy.

Table 17.6-B. Ethiopia PHC algorithm (WHO PEN; informed by GINA/GOLD)

Step	Operational content in Ethiopia PHC
Assessment	History, triggers; peak flow; refer for spirometry; pulse oximetry in acute episodes.
Asthma treatment	As-needed SABA; low-dose ICS; step up to ICS/LABA; action plans; oral steroids for severe exacerbations.

COPD treatment	Smoking cessation; SABA/SAMA; add LABA/LAMA; ICS/LABA for frequent exacerbations; pulmonary rehab.
Vaccines	Influenza/pneumococcal per policy for high-risk adults.
Environmental control	Clean-cooking transitions; ventilation; occupational protections.
Referral	Red flags, frequent exacerbations, diagnostic uncertainty, hypoxemia, suspected TB.

Table 17.6-C. Indicators & formulas

Indicator	Formula / definition
Asthma control (%)	$100 \times (\text{Asthma pts well-controlled} / \text{Asthma pts assessed})$
COPD post-BD spirometry (%)	$100 \times (\text{COPD pts with post-BD spirometry} / \text{COPD pts})$
Exacerbation admission rate	$100,000 \times (\text{CRD exacerbation admissions} / \text{adult population})$
SABA over-use (%)	$100 \times (\text{Pts with } >3 \text{ SABA canisters/year} / \text{Asthma pts})$
Inhaler availability (%)	% facilities with SABA; % with ICS; % with ICS/LABA

Table 17.6-D. Data sources & triangulation

Source	What it provides / note
STEPS	Symptoms, tobacco exposure, BMI; spirometry in special modules
HMIS/DHIS2	Visits, admissions, mortality; stockouts; follow-up rates
LMIS	Availability/consumption: SABA, ICS, ICS/LABA, spacers
Hospital registries	Admissions, oxygen use, LOS, readmissions
Air-quality datasets	Solid-fuel survey data; ambient PM2.5

Table 17.6-E. Quality, safety & equity practices

Domain	Operational practice
Diagnosis	Avoid mislabelling without objective testing where possible; consider TB
Technique	Teach/re-check inhaler technique; spacers; pictorial instructions
Oxygen	Titrated oxygen; pulse oximetry; device maintenance
Action plans	Personalized plans; steroid packs where appropriate; referral criteria

Equity	Women exposed to biomass; urban poor in high-PM areas; pastoralist outreach
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Care model narrative

Ensure accurate diagnosis, correct inhaler technique, and step-wise therapy. Address environmental drivers through clean-cooking transitions and occupational protections. District hospitals should maintain oxygen and nebulization capacity, steroid protocols, and early rehab, with clear referral pathways. Use LMIS to ensure SABA/ICS/ICS-LABA availability and align with DHIS2 service data. Equity efforts should prioritize women facing biomass exposure, urban residents in high-PM corridors, and pastoralist communities.

References — Section 17.6 (URLs)

- **WHO — Chronic respiratory diseases** — <https://www.who.int/health-topics/chronic-respiratory-diseases>
- **GINA — Global Initiative for Asthma** — <https://ginasthma.org/>
- **GOLD — Global Initiative for Chronic Obstructive Lung Disease** — <https://goldcopd.org/>
- **IHME — Global Burden of Disease (GBD)** — <https://www.healthdata.org/gbd>
- **Ethiopia FMoH — NCD resources** — <https://www.moh.gov.et/>

17.7) Cancer — Priorities for Prevention, Screening & Early Diagnosis

Cancer control in Ethiopia should start with prevention (HPV vaccination; HBV immunization and aflatoxin control), pragmatic screening (VIA/HPV for cervical), and reliable early-diagnosis pathways (pathology, imaging, surgery). Breast and cervical cancers dominate adult female cancer burden; liver, colorectal, and esophageal cancers add substantial mortality among both sexes. Figures are schematic placeholders and should be replaced with IARC/Globocan, national registry, HMIS/DHIS2, and EPI data before publication.

Figure 17.7-1. Leading cancer DALYs — schematic trends

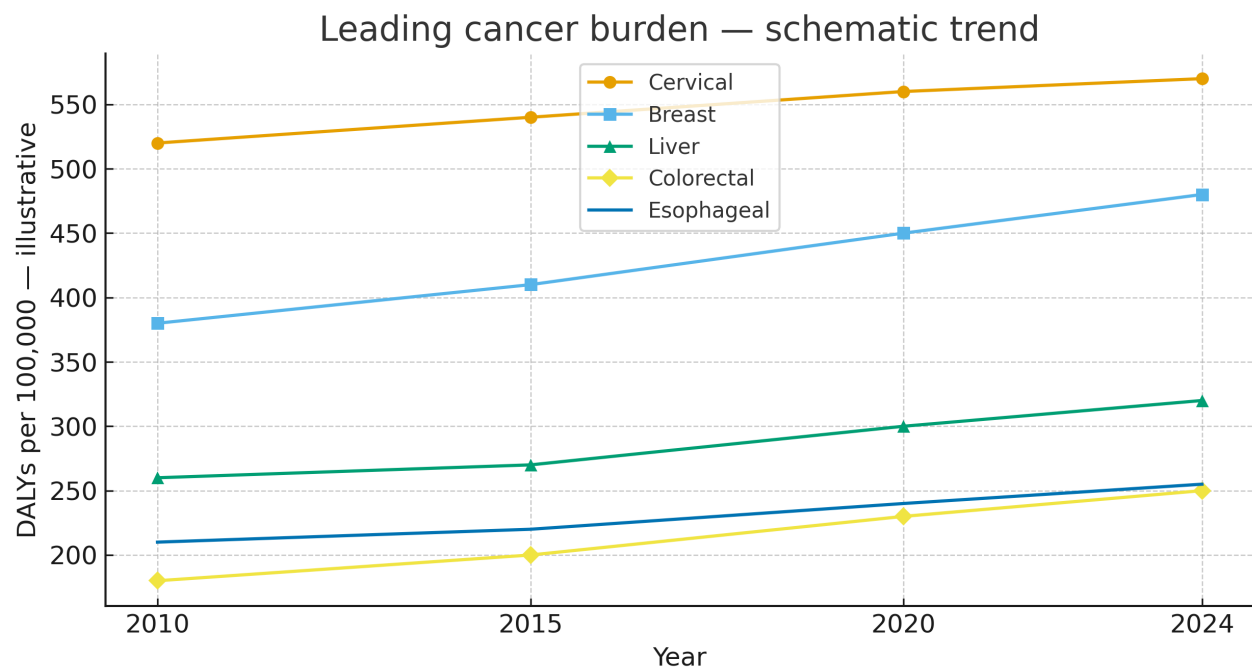


Figure 17.7-2. HPV vaccination coverage (girls) — schematic

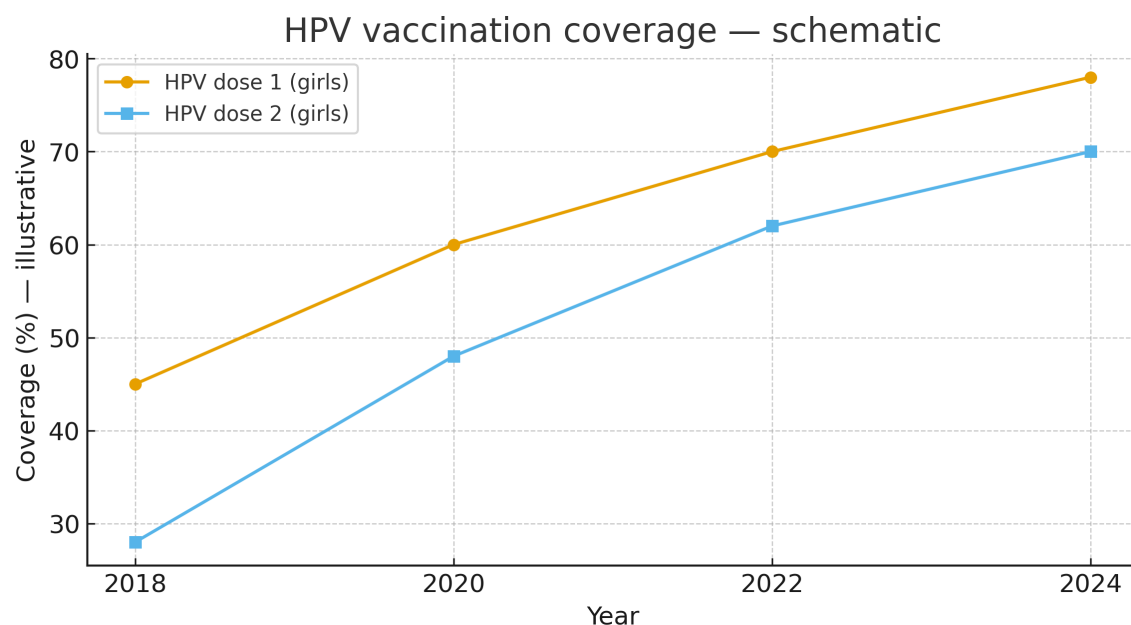


Figure 17.7-3. Cervical screening coverage (VIA/HPV) — schematic

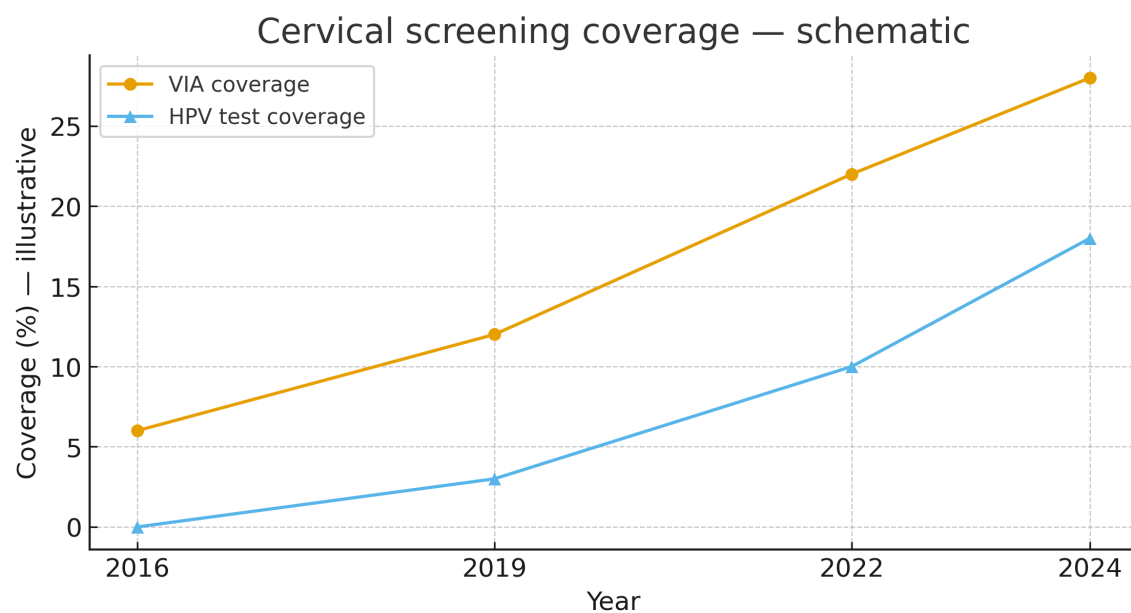


Figure 17.7-4. Stage at diagnosis distribution — schematic

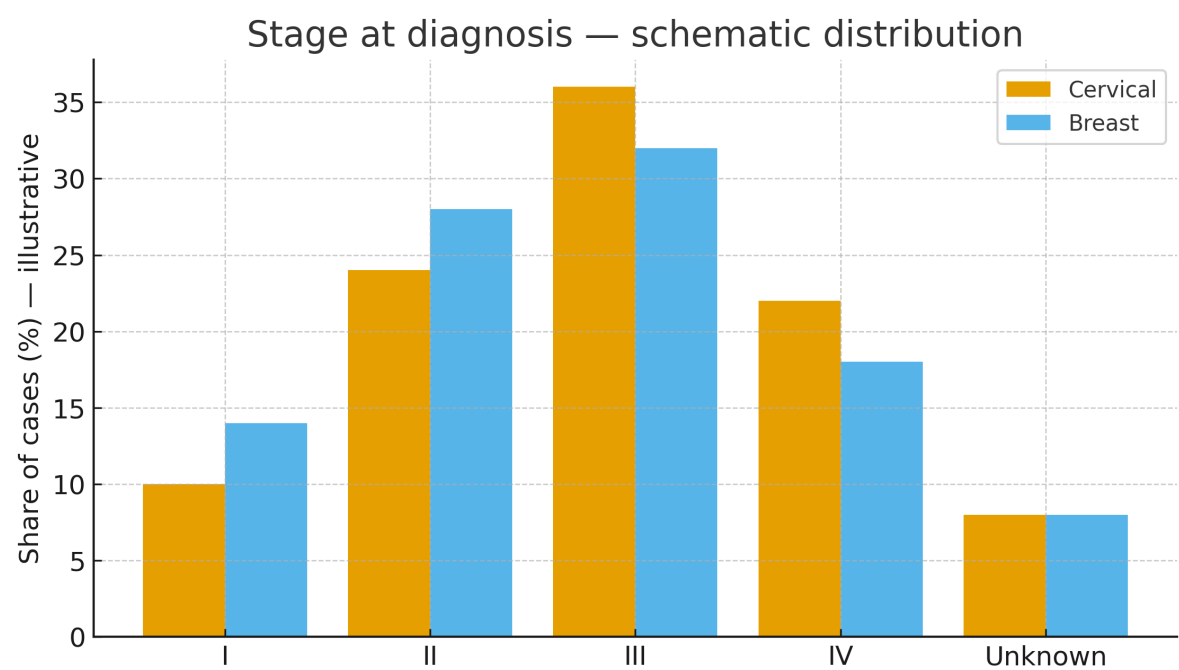


Figure 17.7-5. Cancer system capacity — schematic

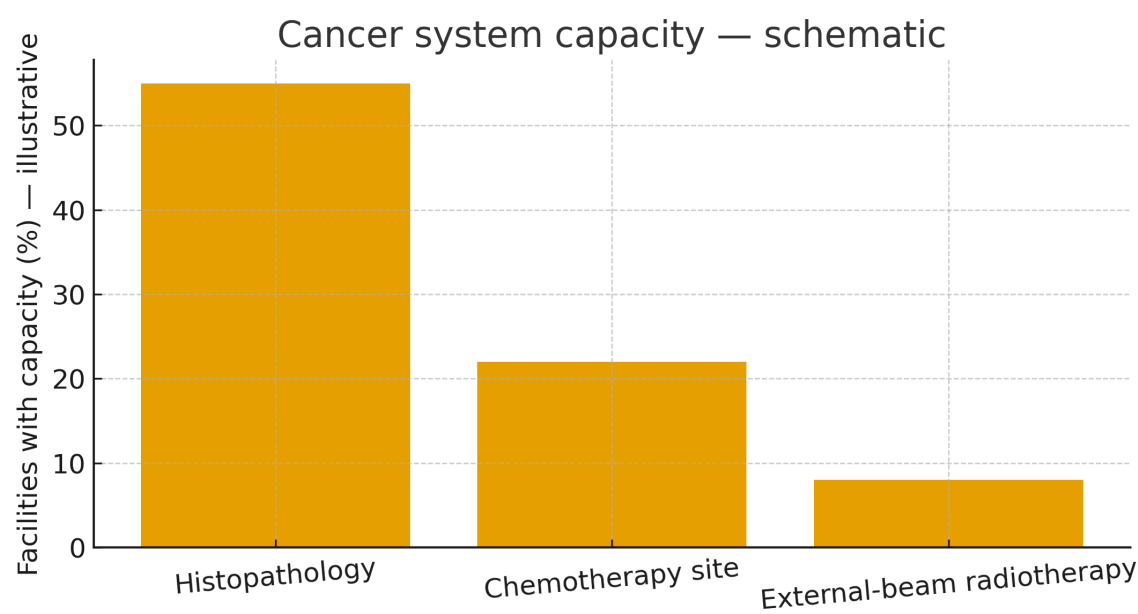


Table 17.7-A. Priority cancers and early-control actions

Cancer	Priority prevention/screening & early diagnosis actions
Cervical cancer	HPV vaccination (girls), VIA/HPV screening (30–49y), screen-and-treat with thermal ablation/cryotherapy, referral for LEEP.

Breast cancer	Awareness & clinical breast exam (CBE) pathways; diagnostic ultrasound; core-needle biopsy; timely surgery; tailored chemo; limited mammography where feasible.
Liver cancer (HBV)	Universal birth-dose where policy allows; infant EPI series; PMTCT; antiviral therapy eligibility; aflatoxin control.
Colorectal cancer	Symptom pathways; stool tests (FIT) pilots; timely colonoscopy referral where capacity exists.
Esophageal cancer	Risk communication (very hot beverages), nutrition; prompt endoscopy referral for dysphagia; pathology confirmation.

Table 17.7-B. Cervical screening algorithms (VIA & HPV)

Algorithm	Key steps
VIA pathway (resource-appropriate)	VIA positive → treat eligible lesions same day (thermal/cryotherapy); VIA negative → rescreen in 3–5y.
HPV test pathway	HPV+ → VIA/visual triage or treat per protocol; HPV– → rescreen per national interval.
Screen-and-treat principles	Minimize loss to follow-up with same-day treatment; ensure pregnancy/therapeutic contraindications respected.

Table 17.7-C. Early diagnosis signal functions (district/regional)

Domain	Minimum signal functions
Pathology	Biopsy handling SOPs; histopathology turnaround targets; external quality assurance.
Imaging	Basic ultrasound; X-ray; access/referral to CT/MRI for staging where available.
Surgery	Timely lumpectomy/mastectomy, hysterectomy; safe anesthesia; post-op pathology review.
System functions	Tumor boards (virtual where needed); palliative care integration; morphine access; referral navigation.

Table 17.7-D. Indicators & illustrative targets

Indicator	Illustrative target (policy-aligned)
HPV vaccination (dose 2) coverage	Target ≥80% of eligible girls (progressive scale-up).
Cervical screening coverage 30–49y	Target ≥70% ever screened; ≥50% within last 5 years.

Screen-positive treatment rate	≥90% of VIA+/HPV+ eligible lesions receive same-day treatment.
Biopsy turnaround time	Median ≤21 days from collection to report.
Stage at diagnosis (breast, cervical)	Increase stage I–II share; reduce unknown stage to <5%.

Table 17.7-E. Data sources & triangulation

Source	What it provides / note
Cancer registries (pop-based)	Incidence by site/stage; trends; survival where feasible.
Hospital registries	Site/stage at diagnosis; treatment timelines; outcomes; palliative care.
HMIS/DHIS2	Facility service stats: VIA/HPV tests, treatments; surgery counts; chemo cycles.
EPI/School platforms	HPV vaccination coverage (by dose, district).
IARC/Globocan & GBD	International comparisons with uncertainty; model-based estimates.

Table 17.7-F. Quality, safety & equity practices

Domain	Operational practice
Safety	Thermal-ablation/cryotherapy adverse-event logs; surgical safety checklist; chemo protocols.
Pathology quality	External QA; standardized reporting; synoptic templates; barcoding/chain-of-custody.
Navigation	Patient navigators; call-back systems; transport vouchers for rural/pastoralist women.
Equity	Outreach in low-coverage regions; mobile screen-and-treat; disability-inclusive facilities; language support.
Palliative care	Oral morphine availability; home-based support; symptom scales in HMIS.

Care model narrative

Focus on high-yield interventions: scale HPV vaccination and screen-and-treat programs; strengthen biopsy handling and histopathology quality; enable timely surgery; and develop networked tumor boards. Where radiotherapy capacity is limited, prioritize early detection and surgical/chemotherapy pathways while planning phased radiotherapy expansion. Track drop-off points across the diagnostic pathway (from first symptom to treatment) and address them with patient navigation, transport support, and clear referral protocols. Embed equity by reaching rural and pastoralist communities with mobile services and ensuring services are financially and physically accessible to women.

References — Section 17.7 (URLs)

- **IARC — Globocan** — <https://gco.iarc.fr/>
- **WHO — Cancer control & early diagnosis** — <https://www.who.int/health-topics/cancer>
- **WHO — HPV vaccination** — [https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/human-papillomavirus-\(hpv\)](https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/human-papillomavirus-(hpv))
- **Ethiopia FMoH — Cancer/NCD resources** — <https://www.moh.gov.et/>

17.8) Chronic Kidney Disease (CKD)

CKD prevalence is rising in Ethiopia, largely driven by hypertension and diabetes and compounded by limited early detection. A PEN/HEARTS-concordant approach prioritizes albuminuria and eGFR testing in high-risk adults, aggressive BP and glycemic control, and timely referral for advanced disease. Figures are schematic and should be replaced with STEPS/special surveys, DHIS2/HMIS, LIS, dialysis registry, and transplant program data before publication.

Figure . CKD prevalence trend — schematic

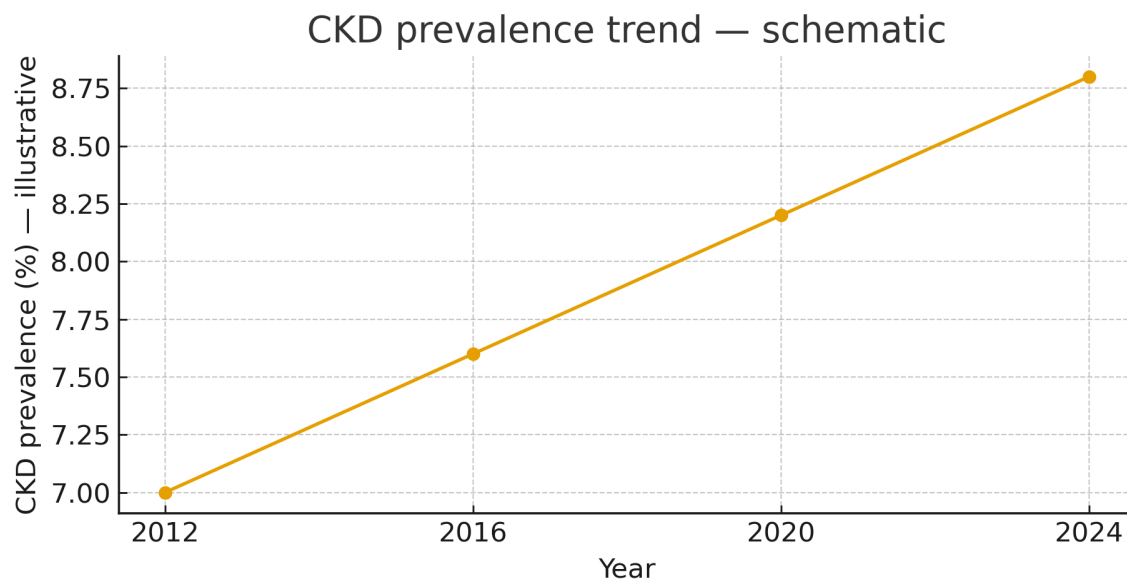


Figure 17.8-2. CKD detection & treatment cascade — schematic

Figure . Dialysis capacity (centers & machines) — schematic

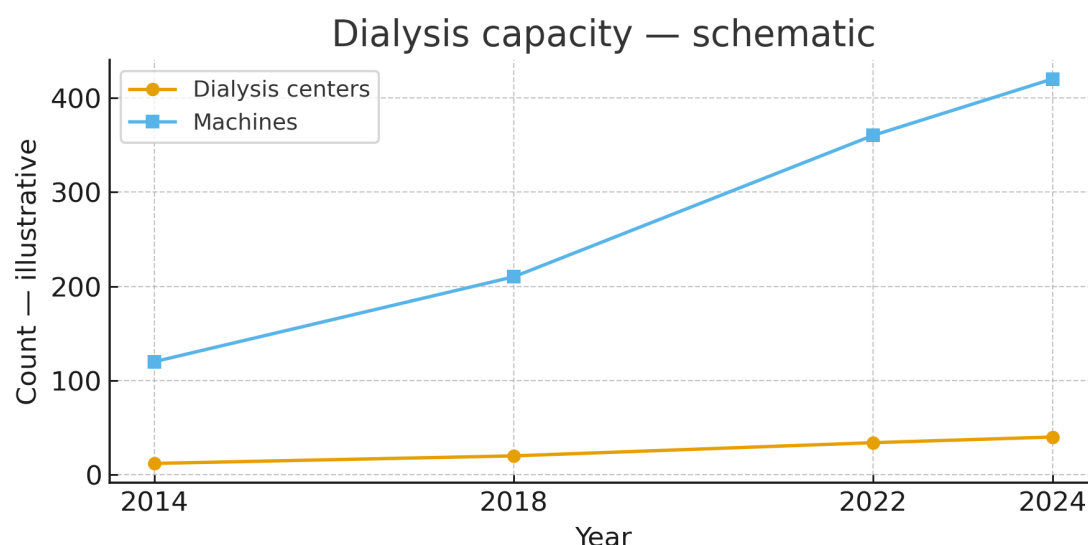


Table 17.8-A. Definitions & staging (KDIGO)

Term / Threshold	Definition / note
CKD definition	Abnormal kidney structure or function ≥ 3 months (damage and/or eGFR < 60).
eGFR (CKD-EPI)	Estimate from serum creatinine ($\pm$ cystatin C).
G-stage (eGFR)	G1 ≥ 90 ; G2 60–89; G3a 45–59; G3b 30–44; G4 15–29; G5 < 15 .
A-stage (albuminuria)	A1 < 30 mg/g; A2 30–300; A3 > 300 (UACR).
Risk grid	Combine G and A to stratify progression/CV/mortality risk.

Table 17.8-B. Ethiopia PHC algorithm (PEN/HEARTS-concordant)

Step	Operational content
Screening	UACR + eGFR in diabetes, hypertension, or high CVD risk; confirm persistence.
Risk reduction	BP control (ACEi/ARB if albuminuria); glycemic control; statin for high CVD risk; lifestyle.
Medication safety	Renal dose adjust; avoid NSAIDs; contrast precautions; sick-day rules.
Follow-up	Intervals by risk; monitor eGFR/UACR; immunizations per policy.
Referral	Rapid eGFR decline; A3; refractory HTN; electrolyte disorders; suspected GN; G4–G5 for RRT planning.

Table 17.8-C. Indicators & formulas

Indicator	Formula / definition
CKD prevalence (%)	$100 \times (\text{Adults with CKD} / \text{Adults assessed})$
Albuminuria testing (%)	$100 \times (\text{Eligible adults with UACR in last 12 mo} / \text{Eligible adults})$
ACEi/ARB among A2–A3 (%)	$100 \times (\text{CKD A2–A3 on ACEi/ARB} / \text{CKD A2–A3})$
eGFR monitoring (%)	$100 \times (\text{CKD with } \geq 2 \text{ eGFR tests/year} / \text{CKD patients})$
RRT readiness (%)	% of G4–G5 with modality counseling and access plan

Table 17.8-D. Data sources & triangulation

Source	What it provides / note
STEPS/surveys	Albuminuria/creatinine modules; risk factors
HMIS/DHIS2	CKD clinic panels; ACEi/ARB use; referrals; dialysis visits
LIS	Creatinine and UACR volumes; EQA status
Dialysis/transplant registries	Centers, machines, patients, outcomes; modality mix; transplant
GBD/IHME	CKD burden and CKD-attributable CVD

Table 17.8-E. Quality, safety & equity practices

Domain	Operational practice
Accuracy	Lab EQA for creatinine/UACR; validated BP devices
Safety	Avoid nephrotoxins; monitor potassium on ACEi/ARB; anemia/mineral-bone management
Equity	Subsidize tests/ACEi/ARB; mobile transport; rural/pastoralist outreach; fair RRT access
Integration	DM/HTN/CKD joint clinics; nutrition; palliative kidney care
Supply	LMIS tracking for ACEi/ARB, diuretics, EPO/iron, dialysis consumables

Care model narrative

Systematically screen adults with diabetes and hypertension for CKD using UACR and eGFR; confirm persistence of abnormalities. Use ACEi/ARB in albuminuric CKD, optimize BP and glycemic control, and manage anemia and mineral-bone disorder per guideline. Prepare G4–G5 patients for renal replacement therapy with early education on modalities; when RRT is not feasible, embed palliative kidney care. Triangulate DHIS2 clinic panels, LIS volumes, and LMIS supply data to close gaps, and ensure equitable access across regions and groups.

References — Section 17.8 (URLs)

- **KDIGO — CKD guidelines** — <https://kdigo.org/guidelines/ckd-evaluation-and-management/>
- **WHO PEN/HEARTS — NCD management** — <https://www.who.int/teams/noncommunicable-diseases/management/pen>
- **IHME — GBD Results** — <https://vizhub.healthdata.org/gbd-results/>
- **Ethiopia FMoH — NCD/renal resources** — <https://www.moh.gov.et/>

17.9) Mental & Substance Use Disorders

Mental and substance use disorders contribute substantially to disability in Ethiopia. Service coverage is expanding through mhGAP and integration with PHC and chronic-care platforms, but treatment gaps remain wide. This section summarizes a pragmatic algorithm, indicators, and data sources. Figures are schematic and should be replaced with HMIS/DHIS2, STEPS, WHO-AIMS, and GBD data.

Figure . Burden trend (DALYs) — schematic

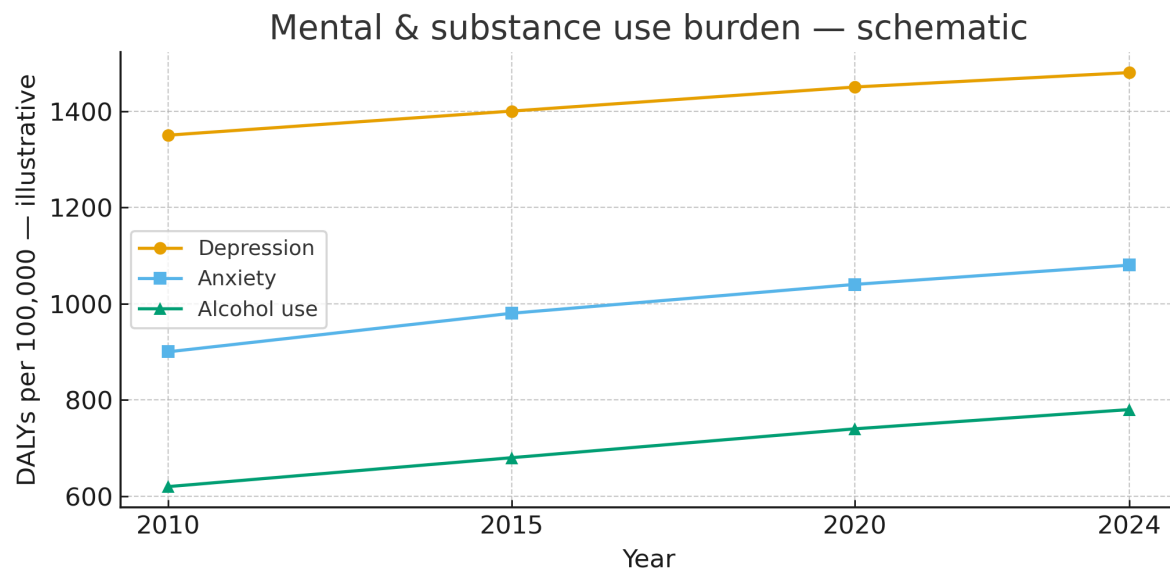


Figure . Treatment gap by condition — schematic

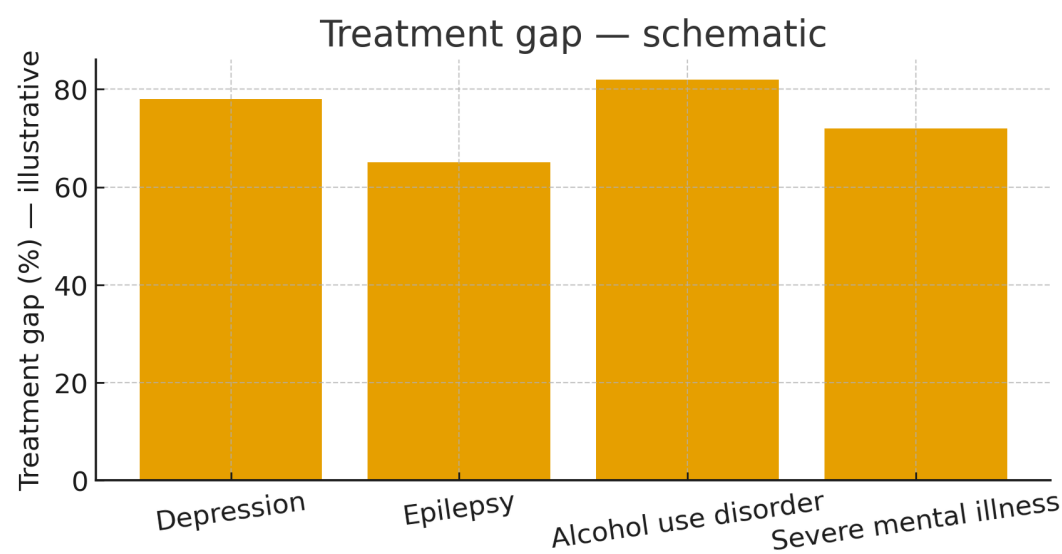


Figure . Suicide mortality rate — schematic

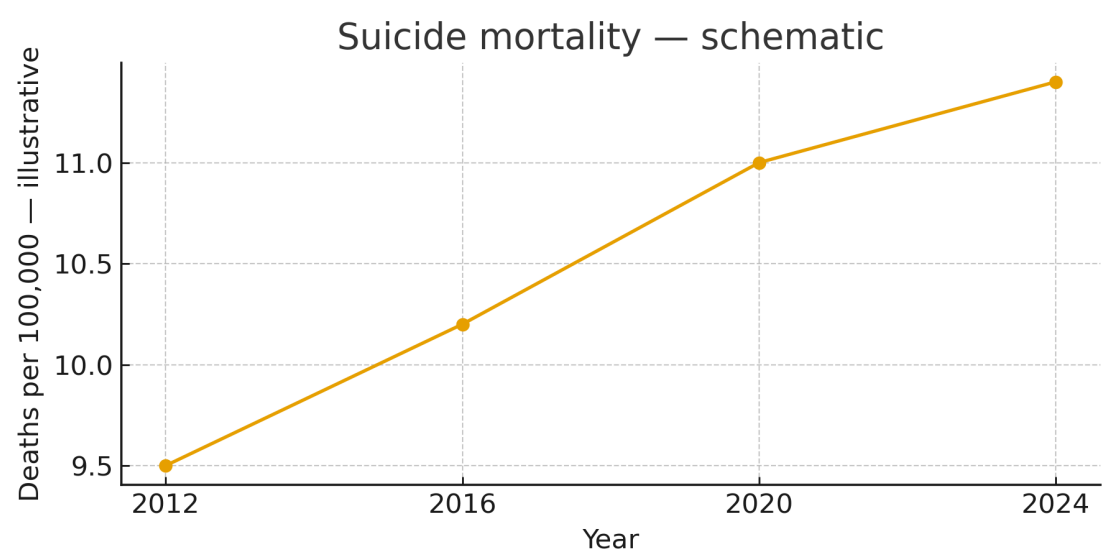


Figure . Adult substance use — schematic

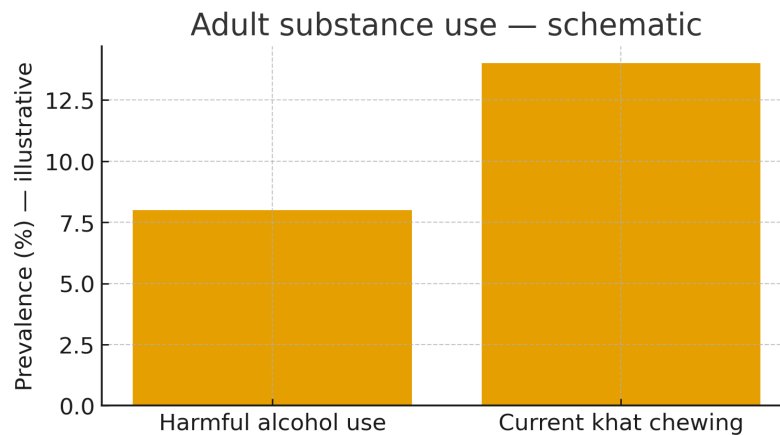


Table 17.9-A. Definitions & diagnostic anchors

Term / Cluster	Operational note
Common mental disorders	Depression/anxiety spectrum; PHQ-9/GAD-7 screens; clinical dx per ICD-10/11.
Severe mental illness (SMI)	Schizophrenia spectrum & bipolar disorders; functional impairment; risk assessment.
Epilepsy	≥2 unprovoked seizures >24h apart; included due to service overlap & mhGAP algorithms.
Substance use disorders	Harmful use/dependence (alcohol, khat, tobacco, other); ASSIST/AUDIT screens.
Suicide indicator	Mortality rate per 100,000; attempts/ideation where tracked.

Table 17.9-B. Ethiopia PHC algorithm (mhGAP-aligned)

Step	Operational content
Screen & triage	Brief screens (PHQ-2/9, GAD-2/7, AUDIT-C) in chronic care; suicide risk assessment.
Diagnosis & initial care	Rule out medical causes; psychoeducation; brief counselling; first-line psychotropic per protocol.
Follow-up & referral	Stepped care; case review; referral for SMI/suicidality/refractory cases; link to social protection.
Substance use care	Brief intervention (BI) for harmful alcohol; referral pathways for dependence; community recovery supports.
Continuity & rights	Care plans; consent; confidentiality; least-restrictive practices; family/carer engagement.

Table 17.9-C. Indicators & formulas

Indicator	Formula / definition
Screening coverage (%)	$100 \times (\text{Eligible adults screened} / \text{Eligible adults attending clinic})$
Any treatment among diagnosed (%)	$100 \times (\text{Diagnosed receiving counselling and/or psychotropic} / \text{Diagnosed})$
Treatment adequacy (%)	$100 \times (\text{Patients meeting adequacy criteria} / \text{Diagnosed on treatment})$
Suicide mortality rate	$100,000 \times (\text{Deaths from self-harm} / \text{Population})$
Follow-up kept (%)	$100 \times (\text{Attended mental-health visits} / \text{Scheduled})$

Table 17.9-D. Data sources & triangulation

Source	What it provides / note
HMIS/DHIS2	Outpatient mental-health visits; psychotropic stockouts; suicide mortality (CRVS-enabled)
STEPS/surveys	Depression/anxiety screens; alcohol/tobacco; suicidality modules in some settings
WHO-AIMS	System capacity, workforce, beds, policies, financing
Hospital registries	Admissions, LOS, restraint incidence, emergency presentations
Police/prison/education	Complementary data for self-harm, substance use, school mental health

Table 17.9-E. Quality, safety & equity practices

Domain	Operational practice
Rights-based care	Privacy, dignity, least-restrictive care; informed consent; grievance mechanisms
Safety	Suicide risk protocols; means restriction; crisis lines/referral maps
Integration	Embed mhGAP into NCD, HIV, TB, ANC/PNC, adolescent services
Equity	Rural/pastoralist/IDP outreach; language services; fee waivers; gender-sensitive care
Workforce	Task-sharing, supervision, peer supporters; burnout prevention

Care model narrative

Embed brief screening into high-volume platforms (HIV, NCD, ANC, adolescent clinics). Use stepped care with psychoeducation and brief counselling for mild/moderate cases, protocolized psychotropics and structured psychotherapy for moderate/severe, and rapid referral for suicidality or SMI. Strengthen supply chains, ensure private counselling spaces, and support workforce wellbeing through supervision and peer networks. Coordinate with community and social-protection services to reduce catastrophic costs and support recovery.

References — Section 17.9 (URLs)

- **WHO mhGAP Intervention Guide** — <https://www.who.int/teams/mental-health-and-substance-use/treatment-care/mental-health-gap-action-programme/mhgap-intervention-guide>
- **WHO-AIMS — Mental health systems assessment** — https://www.who.int/mental_health/evidence/WHO-AIMS/en/
- **IHME — Global Burden of Disease (GBD)** — <https://vizhub.healthdata.org/gbd-results/>
- **Ethiopia FMoH — Mental health resources** — <https://www.moh.gov.et/>

17.10) Musculoskeletal Disorders & Chronic Pain

Low back and neck pain are among the top causes of disability in Ethiopia and globally. A rehabilitation-forward, function-centred approach at PHC can reduce disability, costs, and inappropriate imaging or opioid use. Figures are schematic and should be replaced with GBD, HMIS/DHIS2, occupational surveys, and facility assessments before publication.

Figure . MSK burden (DALYs) — schematic trend

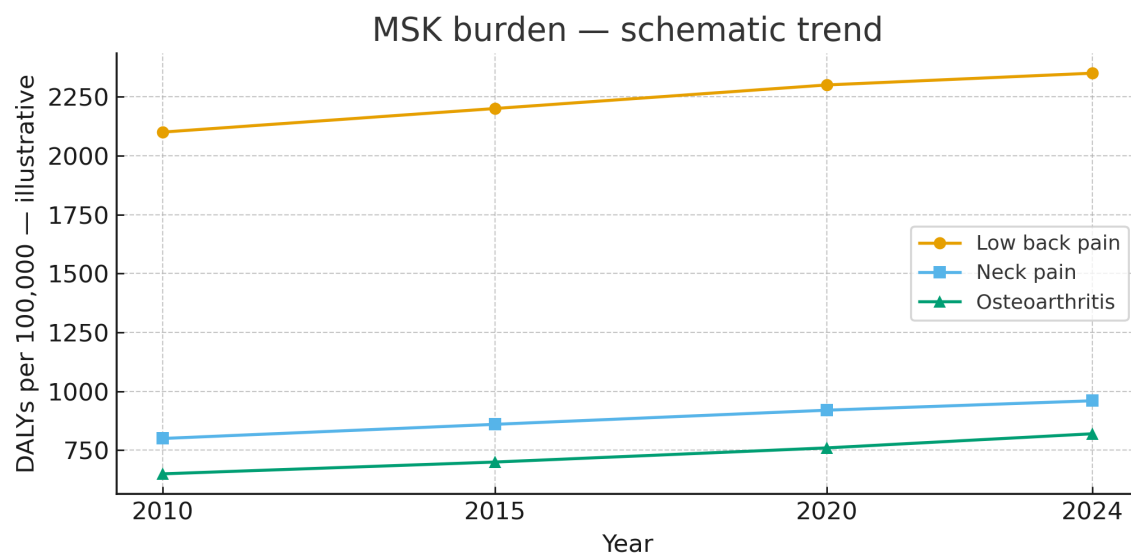


Figure . Occupational MSK risk exposures — schematic

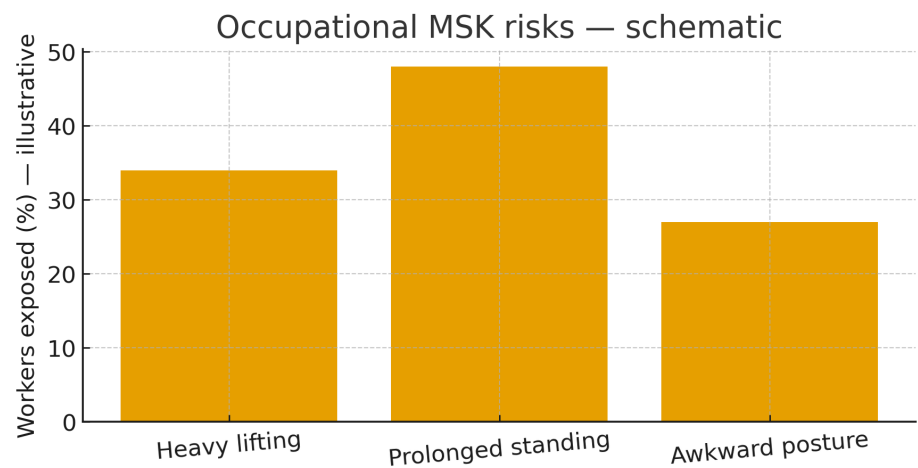


Figure . Analgesic utilization (DDD/1,000/day) — schematic

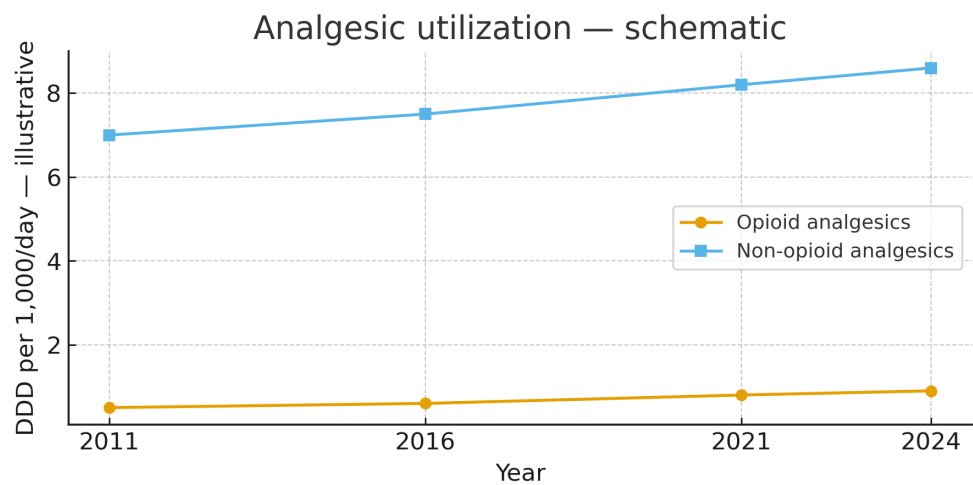


Table 17.10-A. Definitions & diagnostic anchors

Condition / Concept	Operational note
Low back pain (LBP)	Pain between costal margin and gluteal folds; screen red flags.
Neck pain	Cervical pain ± radiation; red-flag screen.
Osteoarthritis (OA)	Chronic joint pain/functional limitation — knee/hip/hand; clinical ± radiographic.
Chronic primary pain	>3 months not fully explained by another dx; function-centered management.
Red flags	Cancer, infection, fracture, cauda equina, severe neuro deficit, inflammatory back pain.

Table 17.10-B. Ethiopia PHC algorithm (rehab-forward)

Step	Operational content
Triage & red flags	Identify red flags; urgent referral if present; otherwise reassure and stay active.
First-line care	Education, activity advice, heat, simple analgesics; avoid routine imaging.
Rehab & function	Physio-style exercises, graded activity, workplace modification, assistive devices.
Persistent pain	Consider amitriptyline/duloxetine for neuropathic features; screen mental health; avoid long-term opioids.
Referral	Neuro deficits, inflammatory arthritis, severe OA not responding, trauma.

Table 17.10-C. Indicators & formulas

Indicator	Formula / definition
MSK visit rate	$1,000 \times (\text{MSK outpatient visits} / \text{Population})$
Return-to-work at 12w (%)	$100 \times (\text{Workers off-work who returned by 12 weeks} / \text{Workers off-work})$
Imaging appropriateness (%)	$100 \times (\text{Imaging with red-flag indication} / \text{All MSK imaging})$
Rehab coverage (%)	$100 \times (\text{Eligible MSK pts receiving structured rehab} / \text{Eligible MSK pts})$
Opioid-sparing (%)	$100 \times (\text{MSK pts managed without opioids} / \text{All MSK pts})$

Table 17.10-D. Data sources & triangulation

Source	What it provides / note
HMIS/DHIS2	Outpatient visits; imaging; physio sessions; stockouts; surgeries
Facility/workforce surveys	Rehab staff; equipment; group space; education materials
Occupational health	Exposure mapping (construction, transport, agriculture)
Road-injury registries	Trauma intersecting with MSK disability; surgical backlogs
GBD/IHME	Burden estimates & comparisons

Table 17.10-E. Quality, safety & equity practices

Domain	Operational practice
Imaging stewardship	No routine imaging for non-specific LBP/neck pain without red flags
Opioid safety	Prefer non-opioids; time-limited opioid use if unavoidable; monitor dependence
Rehab access	Group classes; home programmes; tele-rehab
Workplace integration	Ergonomics; return-to-work plans; employer engagement
Equity	Reach rural/pastoralist/informal workers; culturally tailored materials

Care model narrative

Begin with red-flag triage and reassurance; emphasize staying active and graded rehabilitation. Use non-opioid analgesia and avoid routine imaging. Create group back-care and home-exercise programs; integrate ergonomics and return-to-work planning with employers. Track rehab coverage and imaging appropriateness in DHIS2; align LMIS analgesic consumption with stewardship targets. Reach informal and rural workers via community-based rehab.

References — Section 17.10 (URLs)

- **WHO — Rehabilitation in Health Systems —** <https://www.who.int/initiatives/rehabilitation-2030>
- **WHO — Musculoskeletal health —** <https://www.who.int/health-topics/musculoskeletal-conditions>
- **IHME — Global Burden of Disease (GBD) —** <https://vizhub.healthdata.org/gbd-results/>
- **Global Alliance for Musculoskeletal Health —** <https://gmusc.org/>
- **Ethiopia FMoH — NCD/Rehab resources —** <https://www.moh.gov.et/>

17.11) Oral Health

Oral diseases are among the most common NCDs in Ethiopia, driven by sugar intake, tobacco, limited preventive services, and access barriers. A primary-care- and school-based approach emphasizing fluoride, ART, and timely referral can reduce pain, infection, and tooth loss. Figures are schematic and should be replaced with national oral health surveys, HMIS/DHIS2, school health, LMIS, and GBD data before publication.

Figure . Mean DMFT (age 12) — schematic trend

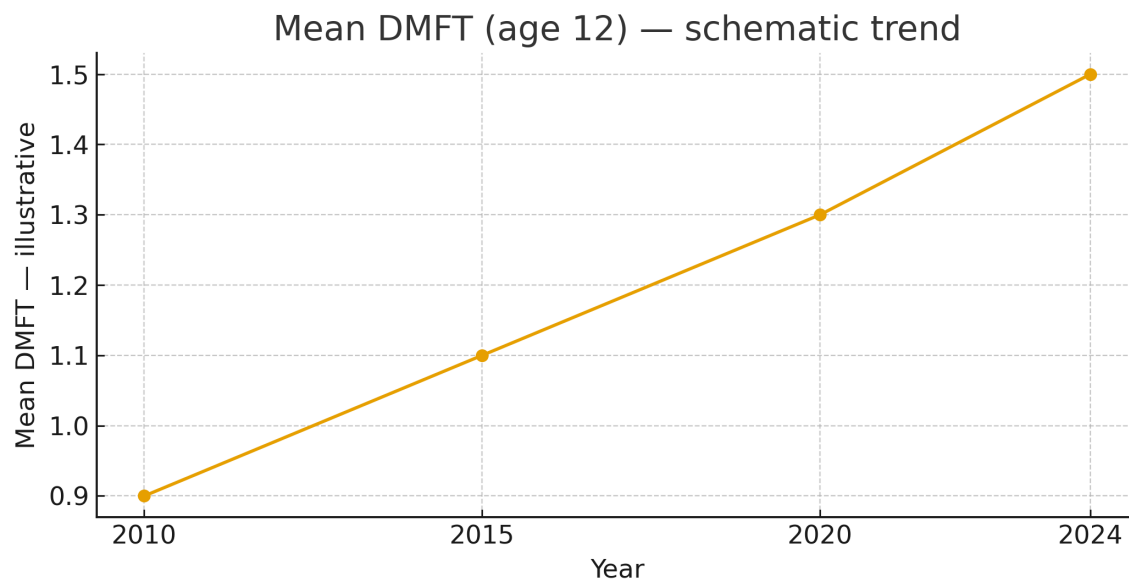


Figure . Adult oral disease prevalence — schematic

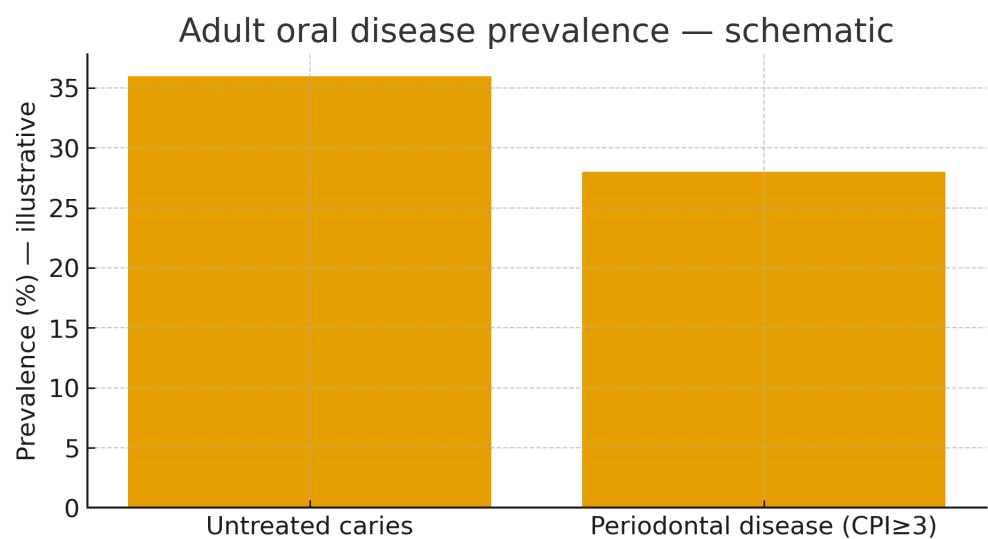


Figure . Fluoridated toothpaste availability — schematic

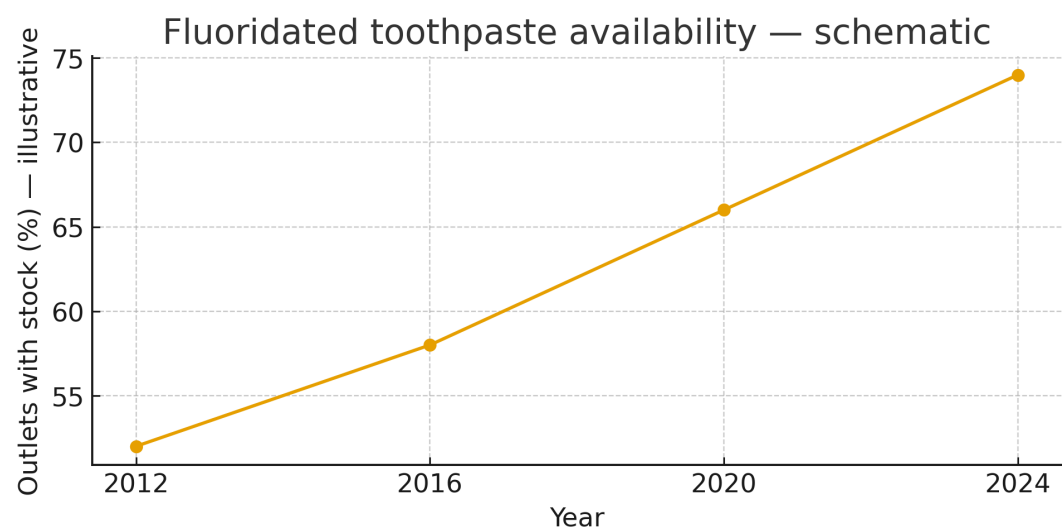


Figure . School sealant/varnish coverage — schematic

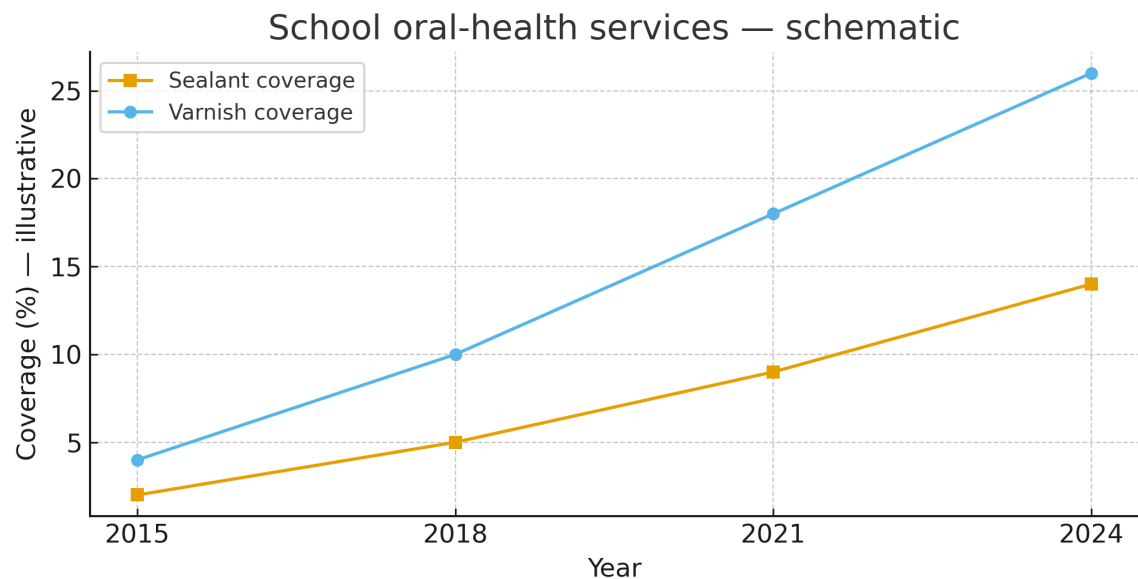


Table 17.11-A. Definitions & diagnostic anchors

Term / Concept	Operational note
DMFT index	Sum of decayed (D), missing (M) due to caries, and filled (F) teeth in permanent dentition; standard at age 12.
CPI (Community Periodontal Index)	Simple probe-based index to screen for periodontal status (bleeding, calculus, pockets).
ECC (Early Childhood Caries)	Presence of ≥1 decayed, missing (due to caries), or filled surface in any primary tooth in a child ≤71 months.
ART (Atraumatic Restorative Treatment)	Hand instruments + high-viscosity glass ionomer for minimal-intervention restorative care.
Fluoride exposure	From toothpaste, salt/water fluoridation (where applicable), and varnish; monitor optimal range and risk of fluorosis.

Table 17.11-B. Ethiopia PHC/community algorithm

Step	Operational content in Ethiopia PHC/community
Promotion & prevention	Twice-daily brushing with fluoridated toothpaste; sugar-sweetened beverage reduction; tobacco cessation; school health programs.
Screening & triage	Visual inspection; pain/infection triage; referral for abscess, trauma, spreading infection, or severe periodontal disease.
Basic treatment	ART, atraumatic extractions, fluoride varnish; analgesia/antibiotics when indicated by guideline; infection control.
Referral & follow-up	Complex restorations, endodontics, surgery, malignancy suspicion; recall for high-risk groups (ECC, diabetics, pregnancy).
Integration	Embed oral health in NCD, maternal, and school platforms; coordinate with WASH for fluoride and safe water.

Table 17.11-C. Indicators & formulas

Indicator	Formula / definition
Mean DMFT at age 12	Mean(DMFT among examined 12-year-olds).
Untreated caries prevalence (%)	$100 \times (\text{Persons with } \geq 1 \text{ untreated carious lesion} / \text{Persons examined})$.
Periodontal disease prevalence (%)	$100 \times (\text{Adults with CPI} \geq 3 / \text{Adults examined})$.
School varnish/sealant coverage (%)	$100 \times (\text{Eligible children receiving service} / \text{Eligible children})$.
PHC readiness (%)	% facilities with sterilization, ART kits, fluoride varnish, and education materials in last quarter.

Table 17.11-D. Data sources & triangulation

Source	What it provides / note
National oral health surveys	DMFT/CPI/ECC prevalence by age/region; service coverage.
HMIS/DHIS2 & school health	Facility oral-health visits; ART/extractions; school sealant/varnish counts.
LMIS/market surveys	Fluoridated toothpaste availability/price; varnish/consumables stock.
GBD/IHME	Burden estimates for oral diseases and international comparisons.
WASH/Water quality	Water fluoride levels; safe water access; salt fluoridation where applicable.

Table 17.11-E. Quality, safety & equity practices

Domain	Operational practice
Infection prevention & control	Instrument reprocessing/sterilization; PPE; waste management.
Fluoride stewardship	Ensure adequate fluoride; mitigate fluorosis risk in high-fluoride groundwater areas.
School platforms	Target ECC/high-risk areas with mobile clinics; teacher engagement; consent processes.
Pain & urgent care	Analgesia; drainage or extraction when indicated; antibiotics only per guideline.
Equity	Reach rural/pastoralist and low-income urban populations; disability-inclusive access; language support.

Care model narrative

Integrate oral-health promotion into schools and maternal/child clinics, emphasizing fluoridated toothpaste, reduced sugary drinks, and tobacco cessation. Train PHC teams to deliver ART, fluoride varnish, and atraumatic extractions with robust infection-control. Build referral pathways for complex care and ensure LMIS tracks varnish/ART supplies and sterilization consumables. Use DHIS2 to monitor DMFT/CPI, service coverage, and readiness. Prioritize outreach to rural, pastoralist, and low-income urban communities and ensure disability-inclusive access.

References — Section 17.11 (URLs)

- **WHO — Oral health** — <https://www.who.int/health-topics/oral-health>
- **WHO — Oral health action plan & ECC resources** — <https://www.who.int/teams/noncommunicable-diseases/oral-health>
- **IHME — Global Burden of Disease (GBD)** — <https://vizhub.healthdata.org/gbd-results/>
- **Ethiopia FMoH — Oral health resources** — <https://www.moh.gov.et/>

17.12) Injury & Violence

Injury and violence impose a substantial burden in Ethiopia. Road-traffic injuries are a leading cause of death and disability among working-age adults, while interpersonal violence, burns, and falls drive emergency demand. A foundational trauma system—prehospital, facility signal functions, and rehabilitation—offers strong returns. Figures are schematic and should be replaced with HMIS/DHIS2, police/road safety, CRVS, trauma registries, and survey data.

Figure . All-injury mortality — schematic trend

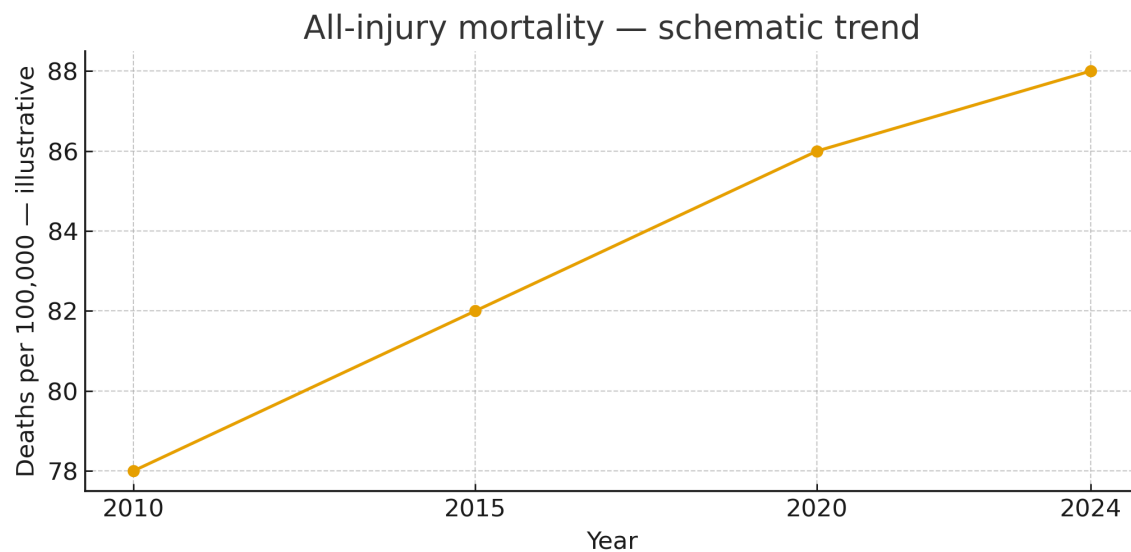


Figure . Road-traffic mortality — Ethiopia vs global — schematic

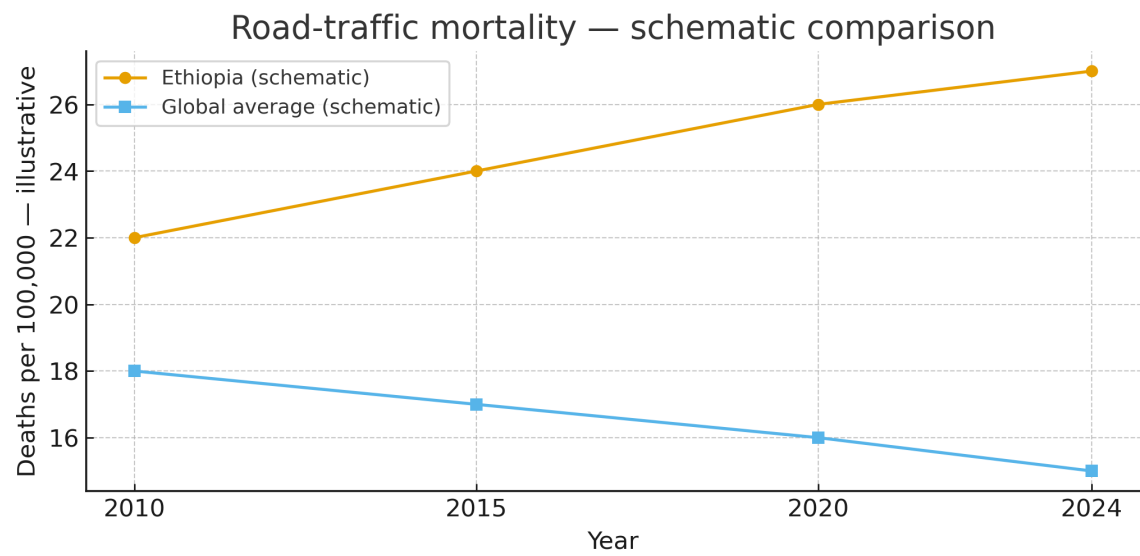


Figure . Homicide mortality — schematic trend

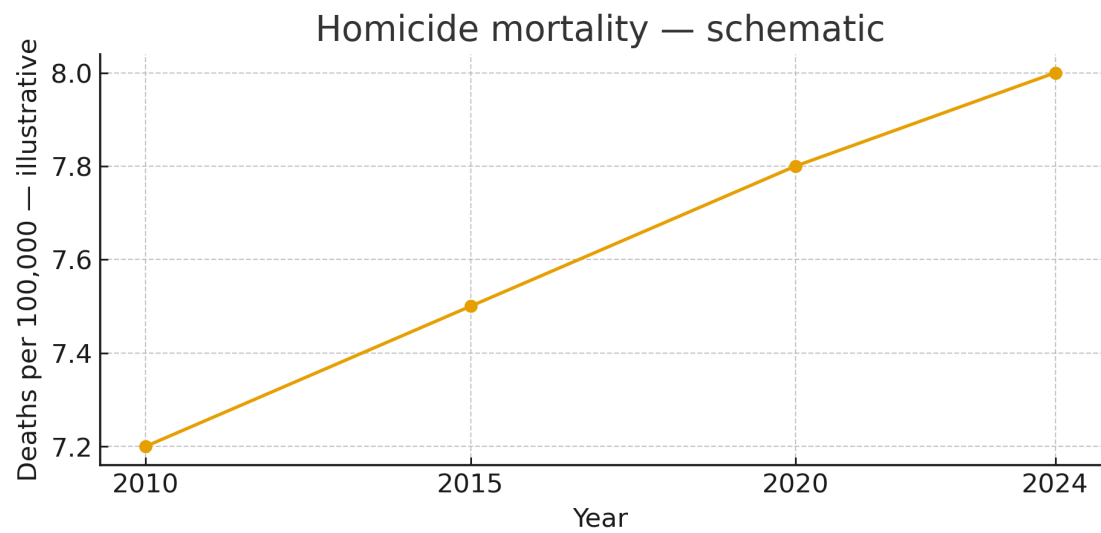


Figure . EMS access within 60 minutes — schematic

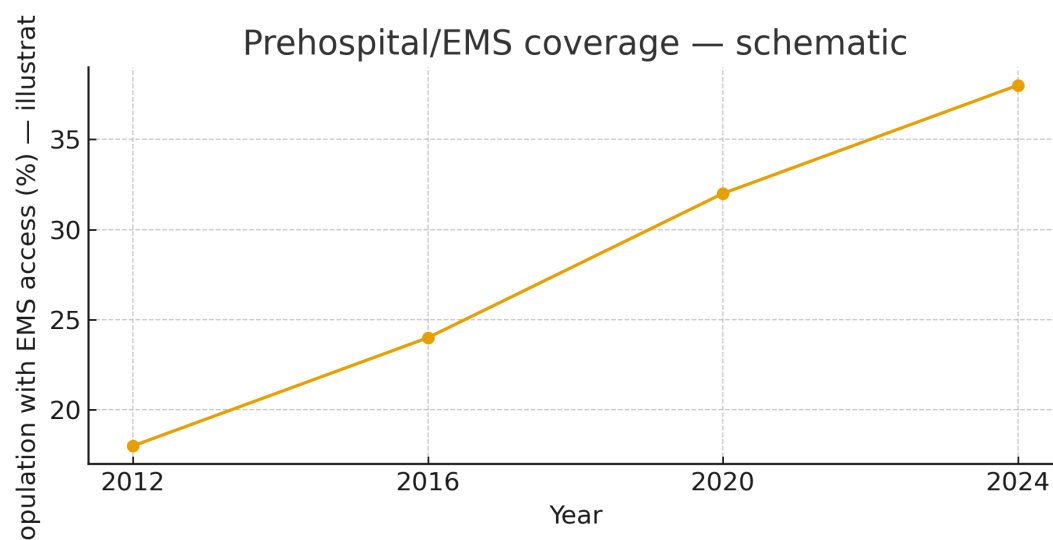


Table 17.12-A. Definitions & typology of injuries

Term / Category	Operational note
Unintentional injuries	Road-traffic, falls, burns, drowning, poisonings, occupational injuries
Intentional injuries/violence	Homicide/assault, self-harm; conflict-related tracked separately where possible
Case fatality rate (CFR)	$100 \times (\text{Deaths among injury cases} / \text{All injury cases})$
Serious injury	Requires admission or causes significant disability; standardize local definition
Trauma system	Coordinated prehospital, hospital, rehab with governance, finance, QA

Table 17.12-B. Ethiopia injury/trauma care algorithm

Step	Operational content in Ethiopia facilities
Scene/prehospital	Bystander first aid; hemorrhage control; safe transport; EMS dispatch; referral map
Triage & resuscitation (ED)	ABCDE; vitals; hemorrhage control; immobilization; analgesia; timely imaging
Definitive care	Damage control surgery; open-fracture antibiotics; burn stabilization; poisoning protocols
Rehabilitation & follow-up	Early mobilization; physio/OT referral; mental-health support; assistive devices
Surveillance & quality	Trauma registry; audit/M&M; road-safety collaboration; violence-prevention linkages

Table 17.12-C. Indicators & formulas

Indicator	Formula / definition
All-injury mortality rate	$100,000 \times (\text{Injury deaths} / \text{Population})$
RTA mortality rate	$100,000 \times (\text{Road-traffic deaths} / \text{Population})$
Injury CFR (%)	$100 \times (\text{Facility injury deaths} / \text{Facility injury cases})$
Time to definitive care (median)	Median minutes from injury to arrival at definitive facility
EMS access within 60 min (%)	$100 \times (\text{Population reachable by EMS} \leq 60 \text{ min} / \text{Population})$

Table 17.12-D. Data sources & triangulation

Source	What it provides / note
HMIS/DHIS2 & hospital registries	ED visits, admissions, procedures, outcomes; triage times; ambulance runs
Police/road safety authority	Crash reports, locations, fatalities/injuries; enforcement data
CRVS/mortality surveillance	Cause-of-death; verbal autopsy where civil registration incomplete
Household & DHS modules	Self-reported injury, IPV; denominators
GIS/transport models	Travel time to facilities; EMS base optimization

Table 17.12-E. Quality, safety & equity practices

Domain	Operational practice
Safety bundles	Airway/oxygen; hemorrhage control; open-fracture antibiotics; tetanus; pain management
Quality assurance	Trauma audits; M&M; referral feedback; ATLS-style protocols (adapted)
Violence prevention	IPV screening/referral; community programmes; alcohol harm reduction
Road safety	Speed management; helmets/seatbelts/child restraints; commercial driver standards
Equity	Rural corridor EMS; pastoralist outreach; financial protection for emergency care

Care model narrative

Strengthen first response and EMS dispatch, standardize ED triage/resuscitation (ABCDE), and ensure district hospitals meet trauma signal functions—airway/oxygen, hemorrhage control, analgesia, fracture care, and timely referral. Establish trauma registries and audits; integrate road-safety and violence-prevention partners. Prioritize rural corridors with high crash density and communities affected by interpersonal violence. Protect households from catastrophic emergency costs and provide rehabilitation and mental-health support to reduce long-term disability.

References — Section 17.12 (URLs)

- **WHO — Injuries & violence** — <https://www.who.int/health-topics/injuries-violence>
- **WHO — Global status report on road safety** — <https://www.who.int/publications/i/item/9789240068649>
- **Ethiopia FMoH — Emergency & trauma care** — <https://www.moh.gov.et/>
- **World Bank — Road safety** — <https://www.worldbank.org/en/topic/transport/brief/road-safety>

17.13) Population Ageing & Multimorbidity

Ethiopia's older population is growing, with implications for chronic disease care, functional support, and social protection. A person-centred, function-first PHC model—aligned with WHO ICOPE, PEN and HEARTS—can prevent avoidable disability, medication harm, and costly admissions. Figures are schematic and should be replaced with CSA/UN WPP, HMIS/DHIS2, STEPS, and social protection data before publication.

Figure . Population aged 60+ (% of total) — schematic

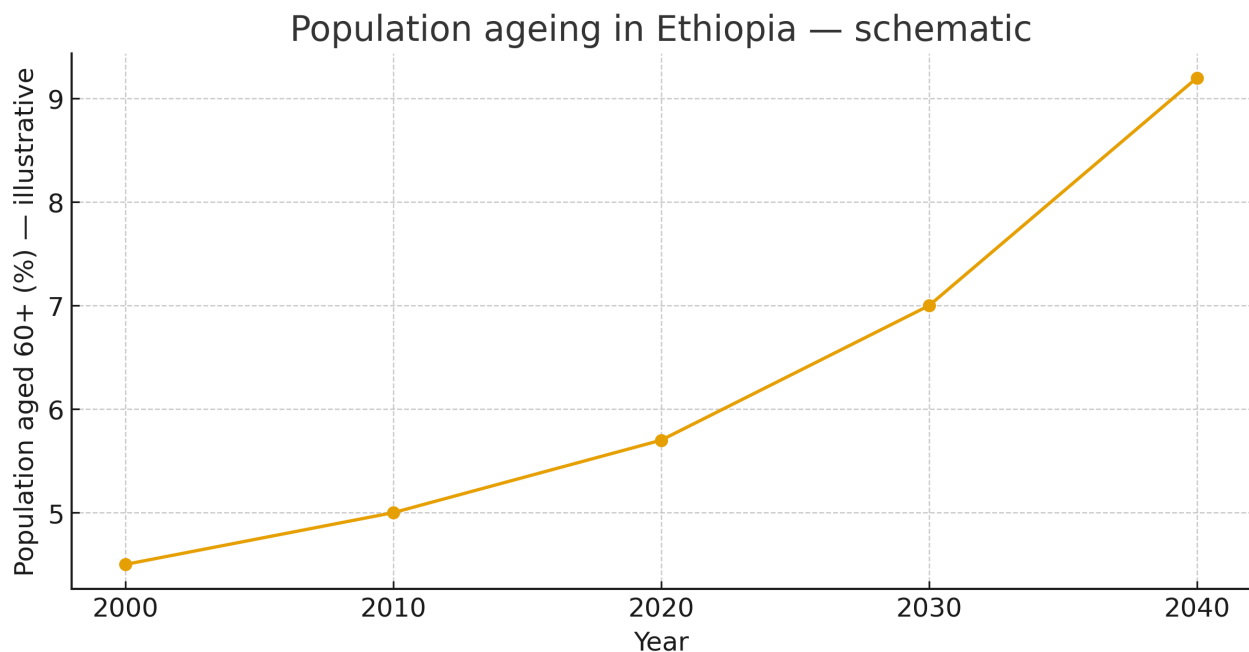


Figure 17.13-2. Multimorbidity by age band — schematic

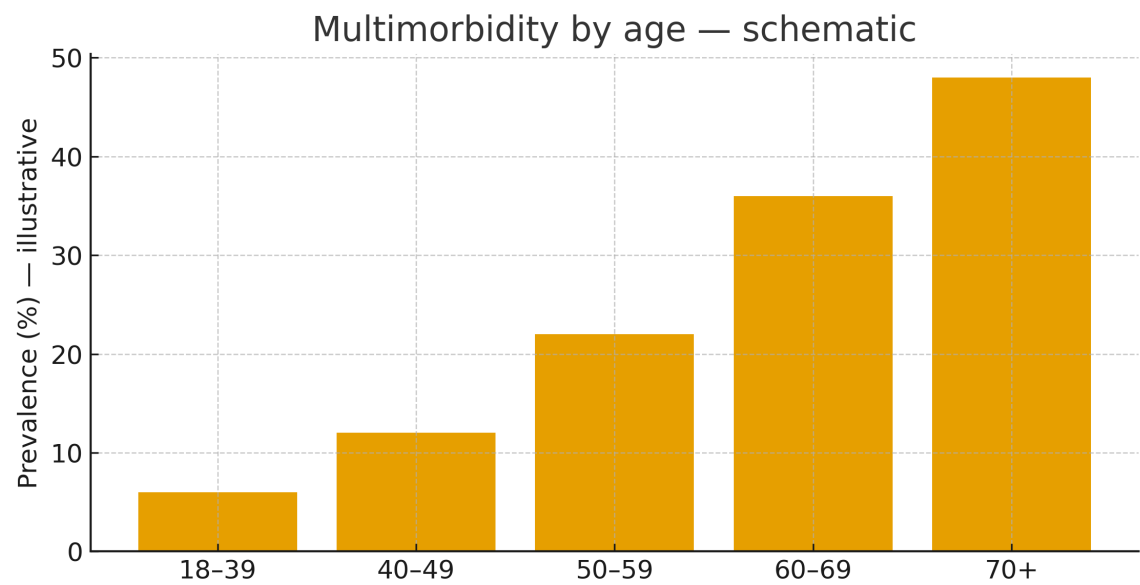


Figure . Polypharmacy among 60+ outpatients — schematic

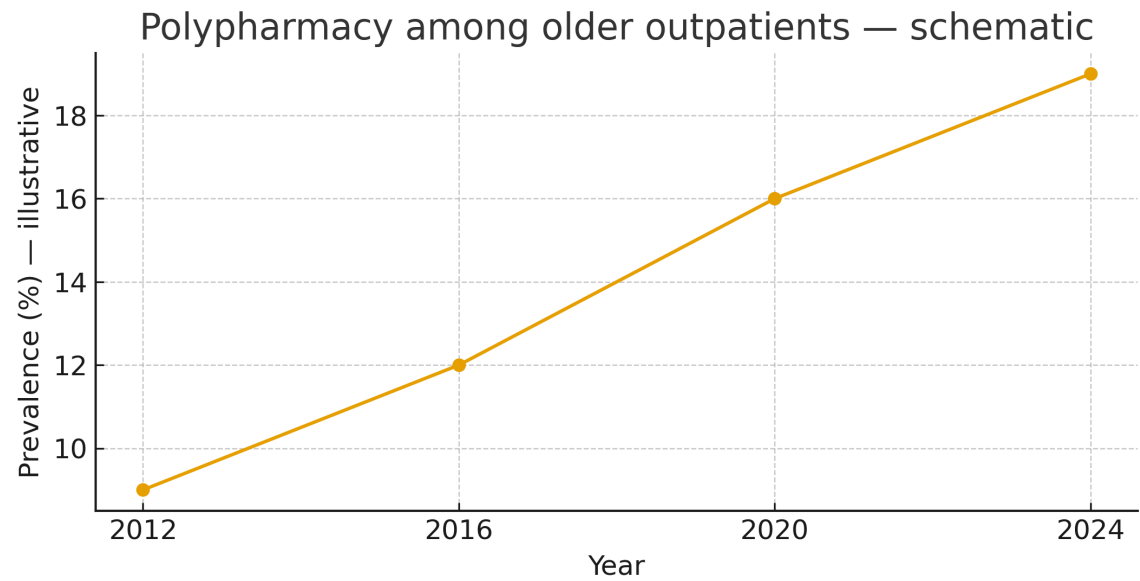


Figure . Social protection coverage (60+) — schematic

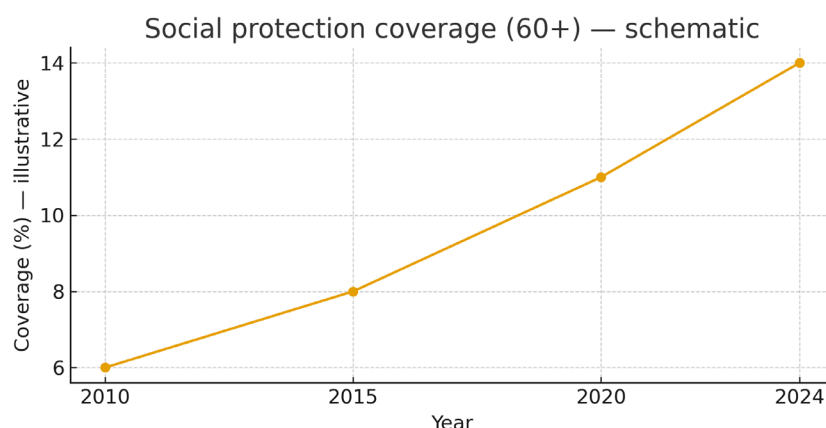


Table 17.13-A. Definitions & diagnostic anchors

Term / Concept	Operational note
Older person (policy context)	Commonly 60+ years in Ethiopia policy; some services use 65+; specify threshold per program.
Multimorbidity	Co-occurrence of ≥ 2 chronic conditions in an individual (e.g., HTN + DM).
Functional status	Activities of daily living (ADL) and instrumental ADL (IADL); screens guide care plans.
Frailty	Syndrome of reduced reserve (e.g., weight loss, weakness, slow gait); screen to predict risk of falls, admission, mortality.
Polypharmacy	Concurrent use of ≥ 5 medications; assess appropriateness and harms; deprescribing protocols recommended.

Table 17.13-B. Ethiopia PHC algorithm (ICOPE/PEN/HEARTS-informed)

Step	Operational content in Ethiopia PHC
Comprehensive assessment	BP, glucose, vision/hearing, cognition, mood, nutrition, pain, ADL/IADL, fall risk.
Care planning	Shared goals; prioritize function and quality of life; reconcile medications; deprescribe high-risk drugs.
Chronic disease control	Integrated HTN/DM/CKD/CRD care; self-management support; vaccination (influenza/pneumococcal where policy allows).
Functional & social support	Physiotherapy, assistive devices, caregiver education, social protection linkage.
Palliative & end-of-life	Identify needs early; symptom control; home-based options; respect preferences/advance directives.

Table 17.13-C. Indicators & formulas

Indicator	Formula / definition
Multimorbidity prevalence (60+)	$100 \times (\text{60+ with } \geq 2 \text{ chronic conditions} / \text{60+ assessed})$.
Functional decline detected (%)	$100 \times (\text{60+ with ADL/IADL impairment} / \text{60+ assessed})$.
Polypharmacy (60+) (%)	$100 \times (\text{60+ with } \geq 5 \text{ meds} / \text{60+ outpatients})$.
Deprescribing completed (%)	$100 \times (\text{60+ with potentially inappropriate meds deprescribed} / \text{60+ flagged})$.
Falls within 12 months (%)	$100 \times (\text{60+ reporting } \geq 1 \text{ fall in prior year} / \text{60+ assessed})$.

Table 17.13-D. Data sources & triangulation

Source	What it provides / note
CSA & UN WPP	Population ages and projections; denominators for 60+.
HMIS/DHIS2	Chronic-care panels; ADL/IADL screens; falls; polypharmacy flags; palliative care registries.
STEPS & special surveys	NCD risk factors; multimorbidity modules; functional status in sub-samples.
Social protection systems	Pension/transfer coverage and adequacy; targeting data.
Community/long-term care	Home-care visits; assistive device provision; rehab referrals.

Table 17.13-E. Quality, safety & equity practices

Domain	Operational practice
Age-friendly care	Quiet queues; seating; signage; caregiver involvement; assistive devices.
Medication safety	Reconcile lists; avoid high-risk meds; renal dosing; monitor interactions.
Continuity & navigation	Care coordinators; referral feedback; community health workers for follow-up.
Equity	Reach rural/pastoralist older adults, widows, IDPs; fee waivers; disability-inclusive access.
Data quality	Standardize ADL/IADL tools; train on multimorbidity coding; link HMIS with social protection IDs.

Care model narrative

Adopt age-friendly PHC with routine functional screening (ADL/IADL), fall-risk checks, mood and cognition assessment, and medication reconciliation with deprescribing. Use integrated chronic-disease clinics to manage multimorbidity with shared goals and home-based follow-up by HEWs/CHWs. Link older adults to pensions or social transfers, assistive devices, and rehabilitation services. Monitor equity: ensure outreach to rural, pastoralist, widowed, and displaced older persons. Track indicators in DHIS2 and coordinate with social-protection data systems using privacy-respecting linkage.

References — Section 17.13 (URLs)

- **WHO — ICOPE (Integrated Care for Older People) —**

<https://www.who.int/teams/maternal-newborn-child-adolescent-life-course/ageing-and-health/icope>

- **WHO HEARTS & PEN — NCD management —**

<https://www.who.int/teams/noncommunicable-diseases>

- **UN — World Population Prospects (WPP) —** <https://population.un.org/wpp/>

- **Ethiopia CSA — Population & surveys —** <https://www.csa.gov.et/>

17.14) Air Pollution & Environmental Exposures

Air pollution is a leading environmental risk in Ethiopia. Household solid-fuel use remains common, while urbanization and traffic intensify ambient PM_{2.5}. A twin-track approach—clean household energy and urban emission control—can rapidly reduce population exposure and prevent respiratory and cardiovascular disease. Figures are schematic and should be replaced with WHO Air Quality Database/satellite models, DHS/MICS, HMIS/DHIS2, and GBD estimates before publication.

Figure . Ambient PM_{2.5} — schematic trend vs WHO guideline

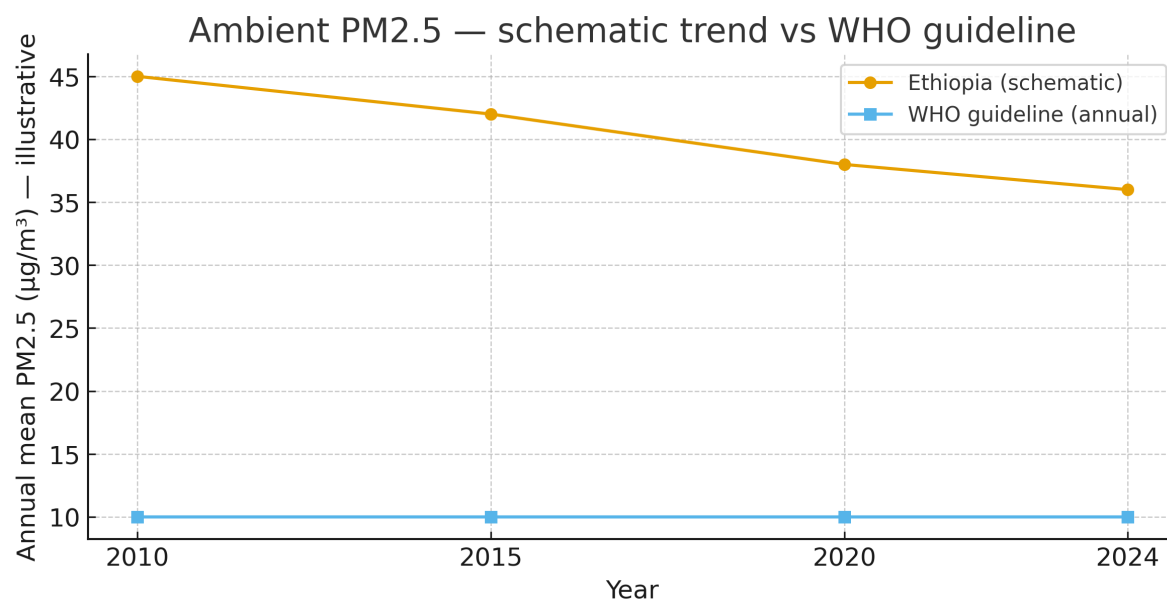


Figure . Exposure composition — household vs ambient — schematic

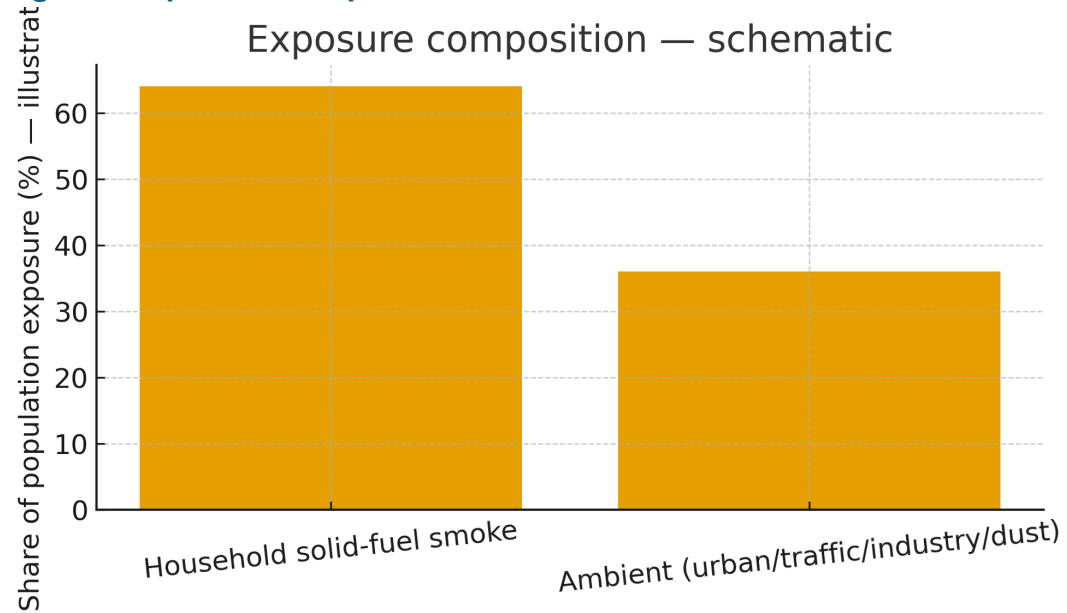


Figure . Air-quality monitoring network — schematic

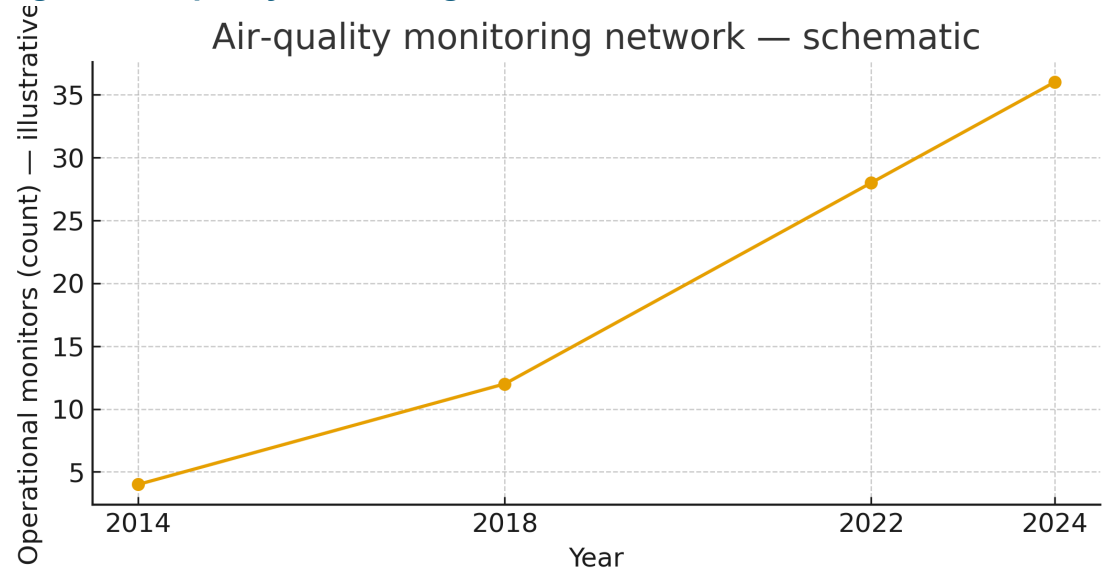


Figure . Clean-cooking adoption — schematic

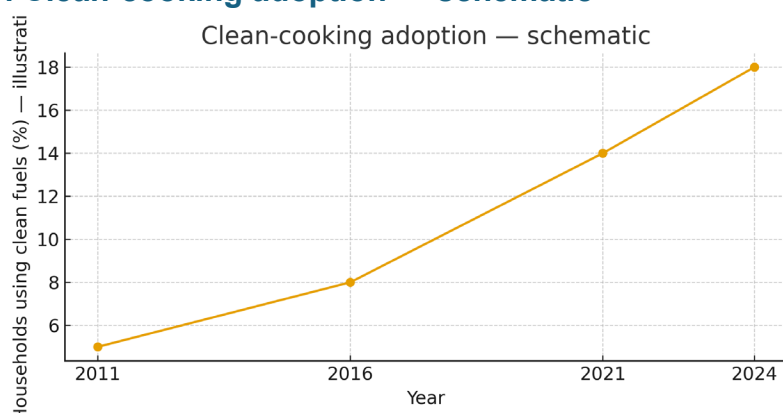


Table . Definitions & concepts

Term / Concept	Operational note
PM2.5	Particulate matter $\leq 2.5 \mu\text{m}$ aerodynamic diameter; penetrates deep into lungs and bloodstream.
Household air pollution (HAP)	Indoor pollution from combustion of solid fuels (wood, dung, charcoal, crop residues) for cooking/heating.
Ambient air pollution (AAP)	Outdoor pollution from traffic, industry, power generation, waste burning, dust, and transboundary sources.
AQI & guidelines	National indices vs WHO Air Quality Guidelines (AQG) — annual PM2.5 guideline = $10 \mu\text{g}/\text{m}^3$ (2021 AQG).
Exposure–response	Non-linear risk functions (e.g., GBD IERs) link PM2.5 to multiple diseases.

Table 17.14-B. Ethiopia policy/practice levers

Lever	Priority actions in Ethiopia
Clean household energy	LPG/electric/biogas; improved stoves as transition where fuels limited; behavior change; ventilation.
Urban transport & land use	Vehicle emission standards/inspection; public transport; active mobility; low-emission zones.
Industry & waste	Stack controls; dust suppression; open-burning bans; landfill gas management.
Early warning & information	Dust/smoke alerts; school/outdoor guidance; worker protection.
Monitoring & data	Hybrid satellite-ground modelling; QA/QC; open data portals; integration with HMIS for health indicators.

Table 17.14-C. Indicators & formulas

Indicator	Formula / definition
Annual mean PM2.5 ($\mu\text{g}/\text{m}^3$)	Population-weighted mean from satellite/ground model.
Days above WHO daily PM2.5 guideline	Count of days with 24-h mean $> 15 \mu\text{g}/\text{m}^3$ (2021 AQG).
HAP exposure (%)	$100 \times (\text{Population in households primarily using solid fuel} / \text{Total population})$.
Clean-cooking coverage (%)	$100 \times (\text{Households using clean fuels} / \text{Households})$.
Attributable mortality/DALYs	From comparative risk assessment linking PM2.5 to diseases.

Table 17.14-D. Data sources & triangulation

Source	What it provides / note
WHO Air Quality Database & Global Platform	Ground station data; QA/QC; trends.
Satellite models (e.g., van Donkelaar)	Gridded PM2.5 estimates with uncertainty; annual trends.
DHS/MICS census/surveys	Primary cooking fuel; stove/ventilation; socio-economic disaggregation.
HMIS/DHIS2 & registries	CRDs, LRI admissions, AMU/antibiotic use; birth outcomes where available.
GBD/IHME	Attributable burden and exposure–response functions.

Table 17.14-E. Quality, safety & equity practices

Domain	Operational practice
Equity targeting	Prioritize rural, low-income urban, and pastoralist households with low clean-fuel access.
Health-sector role	Clinician counselling on HAP; CRD/asthma protocols; vaccination; PM advisories for vulnerable groups.
Data quality	Calibrate low-cost sensors; standardize siting; maintain metadata; validate satellite downscaling.
Governance	Air-quality standards; inter-ministerial task force; fiscal incentives for clean fuels; enforcement capacity.
Co-benefits	Climate/health co-benefits from reduced black carbon; time savings for women and girls.

Care model narrative

Prioritize clean-cooking scale-up (LPG/electric/biogas) with targeted subsidies and last-mile distribution, while maintaining an interim pathway via improved stoves and ventilation where needed. In cities, enact vehicle emissions inspection and fuel standards, expand public/active transport, and control dust and open burning. Build a hybrid monitoring system that combines calibrated low-cost sensors with reference stations and satellite downscaling; publish open data and issue health advisories. Track impacts in DHIS2 (CRD, LRI, COPD/asthma), and align with climate policy to capture black-carbon co-benefits.

References — Section 17.14 (URLs)

- **WHO Global Air Quality Guidelines (2021)** — <https://www.who.int/publications/i/item/9789240034224>
- **WHO Air Quality Database / Global Platform** — <https://www.who.int/data/gho/data/themes/air-pollution>
- **IHME — Global Burden of Disease (air pollution)** — <https://vizhub.healthdata.org/gbd-compare/>
- **UNICEF MICS & DHS — Household fuels** — <https://mics.unicef.org/>
- **Ethiopia FMoH — Environmental health** — <https://www.moh.gov.et/>

17.15) Cross-Cutting: Primary Care Integration & Essential Packages

Delivering integrated primary care for adult NCDs, injuries, oral health, and rehabilitation requires aligned people, platforms, inputs, processes, and data. This section outlines essential packages for Ethiopia's PHC, readiness gaps, practical indicators, and financing/data enablers. Figures are schematic and should be replaced with HMIS/DHIS2, LMIS, readiness surveys, health accounts, and UHC/PHCPI trackers before publication.

Figure . Primary care integration index — schematic

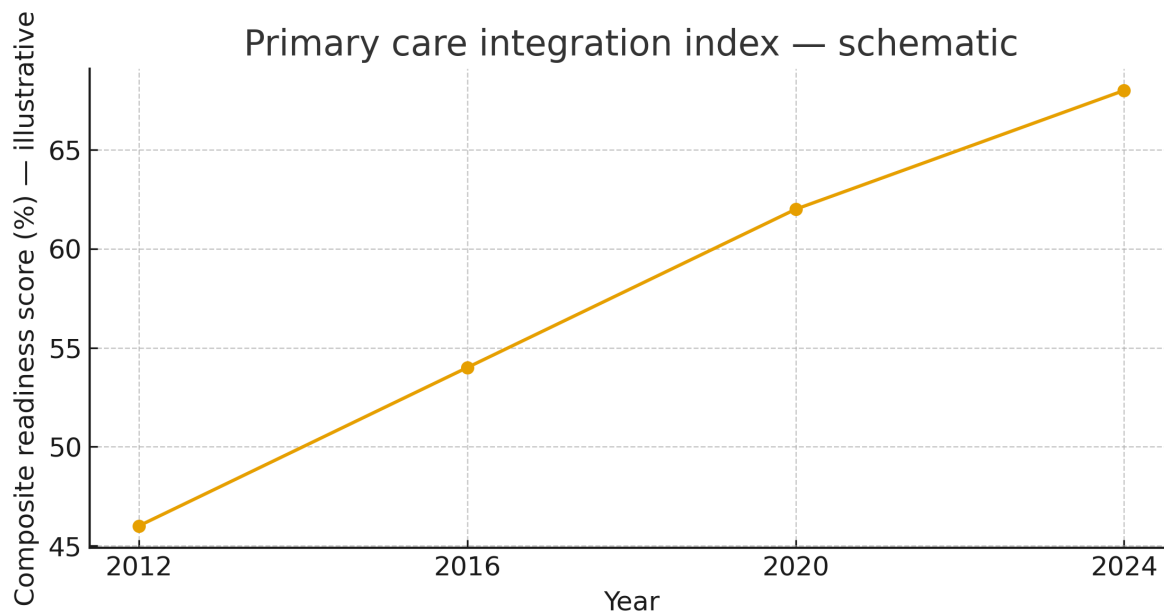


Figure . Referral loop completeness — schematic

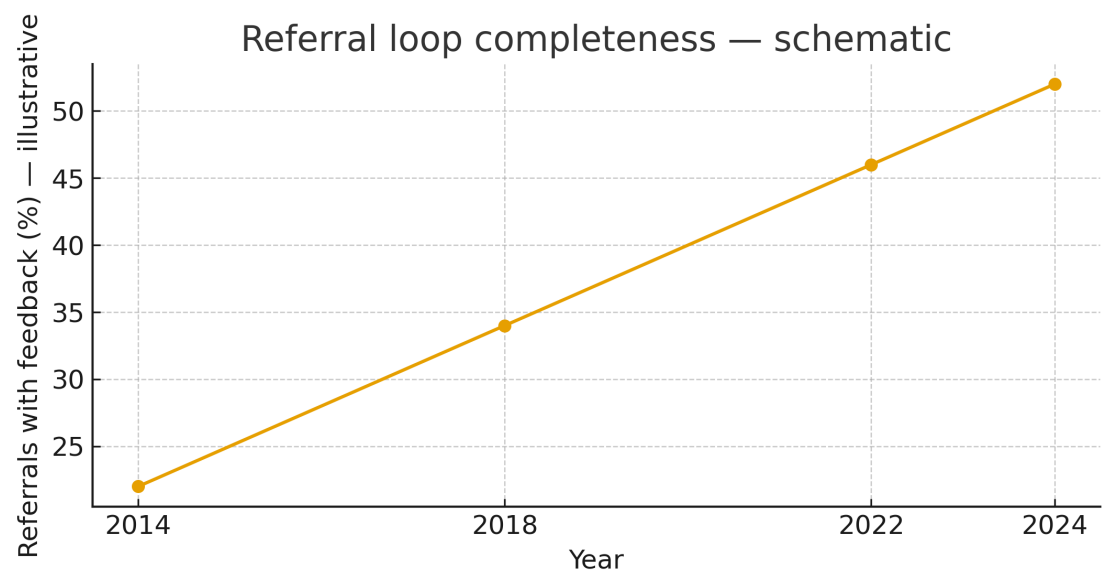


Figure . Financial protection (OOP share) — schematic

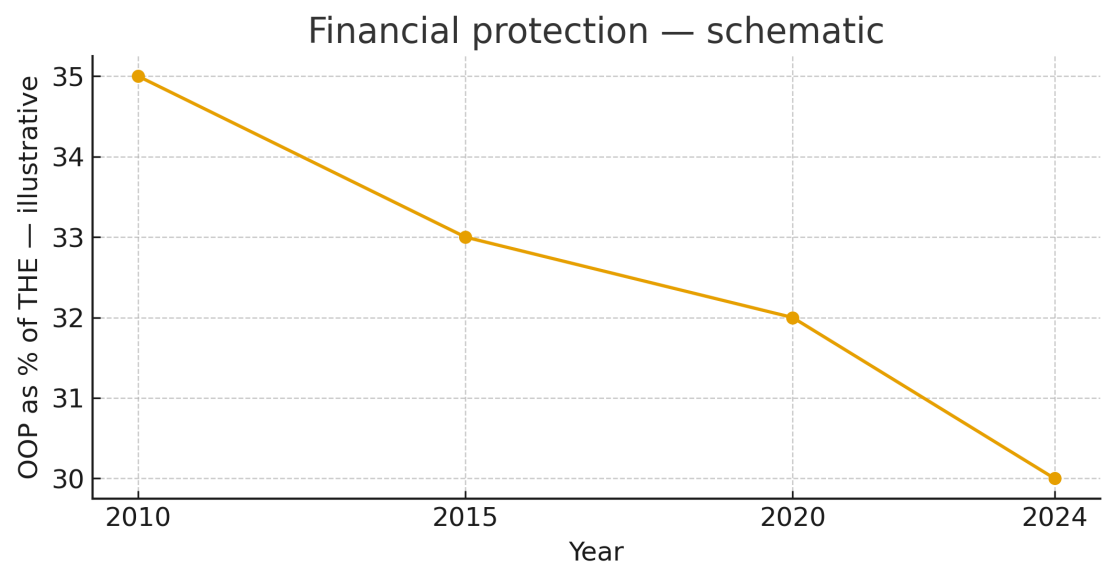


Table 17.15-A. Core components of integrated PHC

Component	Operational content
People & teams	Multidisciplinary PHC teams (nurse/health officer/physician/HEW), with rehab, dental, mental health linkages.
Platforms	Chronic care clinics with shared records; group education; home/community follow-up.
Inputs	Essential medicines, diagnostics, assistive devices; private space; referral transport map.
Processes	Stepped care protocols; task-sharing; case review; referral feedback loops; safety and rights.
Data & learning	HMIS/DHIS2 indicators; registry/lists; dashboards; audit and QI cycles.

Table 17.15-B. Ethiopia essential packages — contents & delivery

Package	Key contents (facility/community)
HTN/DM/CKD	BP/glucose/creatinine/UACR; ACEi/ARB/metformin/insulin; counselling; CKD referral thresholds.
COPD/Asthma	Spirometry where available; inhaled bronchodilators; steroid trials; trigger control; exacerbation plans.
MH/SUD	Screens (PHQ-9/GAD-7/AUDIT-C); brief counselling; psychotropics; suicide risk; referral for SMI.
Oral health	ART/extractions; fluoride varnish; infection control; school programmes.
MSK/Rehab	Back-care education; physio exercises; assistive devices; ergonomic/work reintegration.

Table 17.15-C. Indicators & formulas

Indicator	Formula / definition
Package coverage (%)	$100 \times (\text{People receiving defined bundle} / \text{Eligible population})$.
3-month retention (%)	$100 \times (\text{Patients retained in care at 3 months} / \text{Patients enrolled})$.
Referral feedback (%)	$100 \times (\text{Referrals with documented feedback} / \text{All referrals})$.
Stockout days/quarter	Sum of days without each tracer medicine per quarter.
OOP share of THE (%)	$100 \times (\text{Household out-of-pocket} / \text{Total health expenditure})$.

Table 17.15-D. Data sources & triangulation

Source	What it provides / note
HMIS/DHIS2 & LMIS	Service volumes, retention, outcomes, medicine stockouts.
Facility readiness surveys	Staff, equipment, space, protocols; essential-package tracer items.
Household surveys/HEA/NHA	Utilization, expenditures, financial protection.
UHC & PHCPI trackers	Coverage and quality indices; cross-country benchmarks.
Special registries	Condition-specific cohorts (e.g., CKD, COPD) linked to PHC panels.

Table 17.15-E. Quality, safety & equity practices

Domain	Operational practice
Continuity & person-centredness	Care coordinators, shared plans, culturally-appropriate education, community health worker follow-up.
Safety	High-risk meds monitoring, imaging stewardship, incident reporting.
Equity	Outreach to rural/pastoralist/IDP populations; language access; disability-inclusive facilities.
Digital & data	Unique IDs; referral/feedback in DHIS2; dashboards for decision-makers; data governance.
Financing	Protective benefits for essential packages; capitation/BLM pilots; purchasing aligned to quality.

Care model narrative

Organize PHC around population panels with shared chronic-care clinics, group education, and home follow-up. Use task-sharing and stepped care across packages, with clear referral maps and feedback loops. Align procurement and LMIS to maintain essential medicine availability and minimize stockouts. Use DHIS2 dashboards to track coverage, retention, stockouts, referral feedback, and equity disaggregation. Pilot payment mechanisms (e.g., blended capitation) tied to quality for essential packages; progressively scale based on evaluation.

References — Section 17.15 (URLs)

- **WHO — PHC & integrated care resources** — <https://www.who.int/health-topics/primary-health-care>
- **PHCPI — Primary Health Care Performance Initiative** — <https://improvingphc.org/>
- **World Bank — Health financing & UHC** — <https://www.worldbank.org/en/topic/health/publication/uhc>
- **Ethiopia FMoH — Guidelines & health accounts** — <https://www.moh.gov.et/>

Unified Chapter Summary

Scope & Rationale

Chapter 17 synthesized major adult non-communicable diseases (cardiometabolic, respiratory, kidney, cancer, mental health, MSK/oral, injury & violence, ageing, and environmental exposures) and cross-cutting delivery strategies in primary health care (PHC). The framing is pragmatic: align Ethiopia's PHC platforms to prevent avoidable mortality and disability while protecting households from catastrophic costs.

Burden Patterns & Data

NCDs now account for the majority of adult DALYs and deaths. Cardiometabolic risk (hypertension, diabetes, dyslipidemia) and chronic respiratory disease are rising with urbanization, air pollution, tobacco and occupational exposures. Chronic kidney disease (CKD)—often an NCD complication—requires early albuminuria/eGFR testing. Cancers (by site) need stepwise prevention, screening where cost-effective, and timely referral. Mental/substance use disorders drive disability and present high treatment gaps. Injuries/violence remain prominent among working-age adults. Population ageing increases multimorbidity and polypharmacy.

Primary Care First

Across conditions, Ethiopia's value case is PHC-first: task-shared screening and risk management, standardized treatment protocols, continuity and referral loops, and a rehabilitation-forward approach that emphasizes function and return-to-work. For mental health, mhGAP integration into chronic-care platforms closes treatment gaps. For oral health, ART/fluoride varnish in PHC and school programmes reduce pain and tooth loss. For MSK, non-opioid, imaging-stewardship, and community rehab are central.

Equity, Rights & Protection

Equitable design targets rural, pastoralist, and low-income urban communities; ensures language access; and embeds rights-based practices (privacy, consent, least-restrictive care). Financial protection is strengthened through essential packages and benefit design, while LMIS and procurement reduce stockouts.

Data & Triangulation

Routine indicators in DHIS2/HMIS (screening coverage, control rates, treatment cascades, readiness, stockouts) are triangulated with surveys (STEPS, DHS/MICS, school/occupational), registries (dialysis, cancer, injury/trauma), and environmental monitoring. Where CRVS is incomplete, verbal autopsy and sentinel systems improve mortality attribution. Dashboards and regular audits drive quality improvement.

Environmental & Social Determinants

Household solid-fuel use and urban PM2.5 are major risks; a twin-track policy (clean cooking and urban emissions control) yields rapid health gains with climate co-benefits. Road-safety and violence-prevention partnerships complement clinical trauma care. Social-protection linkages for older persons and persons with disability enhance adherence and independence.

Implementation Priorities

1) Scale integrated PHC packages (HTN/DM/CKD; COPD/asthma; mhGAP; oral/MSK/rehab). 2) Close referral loops and deploy transport maps. 3) Steward medicines and imaging. 4) Build trauma signal functions and EMS coverage in high-risk corridors. 5) Expand clean-cooking adoption and air-quality monitoring. 6) Establish registries (dialysis, oncology, trauma) and publish open health dashboards. 7) Finance essential packages and incentivize quality and equity.

Consolidated References — URLs

- **WHO — Primary Health Care & Integrated Care** — <https://www.who.int/health-topics/primary-health-care>
- **PHCPI — Primary Health Care Performance Initiative** — <https://improvingphc.org/>
- **WHO — NCD Management (PEN/HEARTS)** — <https://www.who.int/teams/noncommunicable-diseases>
- **WHO — Mental Health (mhGAP)** — <https://www.who.int/teams/mental-health-and-substance-use>
- **WHO — Rehabilitation 2030** — <https://www.who.int/initiatives/rehabilitation-2030>
- **WHO — Oral Health** — <https://www.who.int/health-topics/oral-health>
- **WHO — Injuries & Violence / Road Safety** — <https://www.who.int/health-topics/injuries-violence>
- **WHO — Global Status Report on Road Safety (latest edition)** — <https://www.who.int/publications/i/item/9789240068649>
- **WHO — Global Air Quality Guidelines (2021)** — <https://www.who.int/publications/i/item/9789240034224>
- **WHO Air Quality Database / Global Platform** — <https://www.who.int/data/gho/data/themes/air-pollution>

- **IHME — Global Burden of Disease (GBD)** — <https://vizhub.healthdata.org/gbd-results/>
- **GBD Compare (air pollution module)** — <https://vizhub.healthdata.org/gbd-compare/>
- **UN — World Population Prospects (WPP)** — <https://population.un.org/wpp/>
- **UNICEF MICS — Household Fuels & WASH** — <https://mics.unicef.org/>
- **DHS Program — Ethiopia & regional surveys** — <https://dhsprogram.com/>
- **Ethiopia FMoH — Guidelines, NCD, Emergency & Environmental Health** — <https://www.moh.gov.et/>