

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

CHAPTER 13

Other Vectored Diseases (Ethiopia focus plus global lens)

Aynalem Adugna, October 2025

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13.1) Concepts, Burden Profile & Why This Chapter — Other Vected Diseases

This section frames Ethiopia's non-malaria vector-borne disease (VBD) landscape. It summarizes key vectors, priority diseases, and the rationale for an integrated response across surveillance, vector ecology, One Health, and preparedness. Figures are illustrative and should be replaced with official IDSR/NTD/EPR/entomology datasets before publication.

Figure . Other VBD event landscape — illustrative

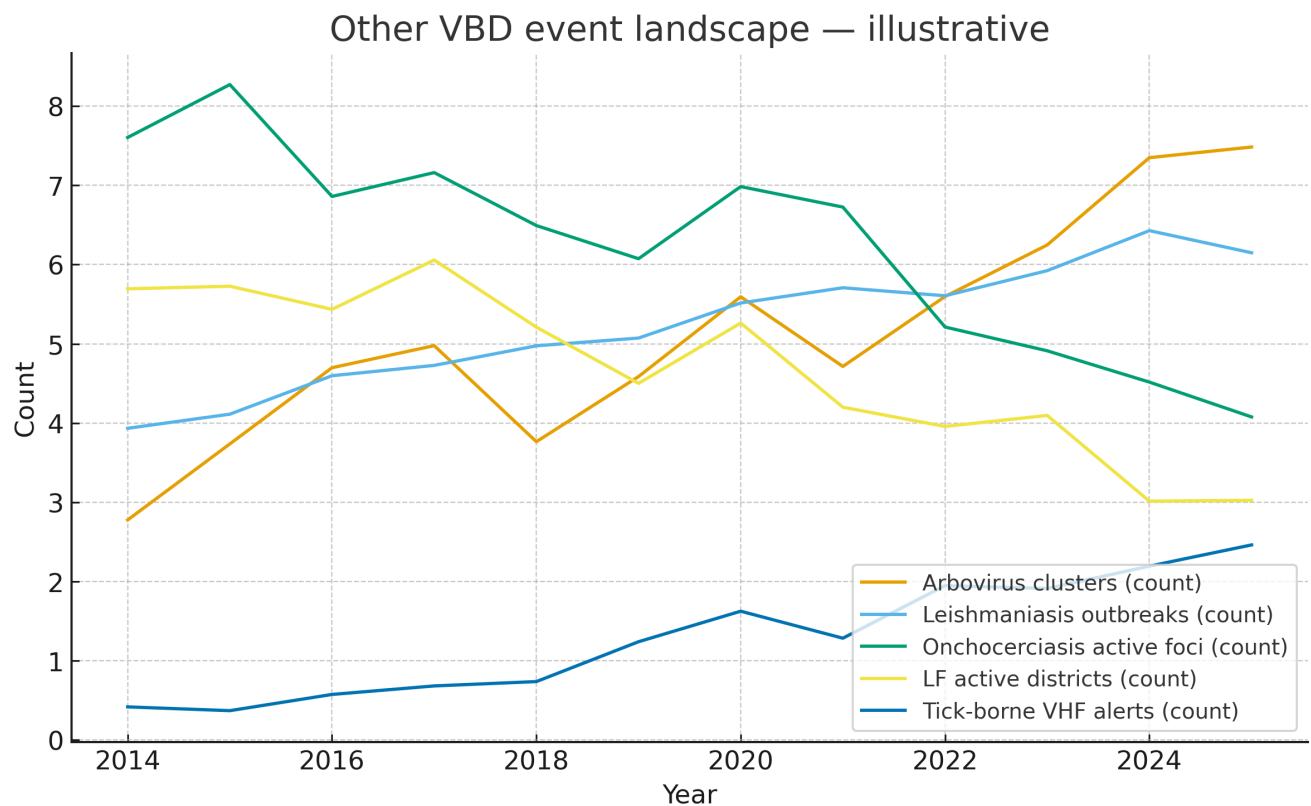


Figure . Urban growth & Aedes suitability — illustrative

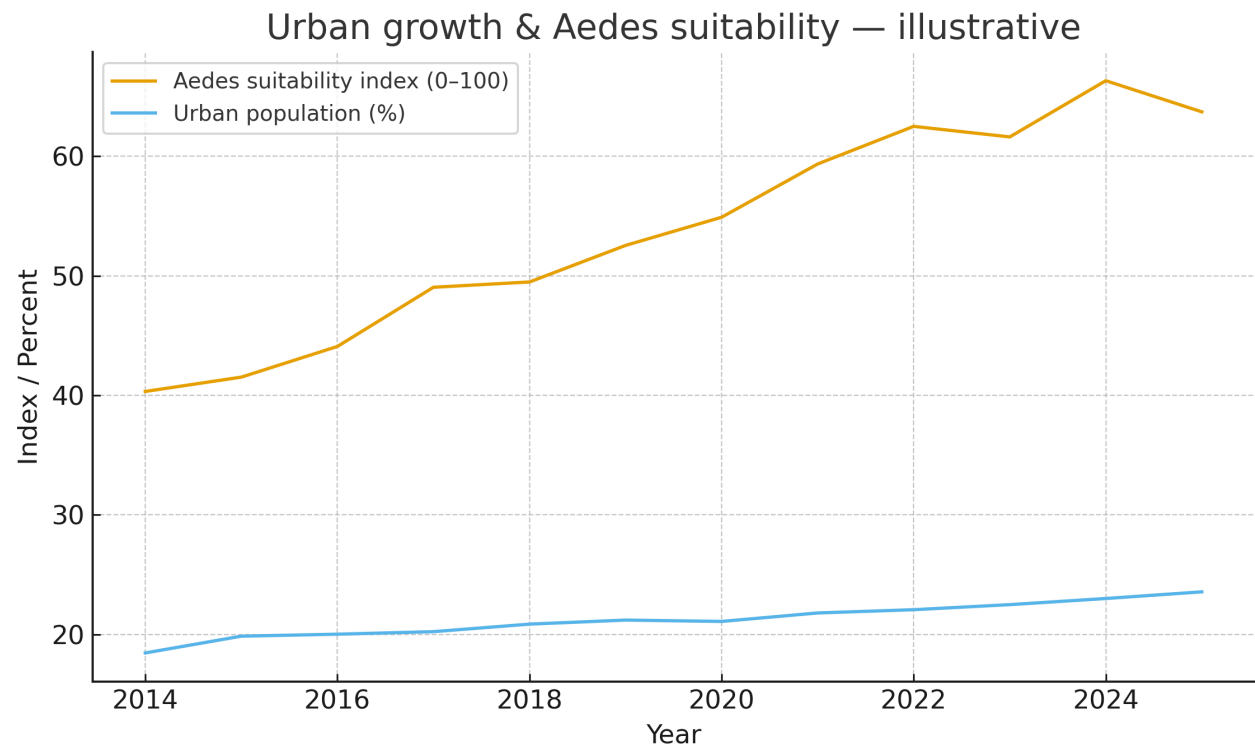


Figure . MDA coverage in eligible areas — illustrative

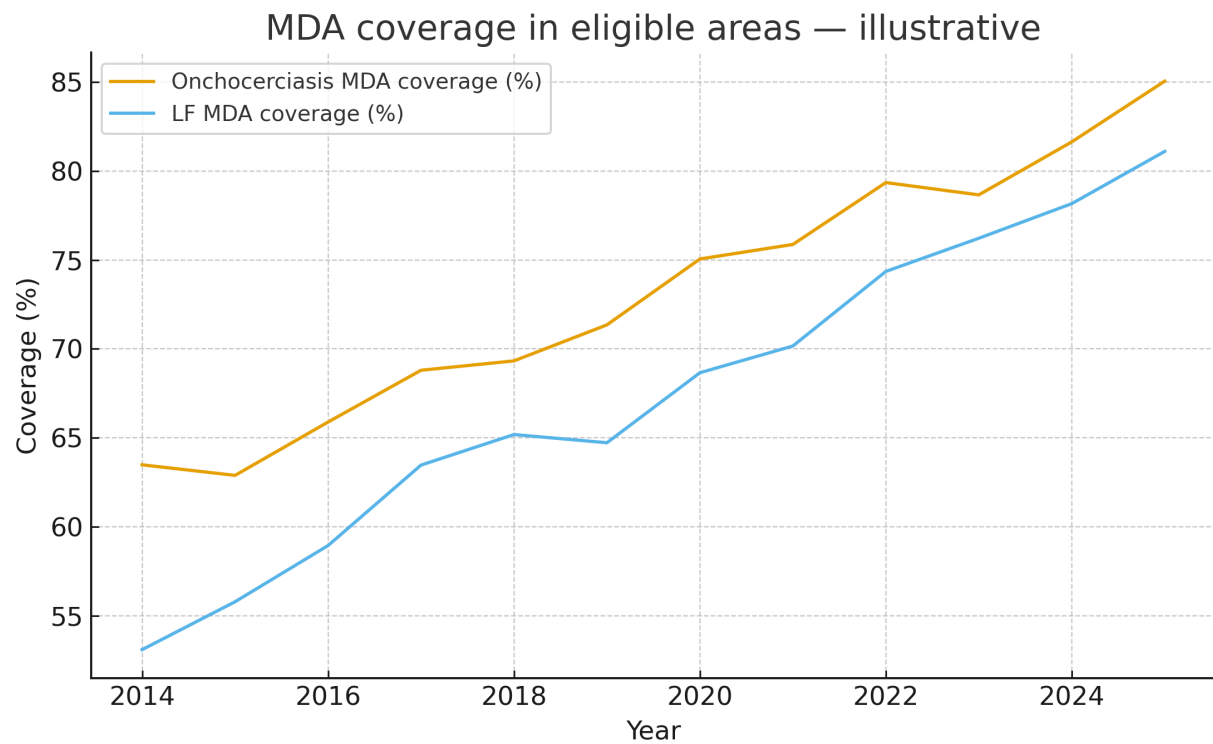


Figure . Visceral leishmaniasis burden & case-fatality — illustrative

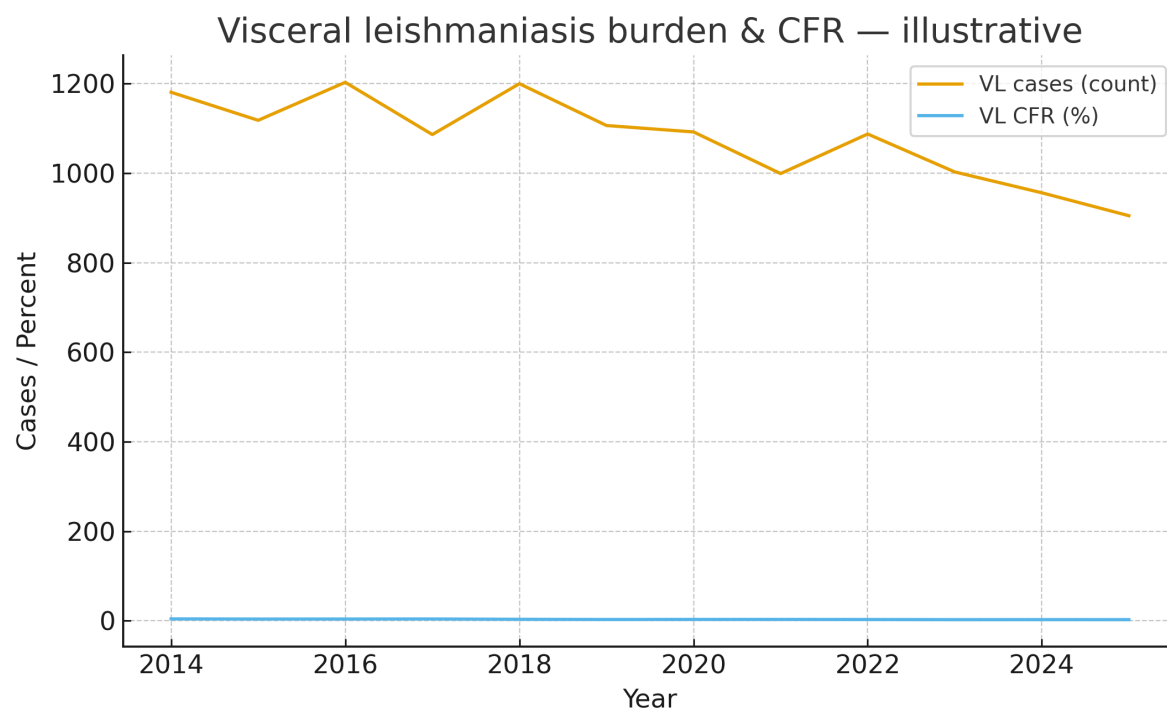


Table 13.1-A. Priority ‘other’ VBDs in Ethiopia

Disease group	Primary vector	Ethiopia-relevant ecology	Clinical/surveillance notes
Dengue & Chikungunya	Aedes aegypti/albopictus	Urban/peri-urban; containers; rainy seasons; travel corridors	Acute febrile illness (AFI); lab confirmation
Yellow Fever	Aedes spp.; sylvatic vectors	Western belts; sylvatic + urban cycles; vaccination prevents	Acute jaundice/hemorrhage; vaccination key
West Nile	Culex spp.	Wetlands, peri-urban; birds reservoirs	Neuroinvasive disease small fraction; serology/PCR
Leishmaniasis (VL/CL)	Phlebotomus sandflies	Lowland/semi-arid foci; reservoirs vary	Fever/splenomegaly (VL); skin lesions (CL)
Lymphatic Filariasis	Culex/Anopheles	Historic foci; elimination via MDA	Lymphedema/hydrocele ; antigen tests

Onchocerciasis	Simulium blackflies	Riverine foci; elimination via ivermectin MDA	Skin disease; ocular complications
Plague	Xenopsylla fleas	Highland foci; rodent control	Pneumonic/septicemic forms; rapid response
Tick-borne (e.g., CCHF)	Hyalomma/Rhipicephalus ticks	Pastoralist belts; abattoirs	VHF; strict IPC and lab safety
Louse-borne diseases	Pediculus humanus	Crowding/displacement	Relapsing fever; epidemic typhus

Table 13.1-B. Why a dedicated chapter now — strategic rationale

Driver	Implication for Ethiopia
Urbanization & mobility	Growing towns and travel elevate Aedes risk and spillovers.
Climate variability	Rains/temperature shifts change habitats and seasonality.
Invasive/expanding vectors	Aedes expansion; need vigilance for new species.
One Health realities	Animal reservoirs require cross-sector action.
Program integration opportunity	Leverage malaria/EPR/NTD platforms for faster gains.
Equity & humanitarian contexts	Displacement/remote areas have higher vulnerability.

Table 13.1-C. Surveillance building blocks (integrated view)

Component	Minimum capabilities for VBDs
IDSR & event-based	Syndromic alerts (AFI, VHF), rapid verification, escalation.
Laboratory	Tiered PCR/ELISA; sample referral; biosafety; QA.
Entomology	Aedes indices; sandfly/blackfly/tick surveys; resistance tests.

Community intelligence	HEW reports; rumor monitoring; school/community mapping.
Data systems	DHIS2; geospatial layers; dashboards; thresholds & alerts.

Table 13.1-D. Core intervention toolbox

Intervention	Ethiopia-oriented notes
Source reduction (Aedes)	Container cleanup; waste & water management; school campaigns.
Targeted larviciding	High-productivity containers/drains; dosing cycles.
IRS/house improvements (sandflies)	VL foci; wall modifications; animal shelter management.
MDA (oncho/LF)	High coverage; morbidity care and disability inclusion.
Zoonotic control	Rodent control (plague); abattoir/animal health (CCHF).
Risk communication	AFI awareness; early care-seeking; vector avoidance.
IPC & preparedness	VHF PPE; triage; isolation; specimen handling SOPs.

Plain-language summary

Ethiopia faces several diseases spread by insects and other vectors besides malaria. Mosquitoes that live around homes and water containers can spread dengue and chikungunya. Sandflies in lowland areas spread leishmaniasis, a serious disease that can affect the skin or internal organs. Blackflies near fast-moving rivers transmit onchocerciasis, and certain mosquitoes spread lymphatic filariasis. Ticks and fleas can spread dangerous infections such as CCHF and plague. As towns grow and weather becomes more unpredictable, the risk from these diseases can rise. The best approach is to combine good surveillance, quick lab testing, and practical actions like cleaning water containers, targeted spraying in the right places, mass drug administration where needed, and strong outbreak preparedness. Working together across human health, animal health, and the environment (One Health) helps detect problems early and prevent larger outbreaks.

References — Section 13.1 (initial web list; add Ethiopia-specific citations in later sections)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR & NTD resources —**
<https://www.moh.gov.et/>
- **EPHI — Public health emergency management & lab networks —**
<https://www.eph.gov.et/>
- **WHO — Vector-borne diseases overview & guidance —**
<https://www.who.int/health-topics/vector-borne-diseases>
- **ESPEN/WHO AFRO — NTD data portal & program guidance —**
<https://espen.afro.who.int/>
- **CDC — Arboviruses, plague, rickettsial diseases —**
<https://www.cdc.gov/globalhealth/index.htm>

13.2) Vector Ecology Across Ethiopia — Other Vectored Diseases

This section summarizes the ecology of priority vectors beyond Anopheles: Aedes (dengue/chik/yellow fever), Culex (West Nile/LF contexts), Phlebotomus sandflies (leishmaniasis), Simulium blackflies (onchocerciasis), ticks (CCHF/rickettsioses), and fleas (plague). Figures are illustrative and should be replaced with official entomology datasets before publication.

Figure 13.2-1. Aedes container indices by region — illustrative (latest year)

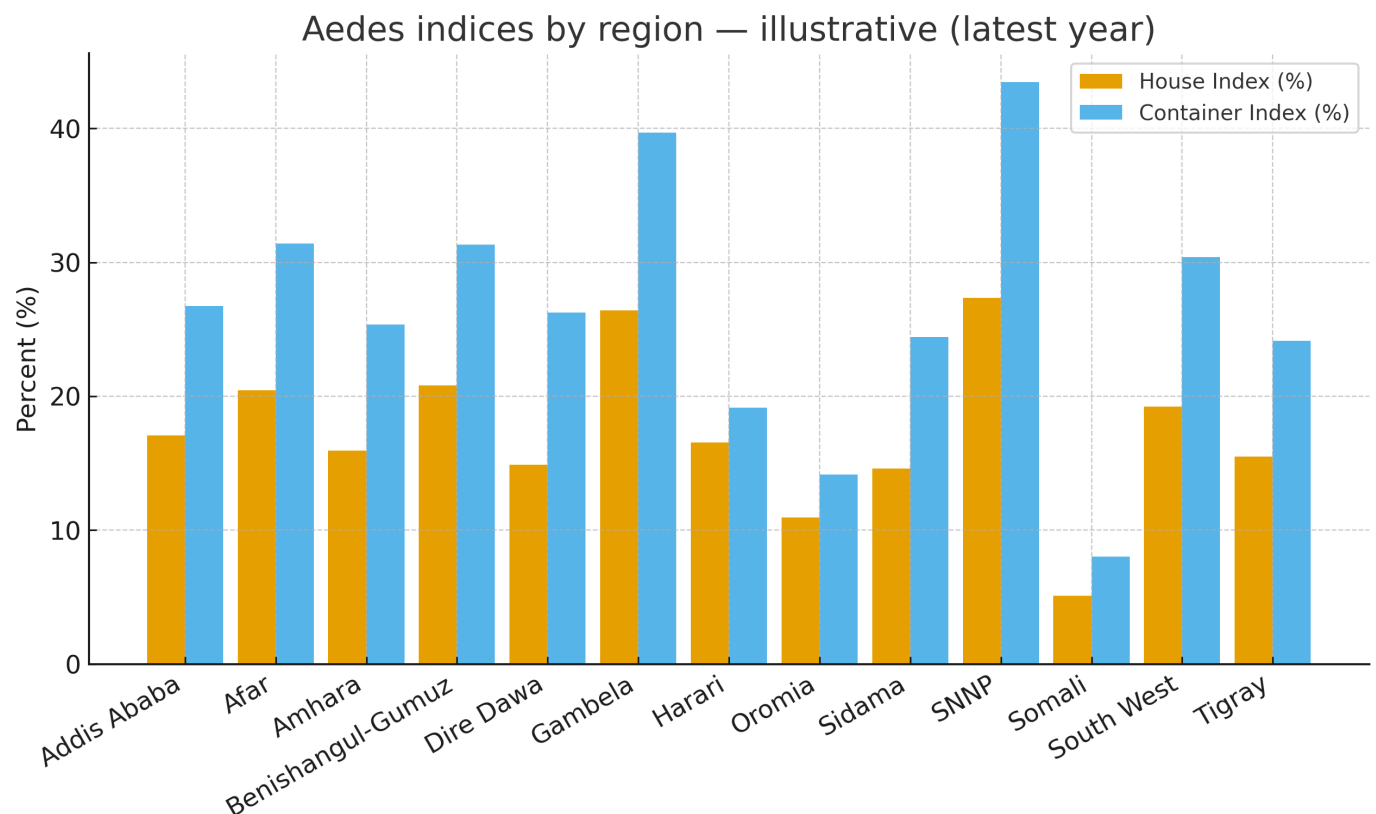


Figure . Sandfly suitability by ecozone — illustrative

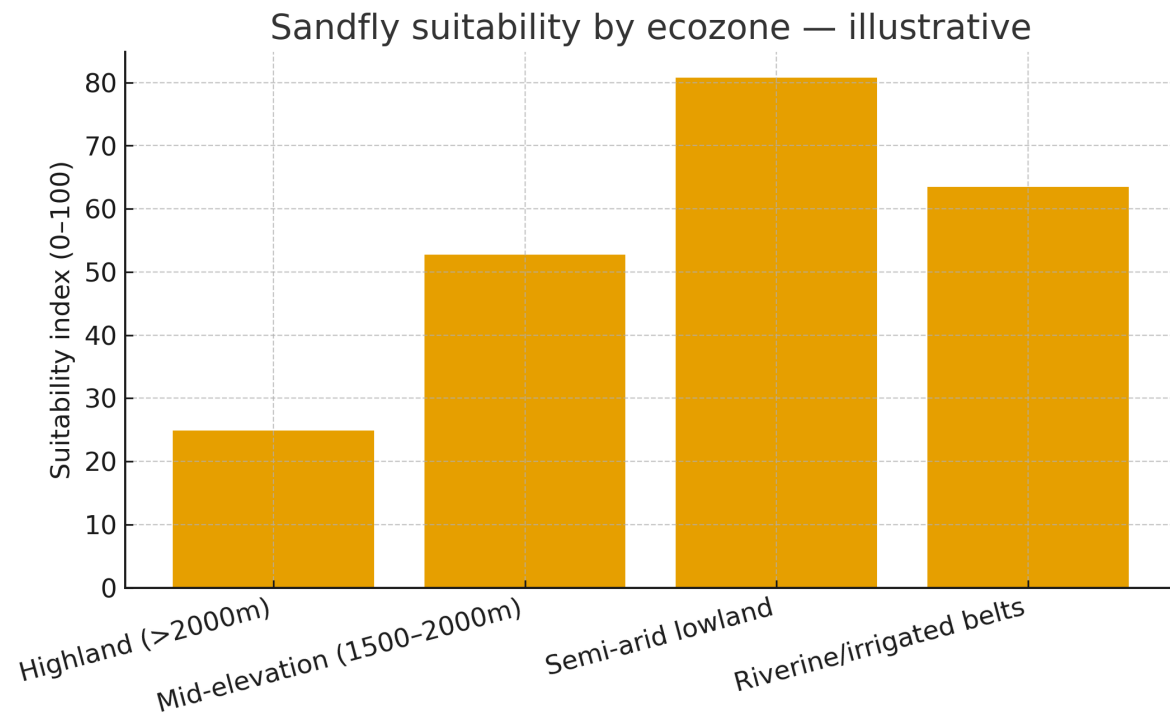


Figure . Blackfly habitat intensity by river basin — illustrative

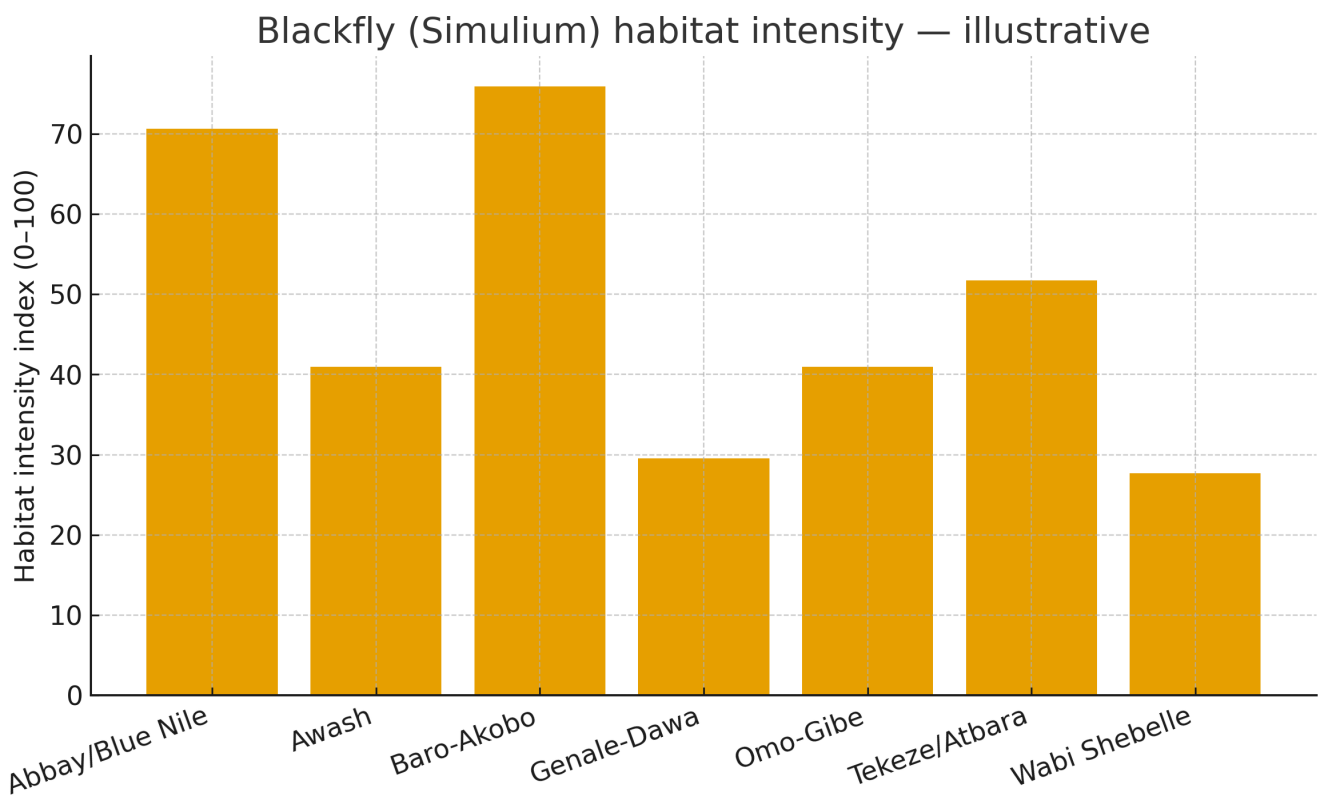


Figure . Vector presence vs elevation band — illustrative

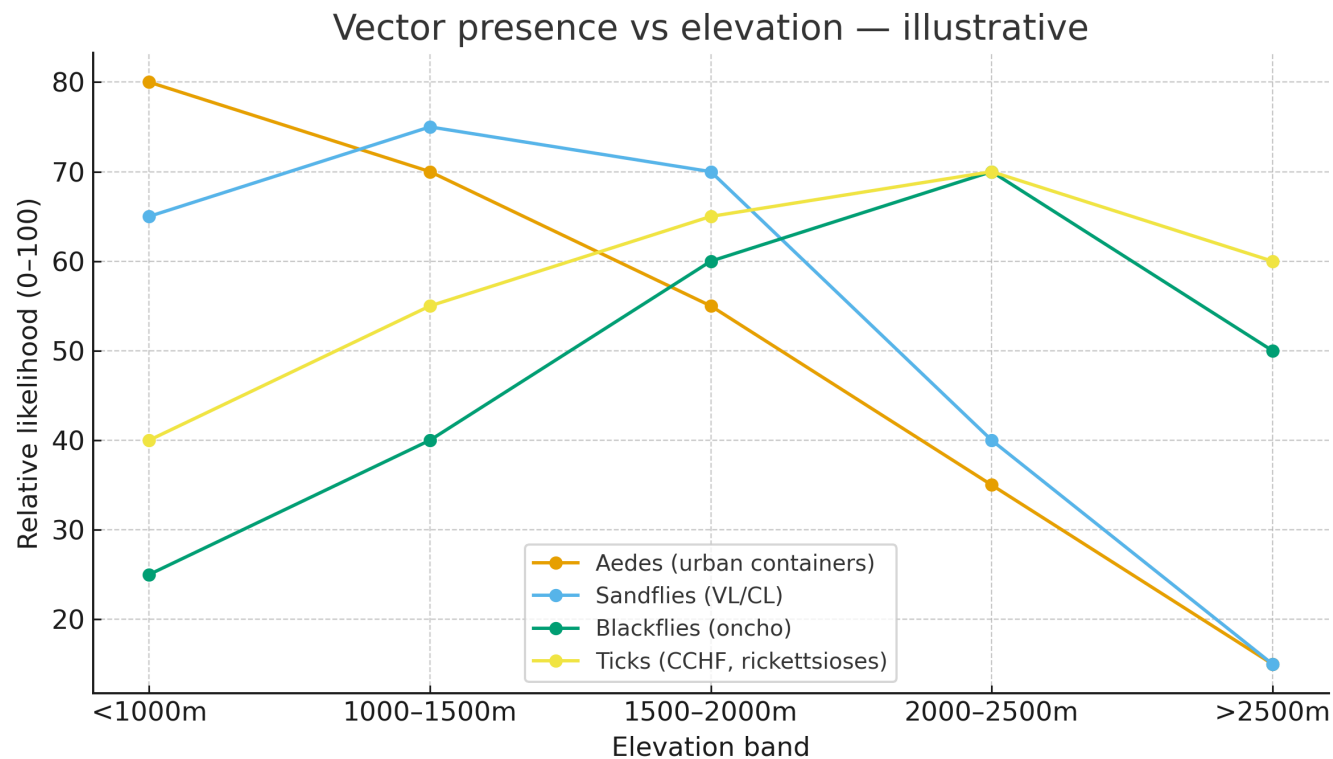


Figure . Urban Aedes risk over time (Addis Ababa & Dire Dawa) — illustrative

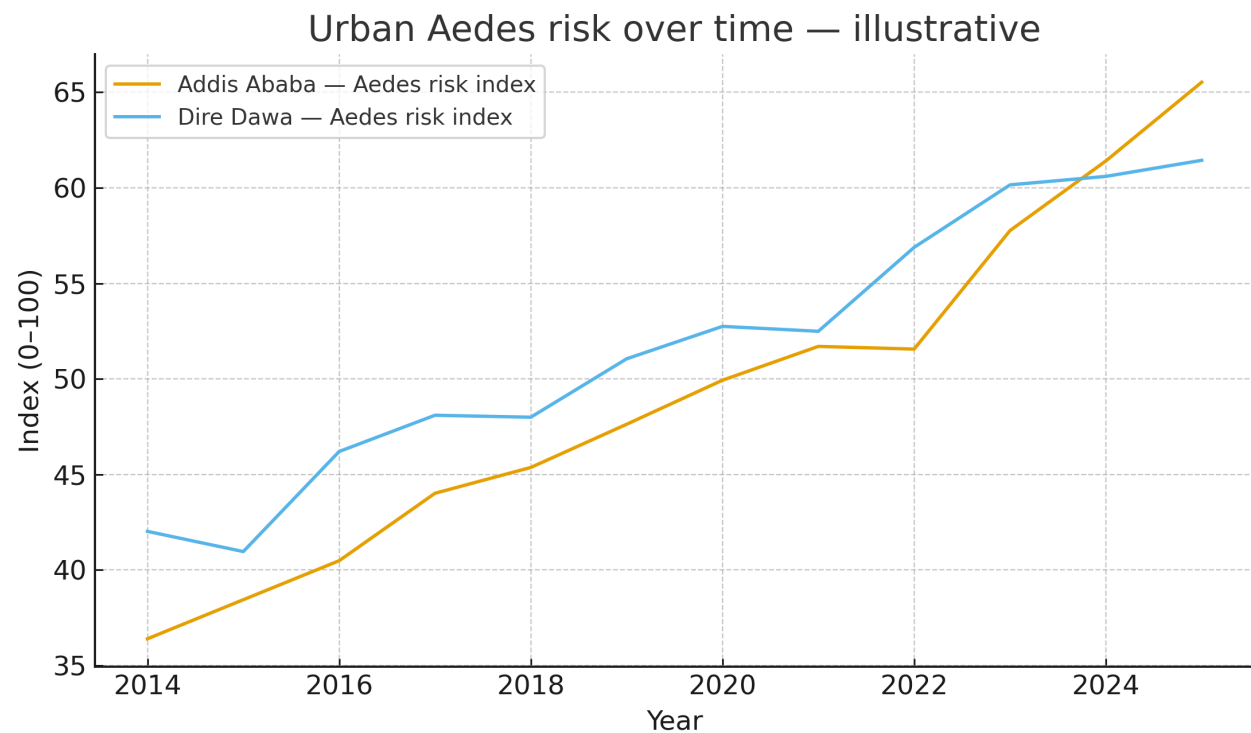


Table 13.2-A. Vector–disease–habitat matrix (Ethiopia context)

Vector	Primary diseases (Ethiopia)	Typical habitats	Entomology indicators
<i>Aedes aegypti/albopictus</i>	Dengue, Chikungunya, Yellow fever (urban)	Urban containers, tires, tanks, construction sites	Container indices (HI/CI/BI); adult traps
<i>Culex</i> spp.	West Nile, LF (context)	Polluted water, drains, wetlands	Gravid/CDC traps; larval surveys
<i>Phlebotomus</i> (sandflies)	Leishmaniasis (VL/CL)	Animal shelters, cracks in walls, peri-domestic sites	Light traps; sticky traps; IRS residual checks
<i>Simulium</i> (blackflies)	Onchocerciasis	Fast-flowing rivers/rapids	Larval/pupal sampling on submerged vegetation
<i>Hyalomma/Rhipicephalus</i> (ticks)	CCHF, rickettsioses	Pastures, livestock enclosures, bush	Drag sampling; livestock/tick inspection
<i>Xenopsylla</i> (fleas)	Plague	Rodent burrows, households	Rodent/flea surveillance; sentinel species

Table 13.2-B. Seasonality & ecological drivers

Period	Vector ecology signals
Long rains (Mar–May)	Urban <i>Aedes</i> surge; container proliferation; early dengue/chik risk
Kiremt (Jun–Sep)	<i>Aedes</i> peaks; blackfly breeding stable with river flows
Bega (Oct–Jan)	Sandfly activity persists in suitable belts; tick activity varies by zone
Irrigation season	Local sandfly and <i>Aedes</i> risks rise near schemes and canals

Table 13.2-C. Urban vs rural vector control implications

Context	Priority actions
Urban/peri-urban	Aedes source reduction; solid waste; container mapping; targeted larviciding; school/community campaigns
Riverine/forested	Onchocerciasis MDA; blackfly habitat considerations; PPE for workers near rivers
Semi-arid lowlands	VL/CL risk reduction (housing/wall improvements; IRS in VL foci)
Pastoralist belts	Tick bite prevention; abattoir biosafety; animal health coordination (One Health)

Table 13.2-D. Sampling design essentials for vector surveys

Design element	Specification for Ethiopia
Stratify by ecozone & elevation	Ensure coverage of urban cores, peri-urban fringes, lowland/semi-arid, and riverine zones
Seasonal timing	At least one wet and one dry season round; align with agricultural/irrigation calendars
Indicator set	Aedes HI/CI/BI; sandfly/blackfly catches; tick drags; resistance testing where feasible
Data capture	Geo-tag sites; link to DHIS2; standardize forms; photo logs where useful

Plain-language summary

Different vectors prefer different places in Ethiopia. Aedes mosquitoes like water stored near homes in cities and towns, sandflies thrive around animal shelters and cracked walls in lowland areas, blackflies breed in fast-flowing rivers, ticks are common in pastoral areas and around livestock, and fleas live on rodents. Because these habitats are so different, there is no single solution. Cities need container clean-ups and targeted larviciding. River communities need protection from onchocerciasis and safe work practices around rapids. Lowland areas with leishmaniasis benefit from housing improvements and, in some places, indoor spraying. Coordinating human and animal

health efforts helps prevent outbreaks of diseases like CCHF and plague. Planning surveys by season, elevation, and ecozone makes vector control smarter and more cost-effective.

References — Section 13.2 (initial list; expand with Ethiopia-specific citations in disease chapters)

- **Federal Ministry of Health (Ethiopia) — NTD & vector control materials —**
<https://www.moh.gov.et/>
- **EPHI — Entomology & public health emergency resources —**
<https://www.ephi.gov.et/>
- **WHO — Vector ecology & integrated vector management —**
<https://www.who.int/health-topics/vector-borne-diseases>
- **ESPEN/WHO AFRO — NTD data portal —** <https://espen.afro.who.int/>
- **FAO/WOAH — One Health resources for zoonoses —** <https://www.fao.org/one-health/>

13.3) Arboviruses I — Dengue & Chikungunya

This section outlines Ethiopia-relevant dengue and chikungunya concepts: surveillance, seasonality, Aedes indices, laboratory capacity, clinical severity proxies, and response timeliness. Figures are illustrative and should be replaced with official IDSR/lab/entomology datasets before publication.

Figure . Annual dengue & chikungunya — suspected/confirmed (illustrative)

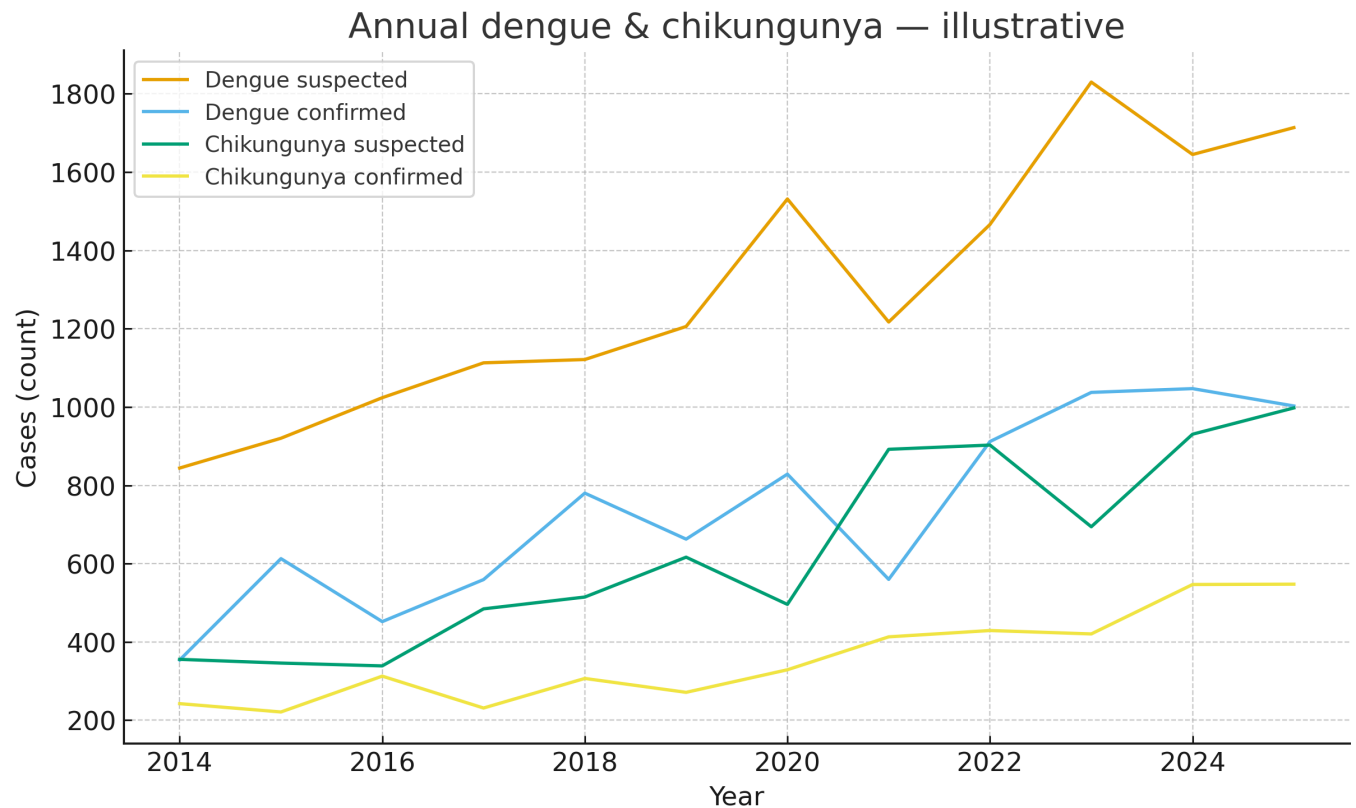


Figure . Seasonality index (illustrative)

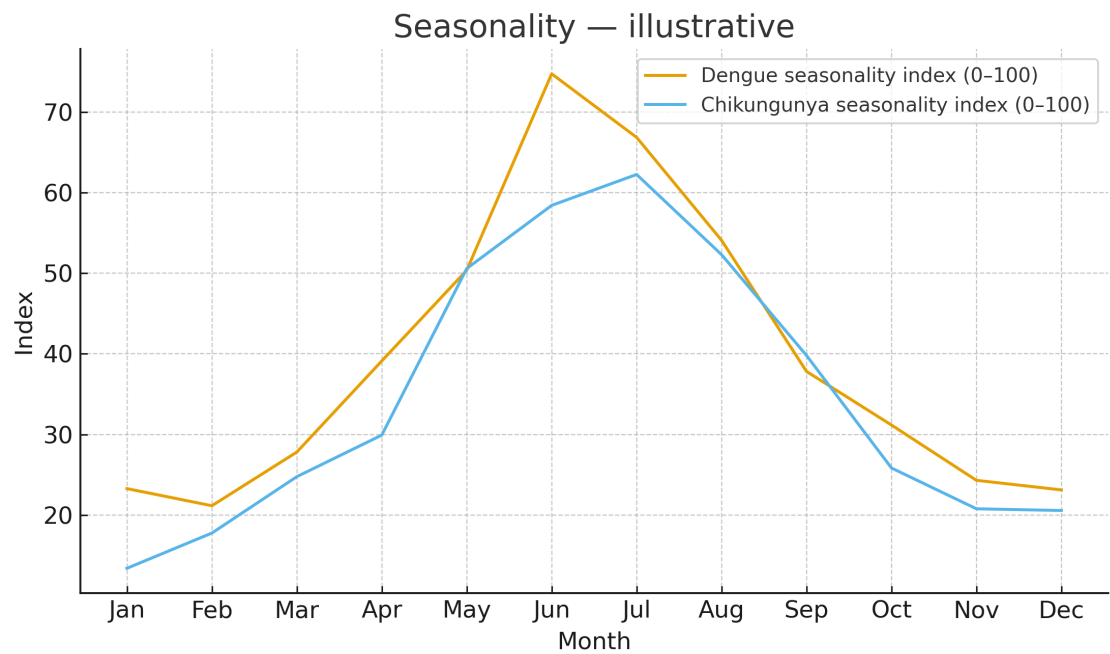


Figure . Laboratory testing volume & positivity (illustrative)

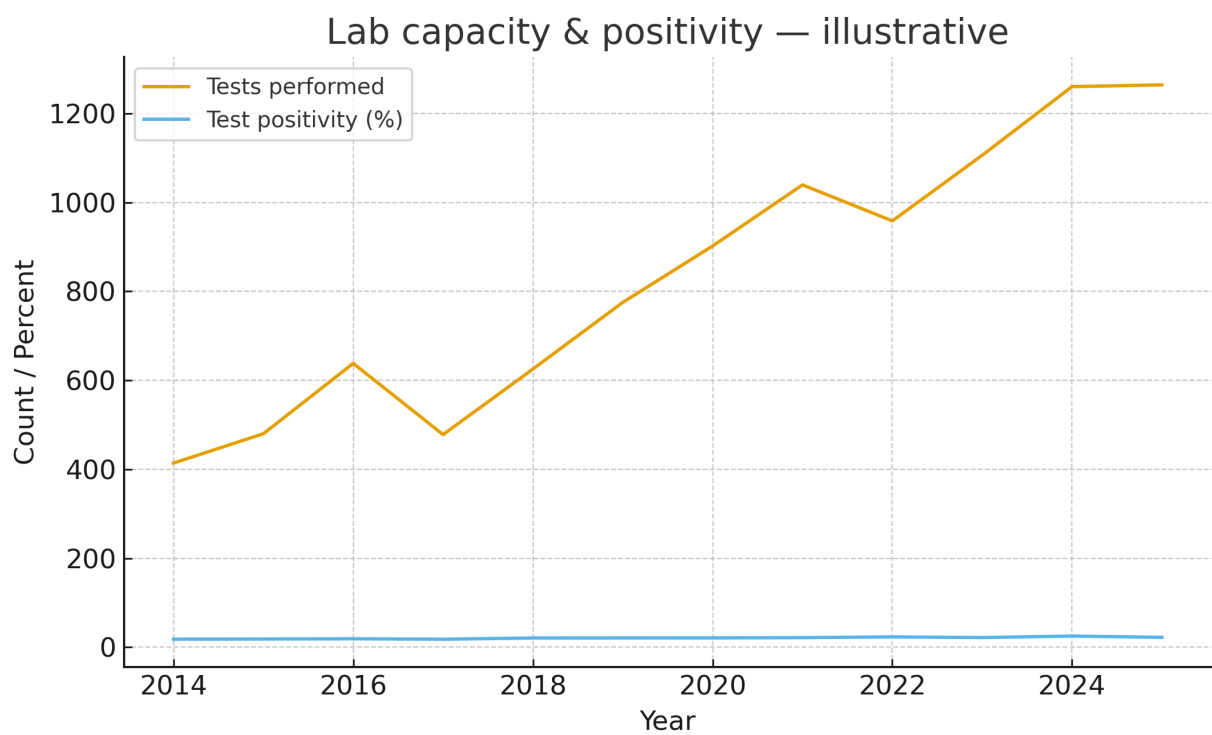


Figure . Outbreak alert-to-action timeliness (illustrative)

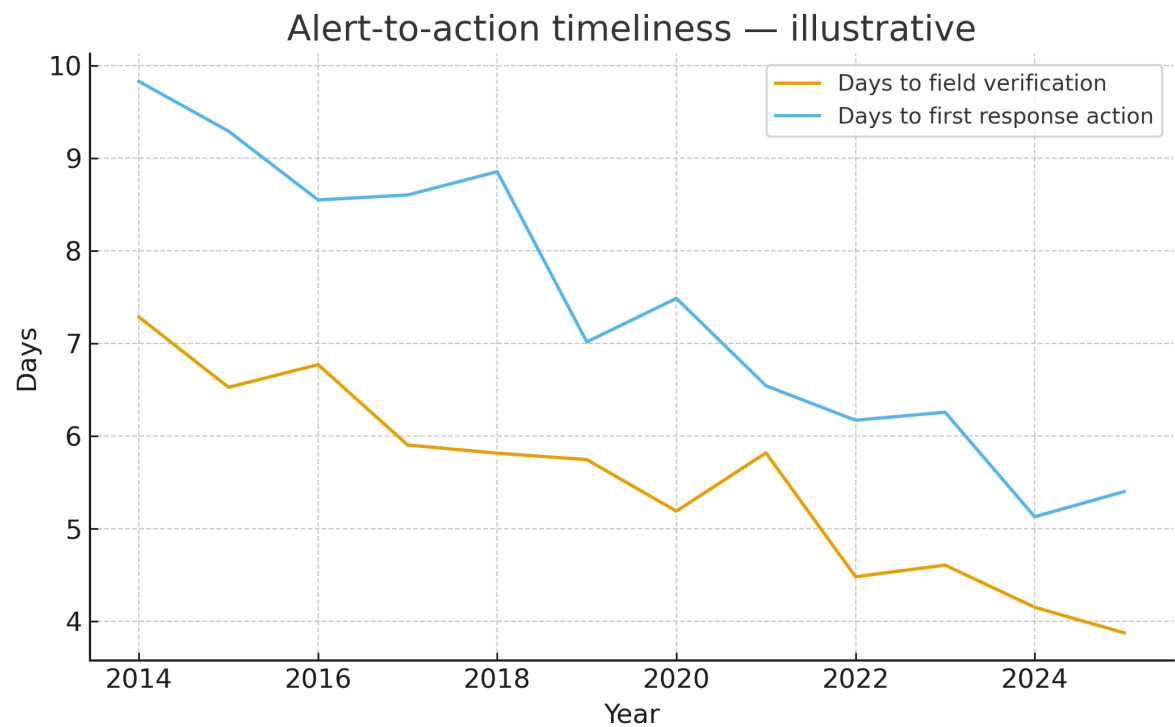


Figure . Clinical severity proxies (illustrative)

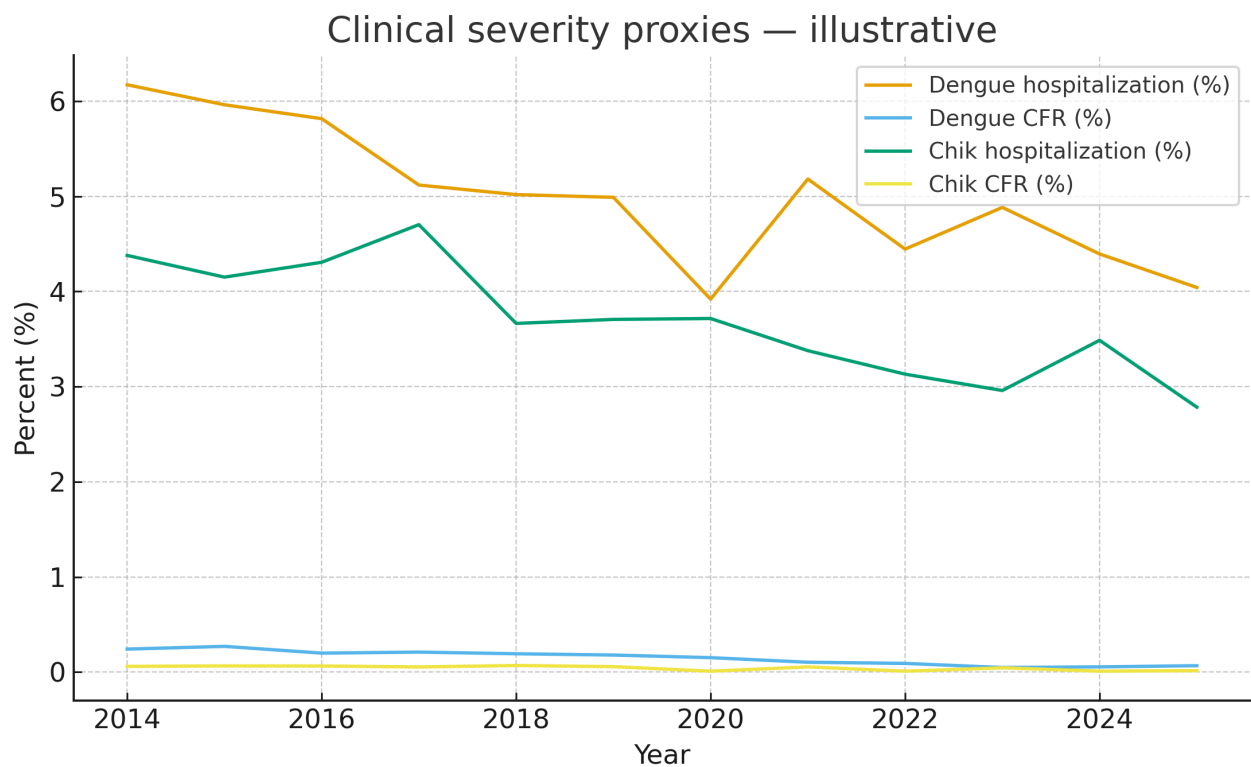


Table 13.3-A. Simplified case definitions (programmatic)

Case definition	Operational summary
Dengue — suspected	Acute febrile illness + 2 of: headache, retro-orbital pain, myalgia/arthralgia, rash, bleeding signs; epidemiologic link.
Dengue — confirmed	Laboratory confirmation (NS1/IgM/PCR) or epidemiologic link to confirmed case.
Chikungunya — suspected	Acute fever + severe arthralgia/arthritis not explained by other conditions; epidemiologic link.
Chikungunya — confirmed	Laboratory confirmation (IgM/RT-PCR) or epidemiologic link to confirmed case.

Table 13.3-B. Triage & differential diagnosis — summary

Domain	Key points
Red flags	Persistent vomiting, mucosal bleeding, lethargy/restlessness, hepatomegaly, rising HCT with falling platelets, hypotension.
Differentials	Malaria, typhoid, sepsis, COVID-19, leptospirosis; manage per national guidelines.
Triage bundle	Early diagnosis, fluid management protocols, hemoconcentration tracking, referral criteria.

Table 13.3-C. Aedes-focused integrated vector management toolbox

Intervention	Implementation notes for Ethiopia
Source reduction	Community container cleanup; secure water storage; weekly container checks.
Targeted larviciding	Treat high-productivity containers/drains; quality monitoring of dosage cycles.
Adult control (space spraying)	Only for outbreak response as adjunct; time to adult peaks; monitor impact.

Behavior change (SBC)	School/community campaigns; season-timed messaging; door-to-door in hotspots.
Urban planning links	Solid waste, drainage, construction site compliance; by-laws enforcement.

Table 13.3-D. Surveillance & response indicators

Indicator	Definition/target
Timeliness — alert→verify	Median days (target ≤ 3)
Timeliness — verify→response	Median days (target ≤ 5)
Aedes indices	HI, CI, BI levels in hotspots (target declines over season)
Lab performance	# tests/week; positivity; turnaround time
Clinical outcomes	Hospitalization rate; CFR; adherence to fluid protocols
Risk comms	% kebeles reached with seasonally timed SBC

Table 13.3-E. Lab testing options & biosafety

Domain	Notes
Rapid tests	NS1 (early dengue), IgM (later); quality assurance essential.
PCR/ELISA	Confirmation and serotype surveillance; referral pathways required.
Biosafety	Specimen handling SOPs; PPE; transport media; cold chain as indicated.

Table 13.3-F. Vaccination & prophylaxis — program notes

Topic	Program note
Yellow Fever vaccine	Recommended in risk zones and for travelers per policy; not for dengue/chik.

Dengue vaccines	Global status evolving; suitability depends on epidemiology/serostatus; follow WHO policy updates.
Chemoprophylaxis	None for dengue/chik; personal protection measures emphasized.

Plain-language summary

Dengue and chikungunya are spread by *Aedes* mosquitoes that breed in water stored around homes, construction sites, and discarded containers. Illness often starts with sudden fever and body pain; dengue can occasionally become severe and needs careful fluid management. Risk usually rises during and after the rainy months, especially in growing towns and cities. The most effective actions are simple and repeated: cover or clean water containers every week, remove standing water, and organize community clean-ups. Health facilities should test suspected cases, report quickly, and follow clear triage and treatment steps. During outbreaks, local teams act fast—verify the alert, communicate risks, increase testing, and target vector control to hotspots. Keeping a close watch on *Aedes* indices and speeding up the move from alert to action helps prevent large outbreaks.

References — Section 13.3 (initial list; add Ethiopia-specific citations in later sections)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR & lab guidance —** <https://www.moh.gov.et/>
- **EPHI — Arbovirus surveillance & laboratory resources —** <https://www.ephi.gov.et/>
- **WHO — Dengue & Chikungunya guidelines —** <https://www.who.int/health-topics/dengue-and-severe-dengue>
- **PAHO/WHO — Chikungunya surveillance & case management —** <https://www.paho.org/en/topics/chikungunya>
- **CDC — Dengue & Chikungunya —** <https://www.cdc.gov/dengue/>

13.4) Arboviruses II — Yellow Fever & West Nile

Figures are illustrative and should be replaced with official datasets prior to publication.

Figure 13.4-1. Annual Yellow Fever & West Nile — suspected/confirmed (illustrative)

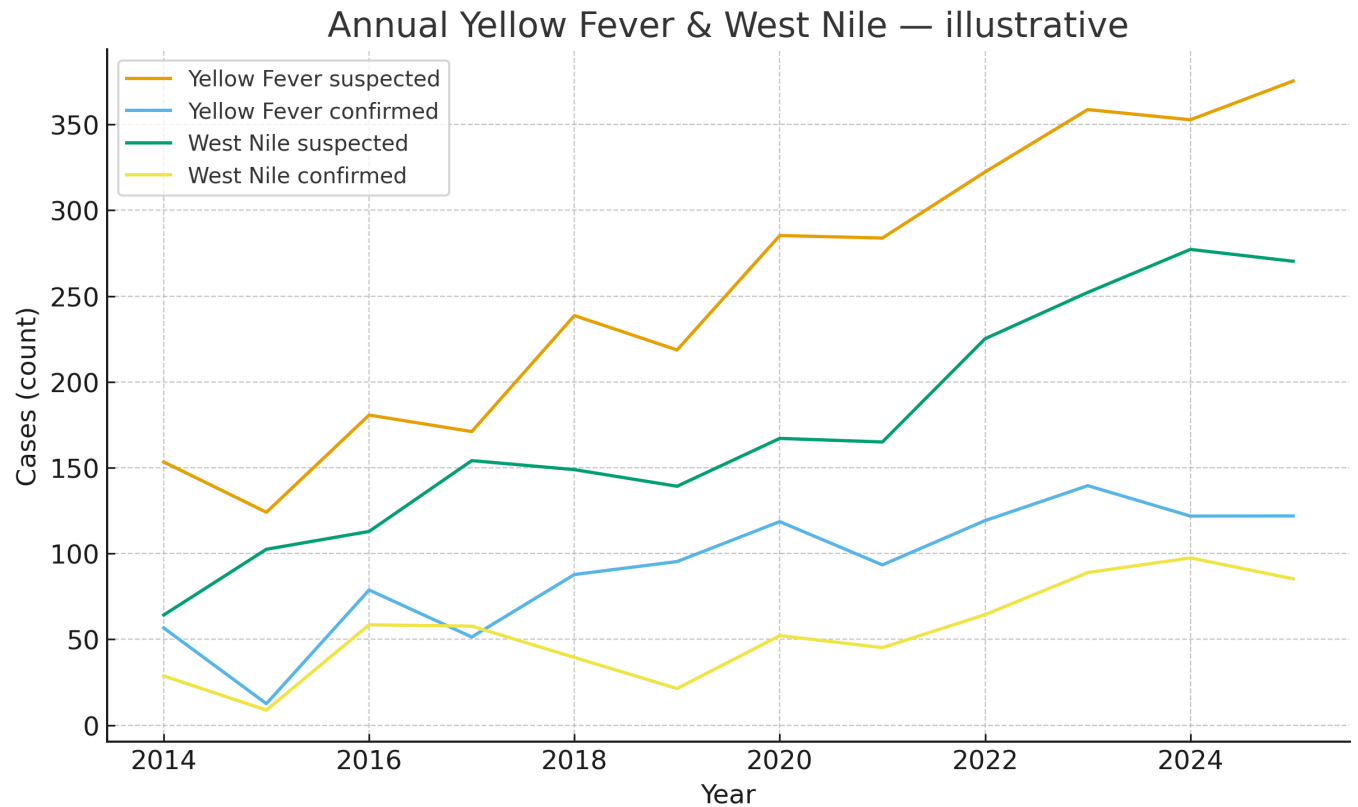


Figure 13.4-2. Seasonality index (illustrative)

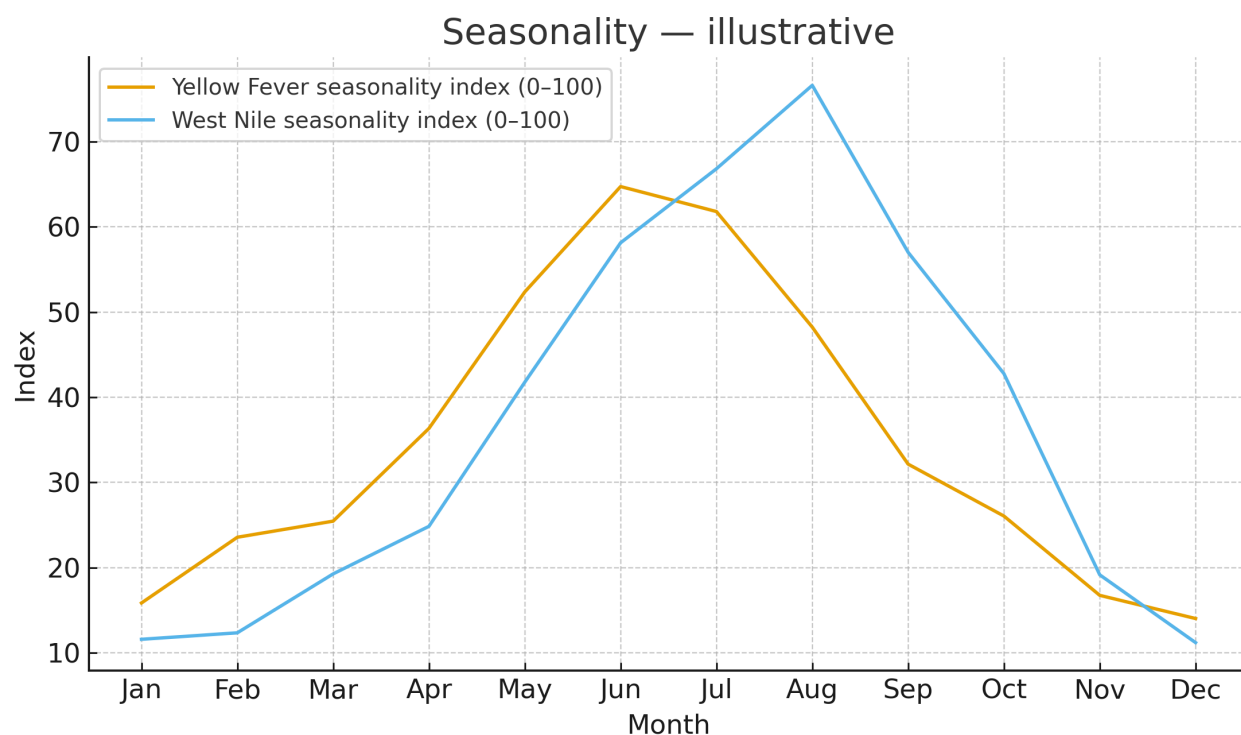


Figure 13.4-3. Yellow Fever vaccination coverage by region (latest year, illustrative)

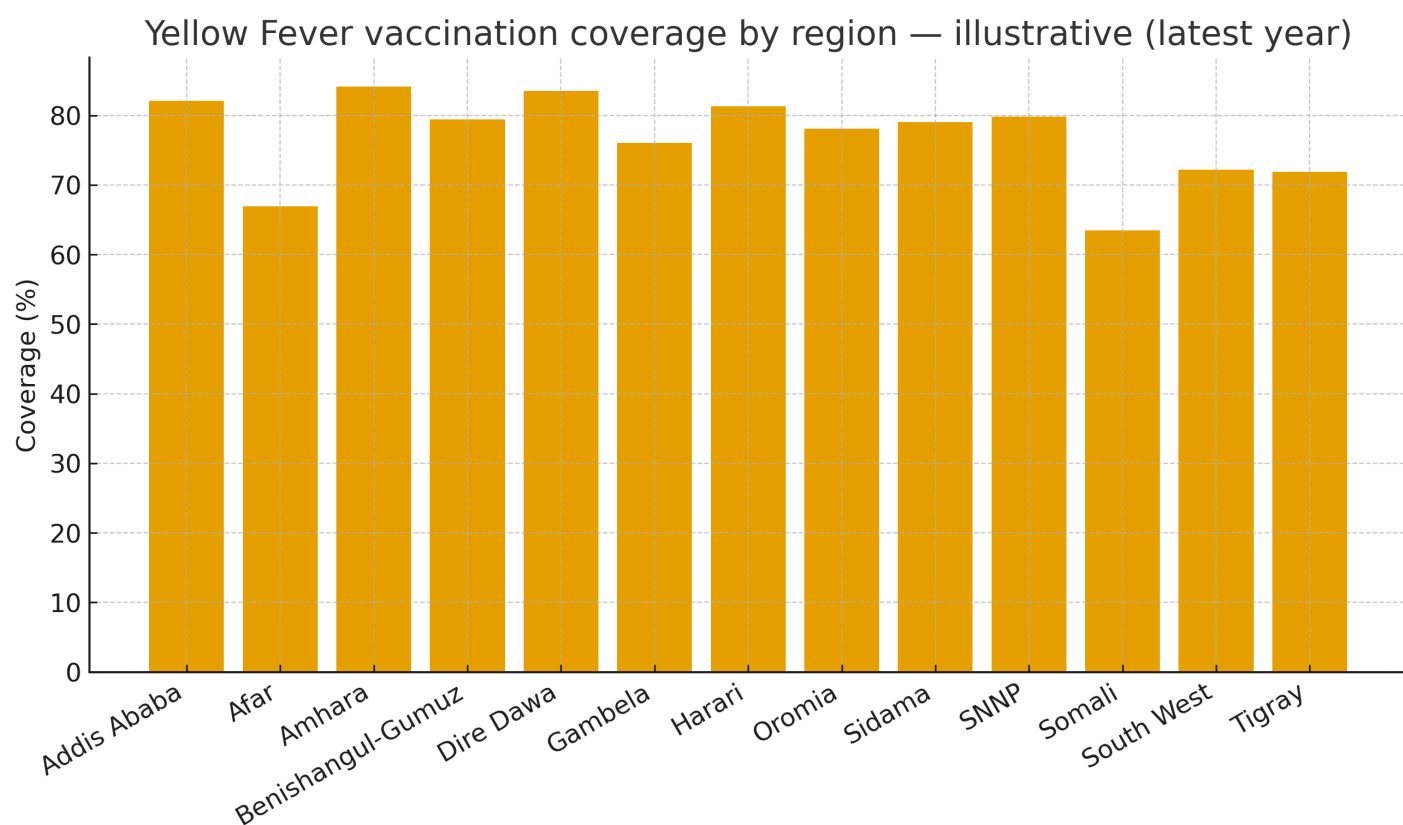


Figure 13.4-4. AEFI serious events rate — illustrative

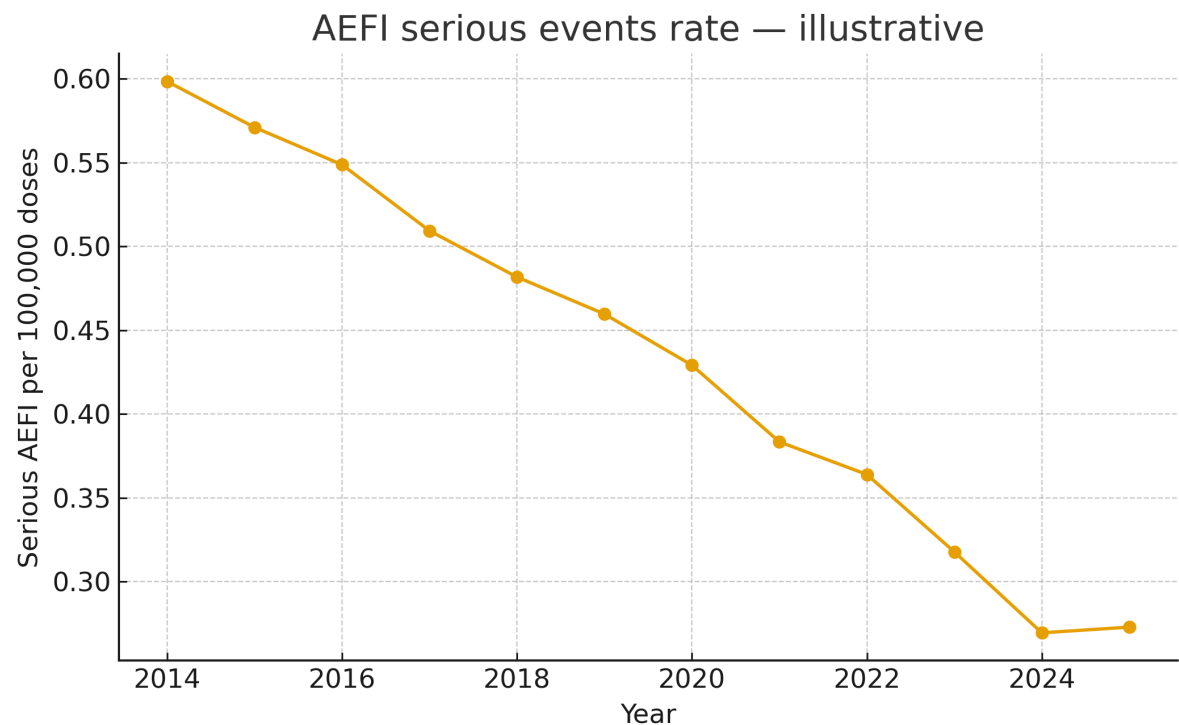


Figure 13.4-5. West Nile neuroinvasive share among confirmed — illustrative

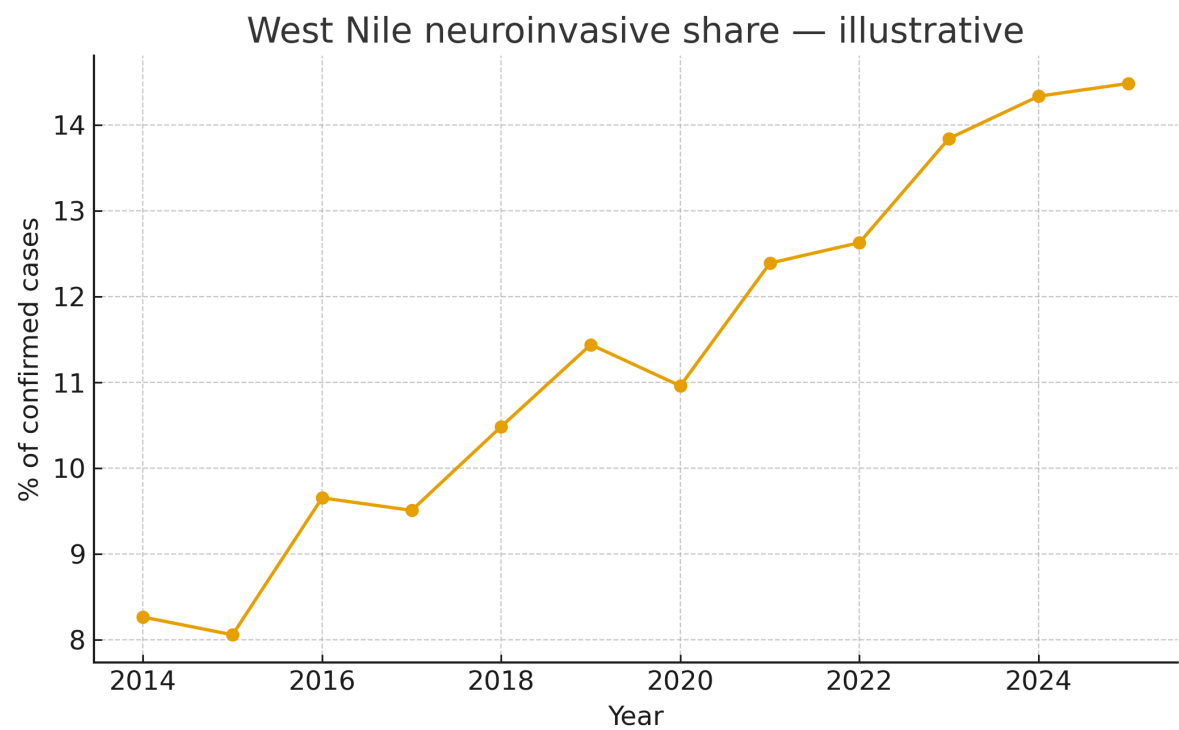


Figure 13.4-6. YF alert-to-campaign timeliness — illustrative

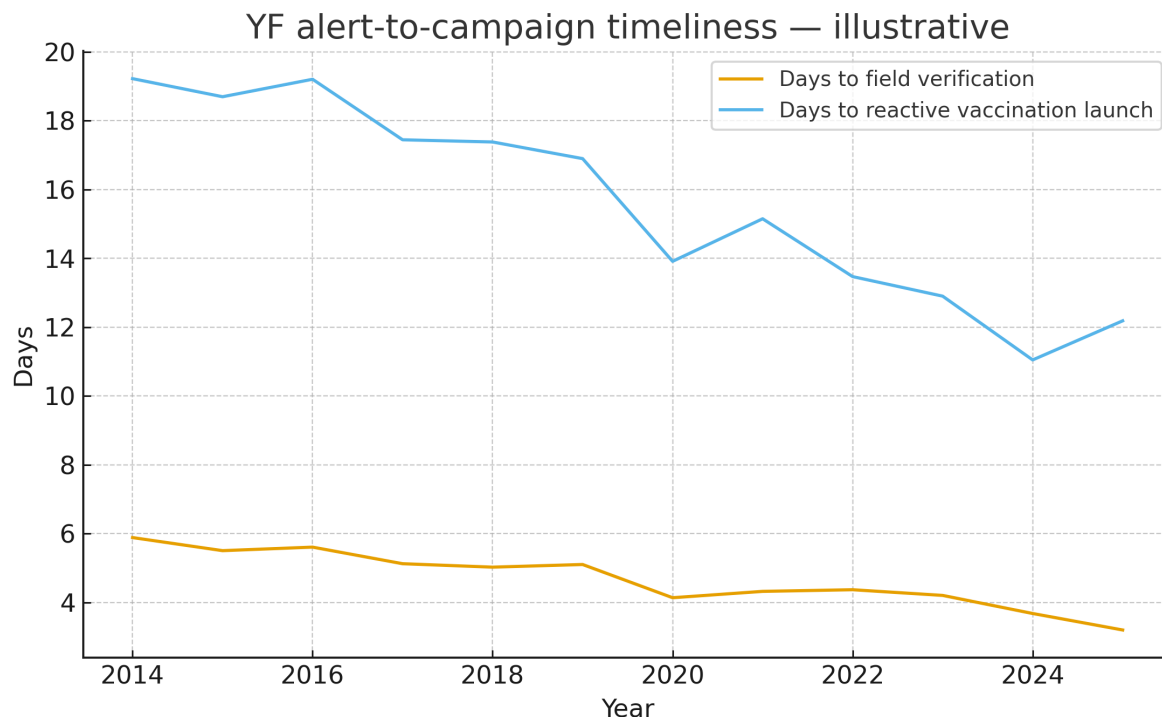


Table 13.4-A. Simplified case definitions (programmatic)

Case definition	Operational summary
Yellow Fever — suspected	Acute fever with jaundice within 14 days OR epi link in risk area.
Yellow Fever — confirmed	PCR or IgM with confirmatory testing (PRNT) or epi link.
West Nile — suspected	Acute febrile or neuroinvasive disease in risk season/area without alternative diagnosis.
West Nile — confirmed	PCR/IgM with confirmation or epidemiologic link.

Table 13.4-B. Vaccination policy & EYE strategy — program notes

Component	Program note
Routine immunization (RI)	Maintain YF vaccine in risk regions; integrate with EPI schedule.

Preventive campaigns (PMVC)	High-risk districts per EYE; high coverage and cold-chain readiness.
Reactive campaigns (RVC)	Rapid risk assessment; timely campaign; AEFI monitoring.
International Health Regulations	YF vaccination certificate as per IHR travel requirements.

Table 13.4-C. Surveillance algorithms (syndromic/event-based)

Syndrome/signal	Operational approach
AFI with jaundice (YF)	Screen malaria/hepatitis; test YF in clusters/travel contexts.
Neuroinvasive syndrome (WNV)	Meningitis/encephalitis algorithm; test for WNV and differentials.
Event-based signals	Unusual deaths; AFI clusters; bird die-offs (WNV).
Lab referral	Tiered PCR/ELISA; confirmatory PRNT; biosafety.

Table 13.4-D. Entomology & environmental indicators

Indicator	Notes
Aedes indices in YF risk zones	HI/CI/BI in urban/peri-urban surveys; construction site compliance.
Culex monitoring	Gravid/CDC traps in peri-urban/wetlands; WNV vector abundance.
Vaccination micro-plans	Map under-vaccinated pockets; mobility hubs.
Seasonal/climate signals	Rainfall anomalies/flooding; integrate with EPR dashboards.

Table 13.4-E. Outbreak response micro-plan checklist

Domain	Key elements
Coordination	Incident management; partner mapping.
Risk communication	Messages on vaccination, protection, care-seeking.

Vaccination ops (YF)	Targets; cold chain; AEFI surveillance; waste management.
Vector control	Aedes source reduction + targeted larviciding; adult control as adjunct.
Clinical pathways	Triage/jaundice management; neuro care; referral networks.
After-Action Review	AAR within 30 days; action tracking.

Table 13.4-F. Laboratory testing overview

Method	Program notes
PCR (YF/WNV)	Acute confirmation; referral and biosafety.
IgM/ELISA	Post day 5–7; possible cross-reactivity; confirm when needed.
PRNT	Reference confirmation for flaviviruses.
QA/QC	PT panels; turnaround time monitoring.

Plain-language summary

Yellow fever and West Nile are mosquito-borne viruses of concern in Ethiopia. Yellow fever can be severe but is preventable with vaccination. West Nile usually causes mild illness, but some people develop serious brain or nerve problems. Keeping vaccination high where yellow fever risk exists, reducing Aedes breeding sites in towns, watching for clusters of fever with jaundice or neurological symptoms, and moving quickly to investigate and respond can prevent large outbreaks.

References — Section 13.4 (initial list)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR & EPI (YF) —** <https://www.moh.gov.et/>
- **EPHI — Arbovirus surveillance & laboratories —** <https://www.ephi.gov.et/>
- **WHO — Yellow Fever; West Nile virus —** <https://www.who.int/health-topics/yellow-fever>
- **EYE Strategy — Eliminating Yellow fever Epidemics —** <https://www.who.int/initiatives/eYE>
- **CDC — Yellow Fever & West Nile —** <https://www.cdc.gov/yellowfever/>

13.5) Leishmaniasis (Visceral & Cutaneous)

Figures are illustrative and should be replaced with official datasets prior to publication.

Figure . Leishmaniasis cases (VL and CL) — illustrative

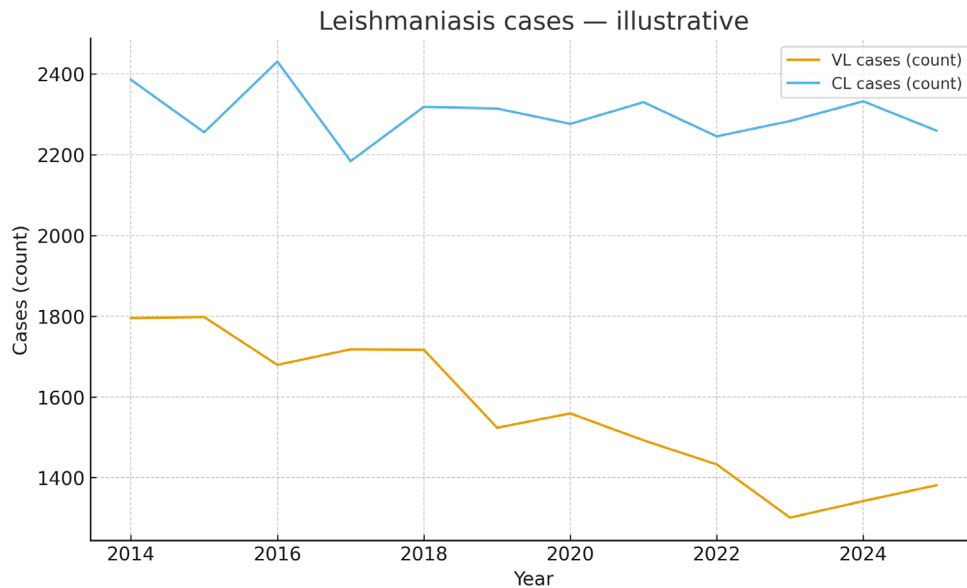


Figure . VL treatment outcomes — illustrative

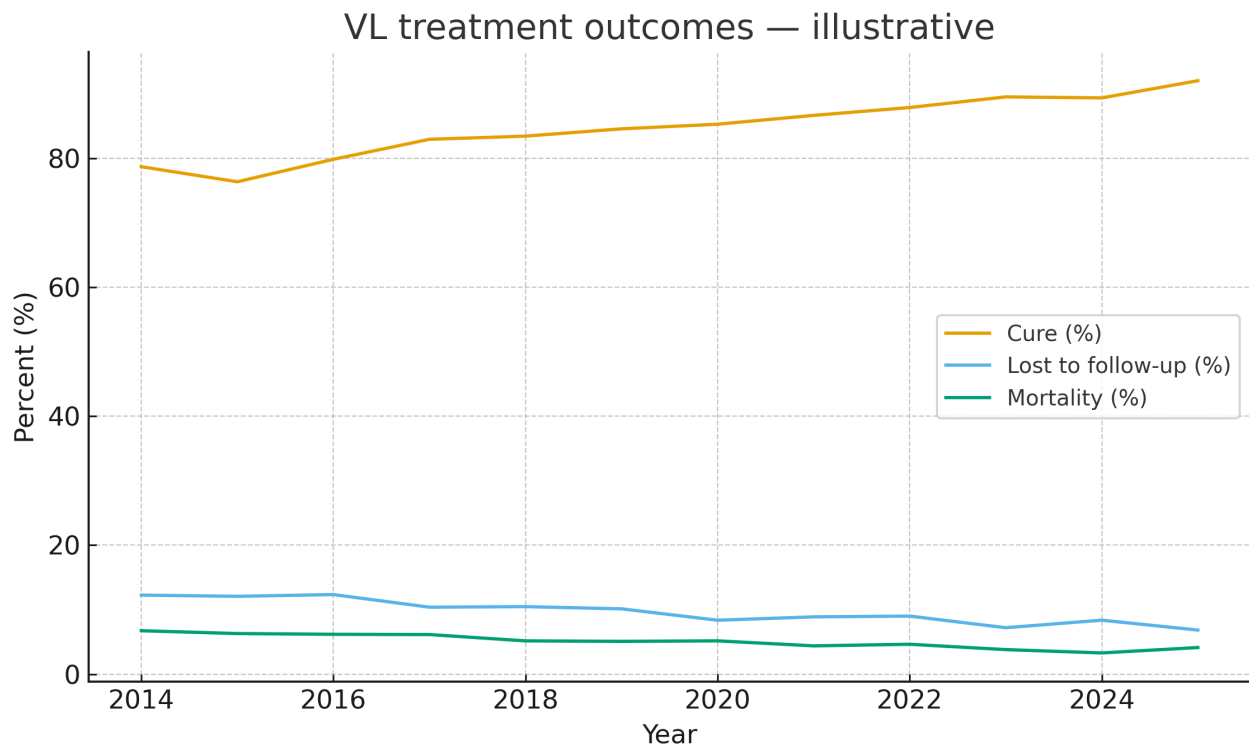


Figure . Sandfly abundance by ecozone — illustrative

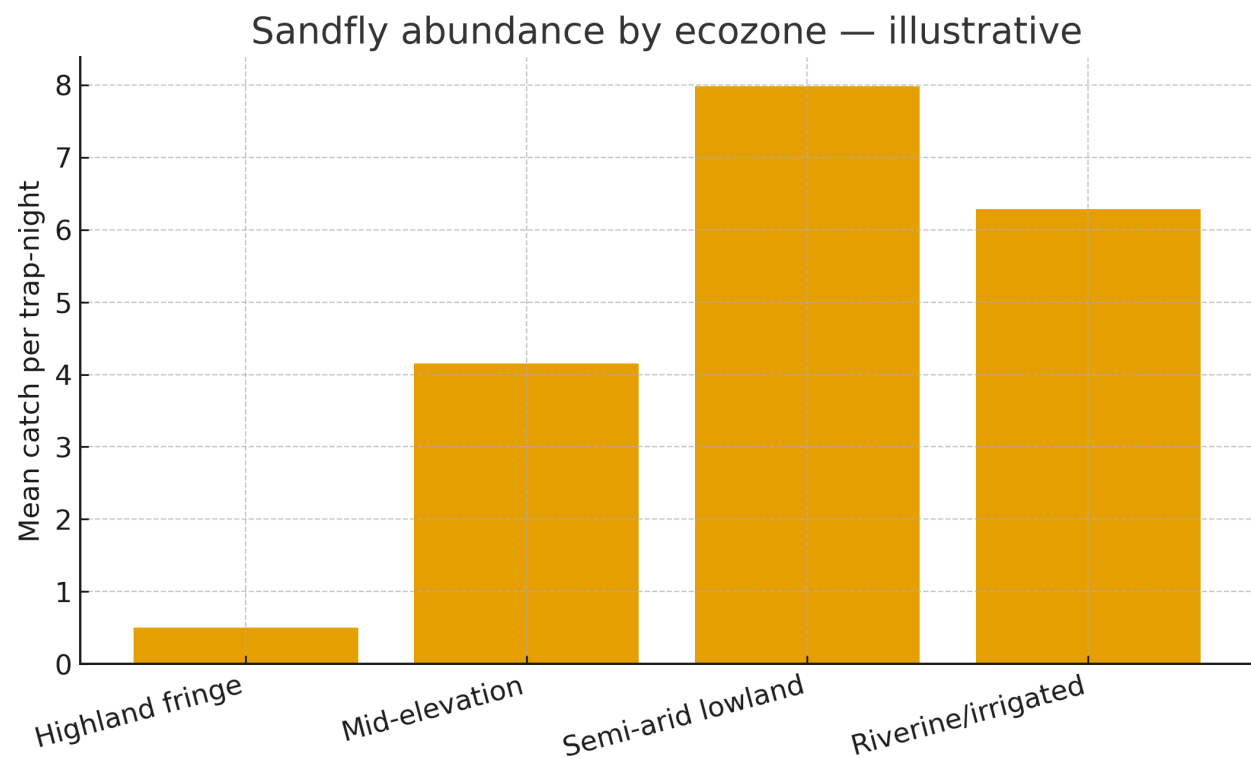


Figure . Seasonality index (VL & CL) — illustrative

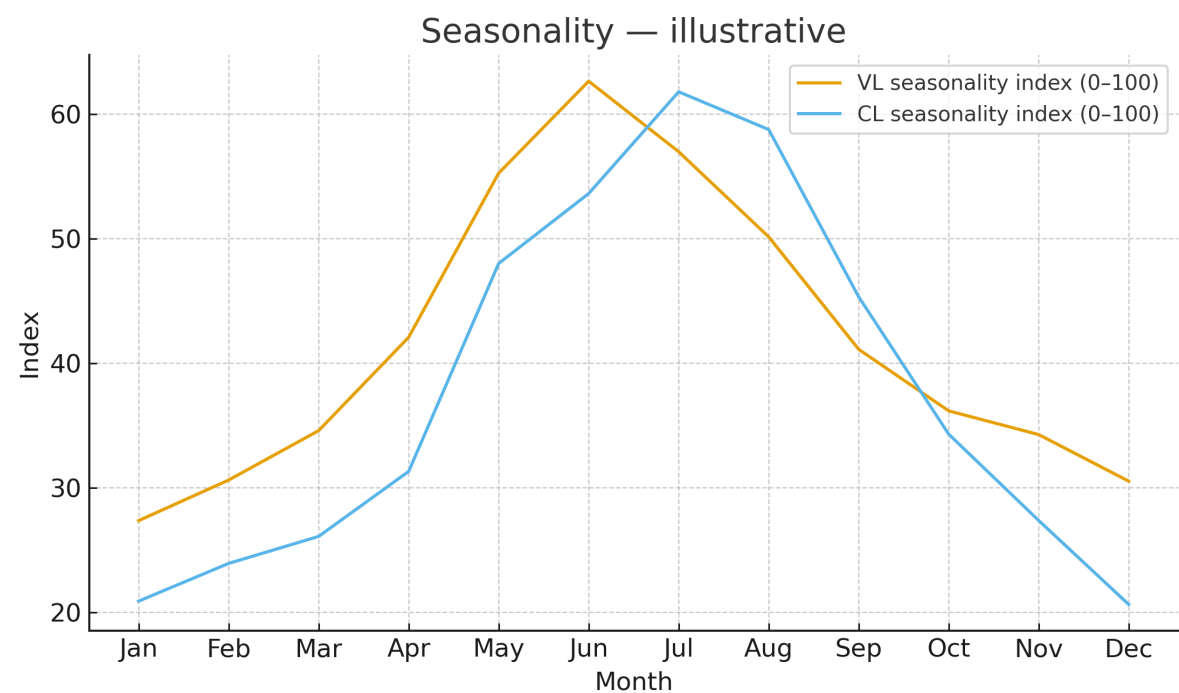


Figure . Commodity stock-outs — illustrative

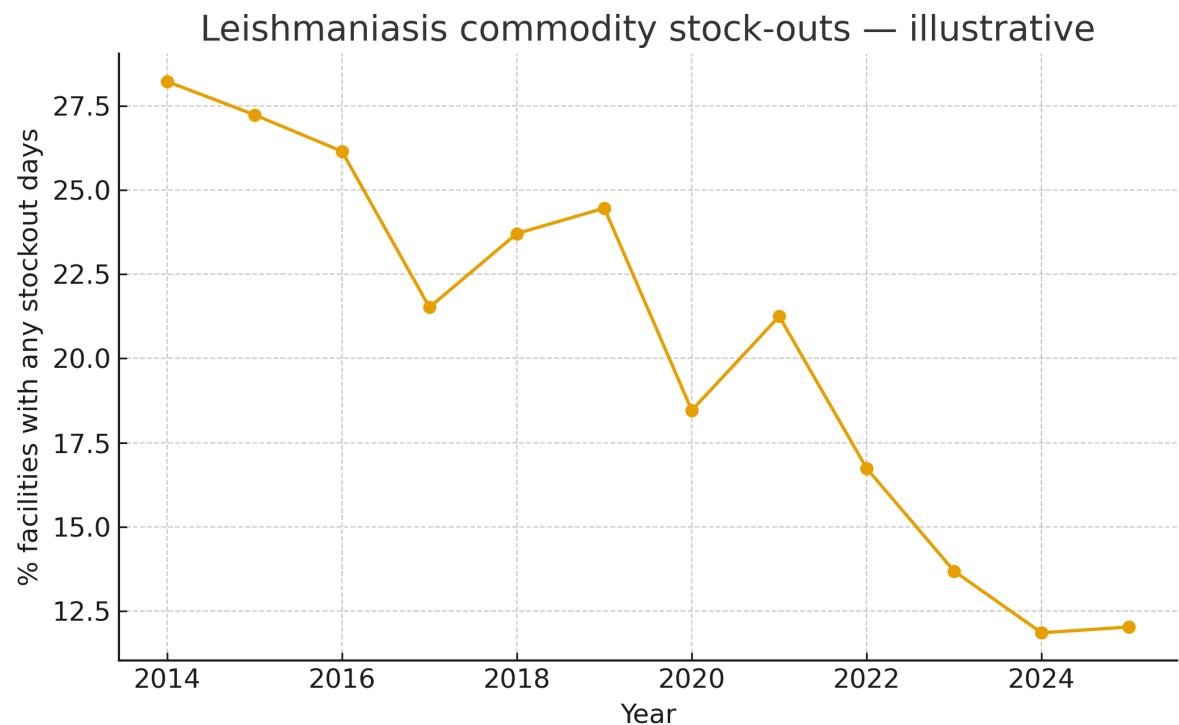


Table 13.5-A. Ethiopia leishmaniasis overview

Domain	Key points (Ethiopia focus)
VL (visceral) — kala-azar	Prolonged fever, weight loss, splenomegaly; fatal if untreated; lowland/semi-arid foci.
CL (cutaneous)	Skin lesions; may scar; occurs in specific belts including peri-urban areas.
Vectors	Phlebotomus sandflies; peri-domestic, animal shelters, cracks in walls; some zoonotic cycles.
Reservoirs	Human (anthroponotic VL in some areas); canids/other animals for zoonotic cycles (context specific).
Seasonality	Peaks often follow rains; varies by ecozone and housing patterns.

Table 13.5-B. Diagnostics — programmatic summary

Topic	Program notes
VL initial test	rK39/rK28 RDT; confirm with DAT/microscopy/PCR where available.
CL diagnosis	Smear microscopy; PCR where available; clinical pattern and exposure history.
Specimen handling	Aseptic technique; biosafety; referral pathways.
Data systems	Link lab and case registers to DHIS2; completeness and timeliness.

Table 13.5-C. Treatment regimens — guideline notes (illustrative)

Condition	Guideline notes (programmatic)
Uncomplicated VL (adult)	Liposomal amphotericin B regimens OR combination therapy per guideline; monitor toxicity.
VL (special groups)	Adjust in pregnancy, HIV coinfection, malnutrition; pharmacovigilance.
CL treatment	Local care; intralesional/systemic therapies per species/context; prevent secondary infection.
Supportive care	Nutrition; manage anemia/coinfections; follow-up to confirm cure.

Table 13.5-D. Vector control & housing improvement

Intervention	Implementation notes
IRS in VL foci	Consider where resting behavior & housing support impact; time pre-season.
Environmental measures	Plaster wall cracks; manage animal shelters; reduce peri-domestic breeding.
Personal protection	Bed nets or fine-mesh screening; repellents as feasible.

Entomology	Light/sticky traps; residual bioefficacy checks; resistance monitoring.
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Table 13.5-E. Surveillance & indicators

Domain	Indicators/targets
Timeliness/completeness	% reports on time/complete; line-list with outcomes.
Case detection	Median days symptom→diagnosis; share lab-confirmed; test positivity.
Treatment outcomes	Cure, LTFU, mortality; track by facility/zone; thresholds.
Commodity security	Stock-out frequency; lead times; buffer stocks.

Table 13.5-F. Diagnostic mix (share of methods)

Method	Share (%)
RDT (rk39/rK28)	45.0
Microscopy	30.0
PCR/ELISA	10.0
Clinical/epi link	15.0

Plain-language summary

Leishmaniasis is caused by parasites spread by tiny sandflies. In Ethiopia, visceral leishmaniasis (VL) can be fatal without treatment, while cutaneous leishmaniasis (CL) causes skin sores that may scar. Risk is higher in some lowland and semi-arid areas and around certain types of housing and animal shelters. People get better when they are diagnosed early and receive the right medicines, but clinics must have reliable supplies and follow clear treatment plans. Programs can reduce illness by improving houses and animal shelters, using indoor spraying in the right places, and by tracking cases and drug stocks closely. Teams should prepare before the rainy season, ensuring tests, medicines, and transport for referrals are ready.

References — Section 13.5 (initial list)

- **Federal Ministry of Health (Ethiopia) — Leishmaniasis guidance —** <https://www.moh.gov.et/>
- **EPHI — NTD & laboratory resources —** <https://www.ephi.gov.et/>
- **WHO — Leishmaniasis fact sheets & guidelines —** <https://www.who.int/health-topics/leishmaniasis>
- **DNDi — Treatments for leishmaniasis —** <https://dndi.org/diseases/leishmaniasis/>

13.6) Lymphatic Filariasis (LF)

Figures are illustrative and should be replaced with official datasets prior to publication.

Figure . LF program footprint — endemic vs surveillance districts (illustrative)

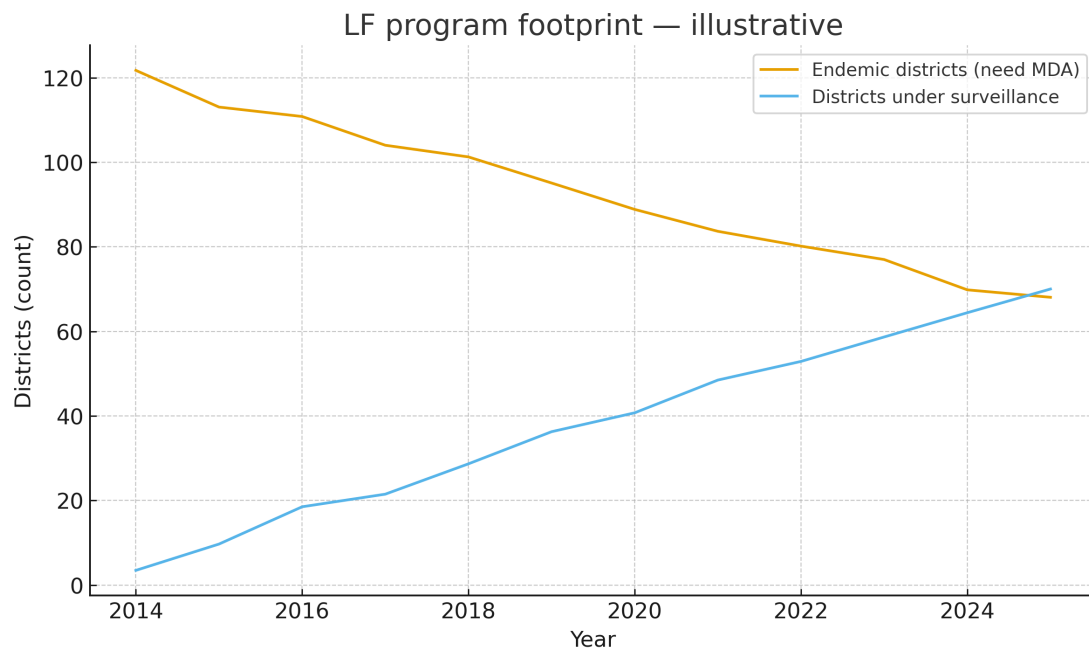


Figure . MDA coverage (illustrative)

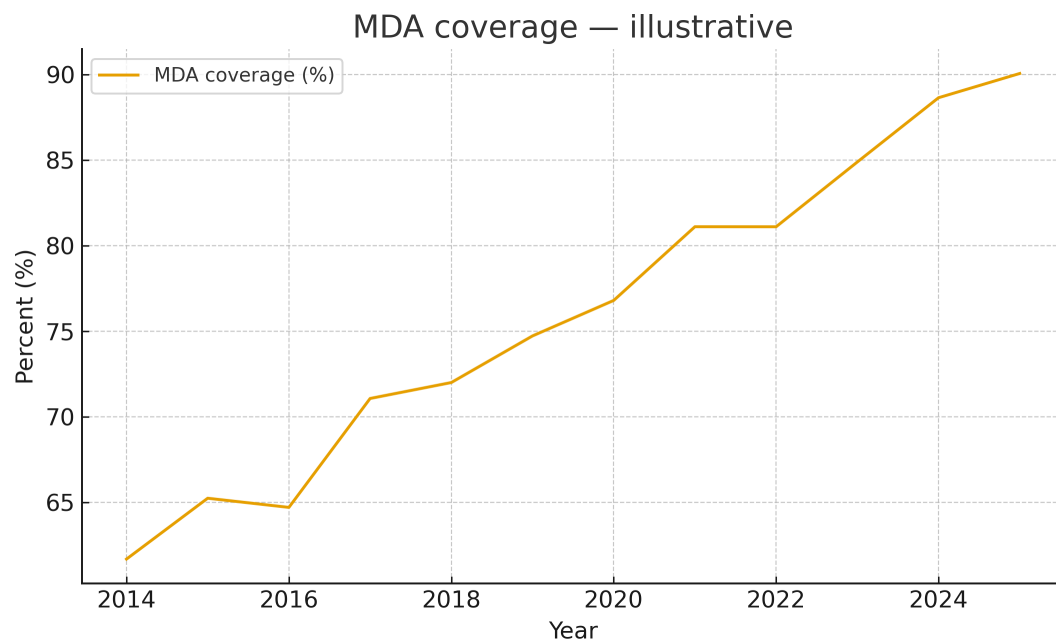


Figure . TAS pass rate (illustrative)

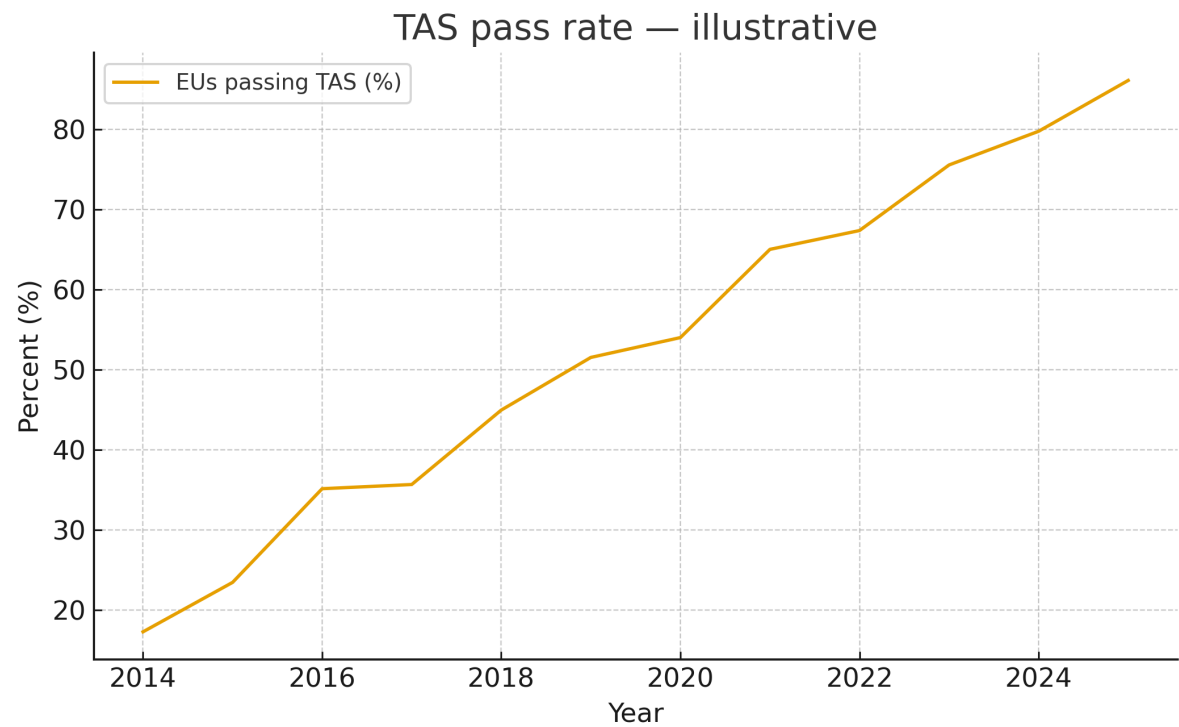


Figure . Morbidity management coverage (illustrative)

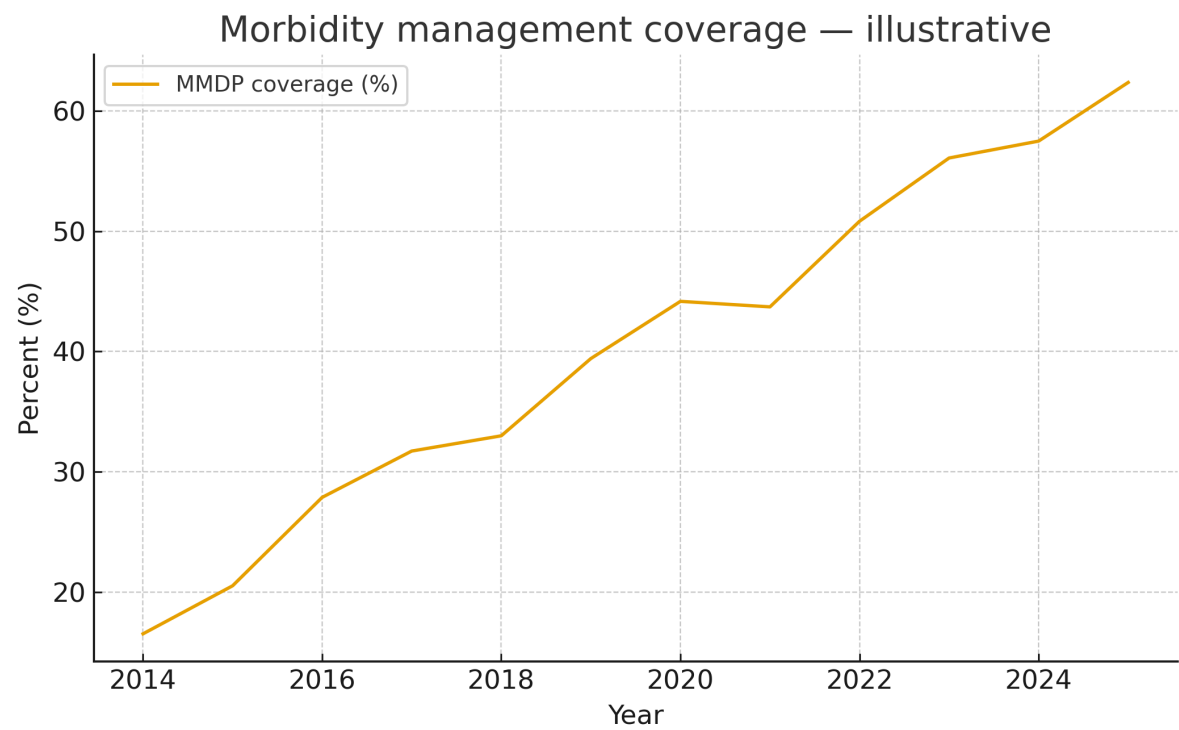


Figure . Hydrocele surgeries (illustrative)

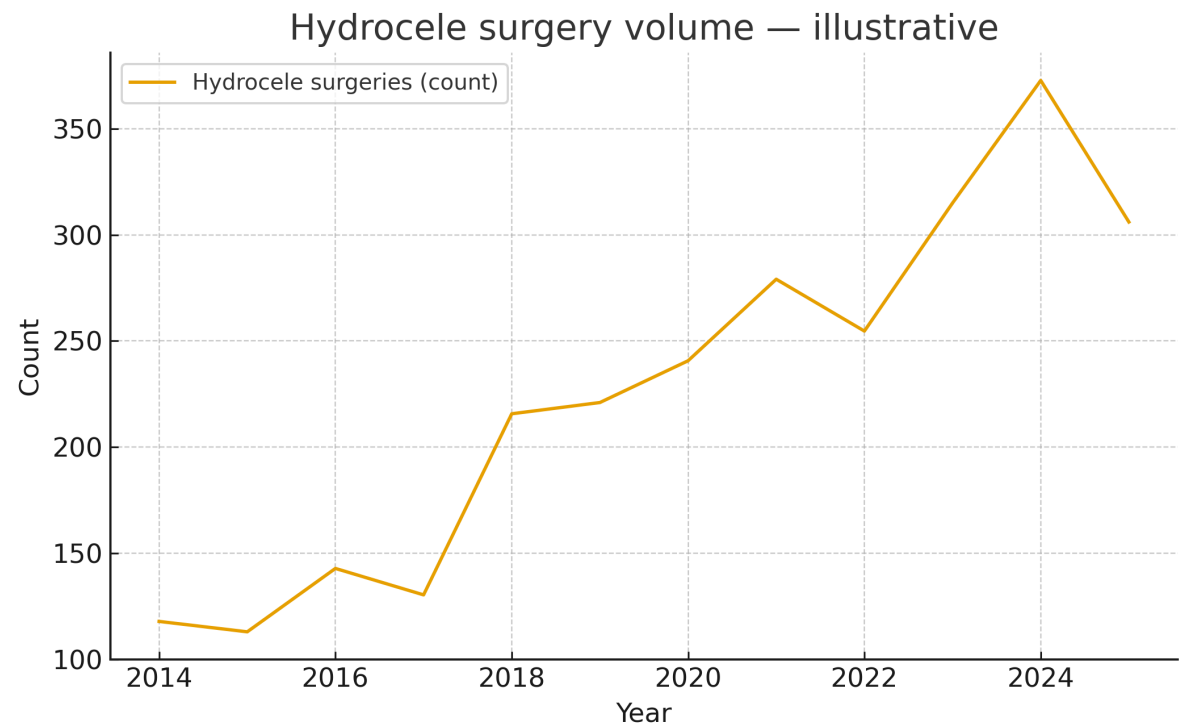


Figure . Culex breeding site positivity (illustrative)

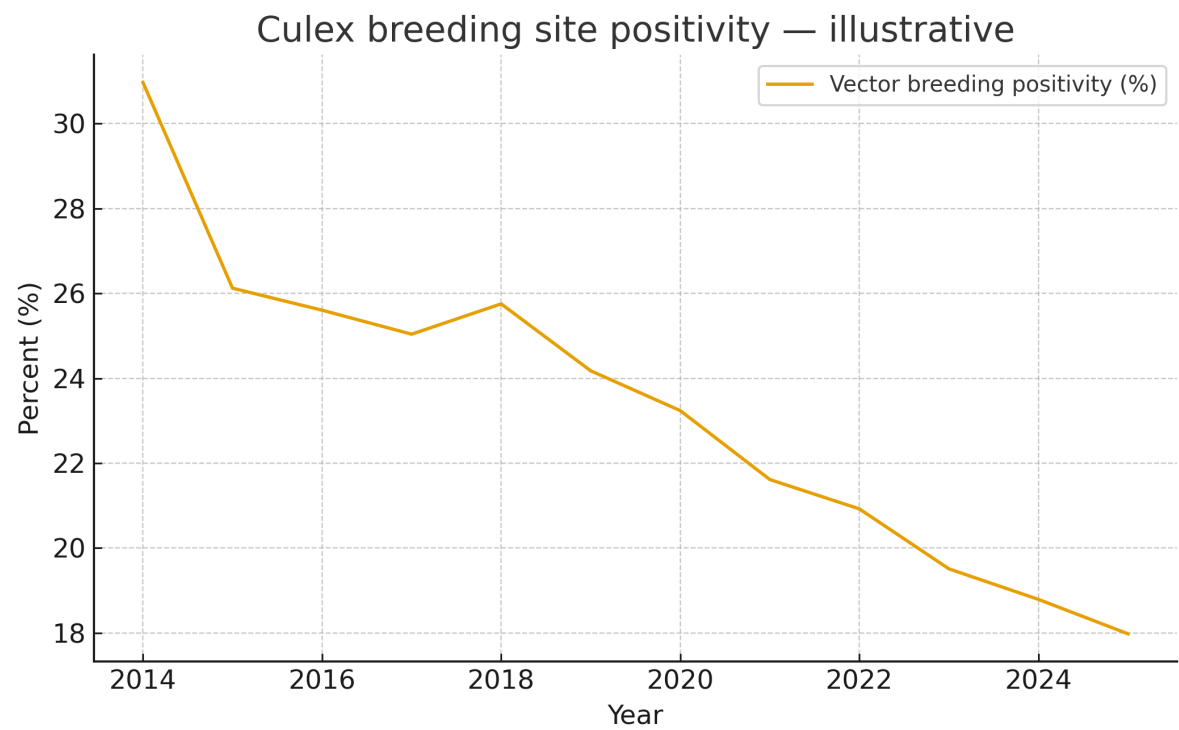


Figure . LF commodity stock-outs (illustrative)

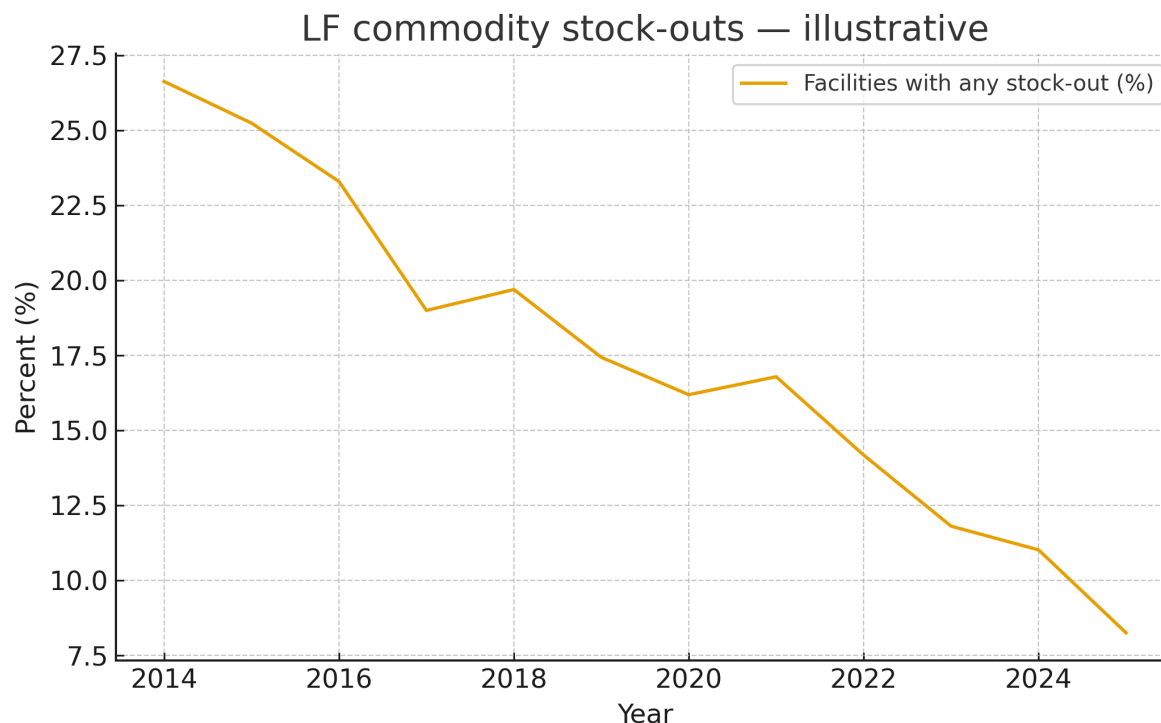


Table 13.6-A. Program architecture for LF elimination (Ethiopia)

Domain	Key elements
Strategy pillars	MDA to interrupt transmission; MMDP to reduce disability; surveillance to document elimination.
Drugs (MDA)	Ivermectin + albendazole (or DEC + albendazole where policy-relevant).
Delivery	Community-directed treatment; fixed & outreach posts; mop-up in low-coverage pockets.
Surveillance	Spot-check surveys, TAS (TAS-1/2/3), entomological monitoring where feasible.
Governance	National NTD program; regional/woreda implementation; partner coordination; DQA/coverage surveys.

Table 13.6-B. Case definitions & patient pathways

Definition/pathway	Operational summary
LF case — suspect	Limb swelling (lymphedema) or scrotal swelling (hydrocele) in resident of risk area; rule out other causes.
LF case — confirmed	Antigen test/ultrasound as available; clinical confirmation per guideline.
Patient pathway — lymphedema	Registration → education on limb care → supplies → morbidity clinic follow-up.
Patient pathway — hydrocele	Registration → surgical assessment → surgery → post-op care → follow-up.

Table 13.6-C. MDA micro-planning essentials

Component	Specification
Micro-plan inputs	Population by kebele; hard-to-reach mapping; prior coverage; adverse event plan.
Delivery tactics	House-to-house plus fixed posts; school platforms; evening/weekend shifts.
Supervision & QA	Daily team checklists; DOT logs; rapid coverage monitoring; independent survey.
Supply chain	Reverse logistics; buffer stock at woreda; monthly reconciliation.

Table 13.6-D. Morbidity Management & Disability Prevention (MMDP)

Domain	Operational notes
Service package	Limb hygiene kits; counseling; acute attack management; footwear; psychosocial support.
Hydrocele surgery	Surgical camps or routine services; safe anesthesia; IPC; outcomes tracking.
Referral network	Criteria and transport plans; designate centers for complications.

Monitoring	% registered receiving minimum package; backlog cleared; patient-reported outcomes.
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Table 13.6-E. Surveillance indicators & stopping decisions

Indicator	Definition/target
Coverage	Eligible population treated (target $\geq$ 65–80% as per policy).
TAS results	% EUs passing TAS-1/2/3; antigenaemia below threshold.
Post-MDA surveillance	Spot-check surveys; entomology; IDSR signals.
MMDP coverage	% registered patients receiving care; surgery completion.
Data quality	DQA results; reported vs surveyed coverage.

Table 13.6-F. Vector control & WASH linkages

Context	Priority actions
Urban/peri-urban Culex	Environmental management; targeted larviciding; community engagement.
Rural settings	Bednets (context-specific); source reduction around compounds.
Inter-program	Align with malaria/WASH/municipal services for joint campaigns.

Plain-language summary

Lymphatic filariasis can cause long-term limb swelling and scrotal swelling in men. It is spread by mosquitoes. Ethiopia aims to end transmission by giving preventive medicines for several years in at-risk districts and checking progress with special surveys. People already affected need steady care at clinics, including hygiene advice and surgery for hydrocele where needed. Keeping drug supplies steady, fixing low-coverage pockets, and improving the environment to reduce mosquito breeding will move the country toward elimination.

References — Section 13.6 (initial list)

- **Federal Ministry of Health (Ethiopia) — NTD & LF materials —**
<https://www.moh.gov.et/>
- **EPHI — NTD surveillance & laboratories —** <https://www.ephi.gov.et/>
- **WHO — Lymphatic Filariasis elimination program —** <https://www.who.int/health-topics/lymphatic-filariasis>
- **ESPEN/WHO AFRO — NTD data portal —** <https://espen.afro.who.int/>

13.8) Plague

This section summarizes Ethiopia-relevant plague readiness and response: burden and case-fatality trends, seasonality, rodent/flea indices, alert-to-action timeliness, and facility IPC readiness. Figures are illustrative and should be replaced with official IDSR/lab/One Health datasets before publication.

Figure . Plague burden — annual cases & CFR (illustrative)

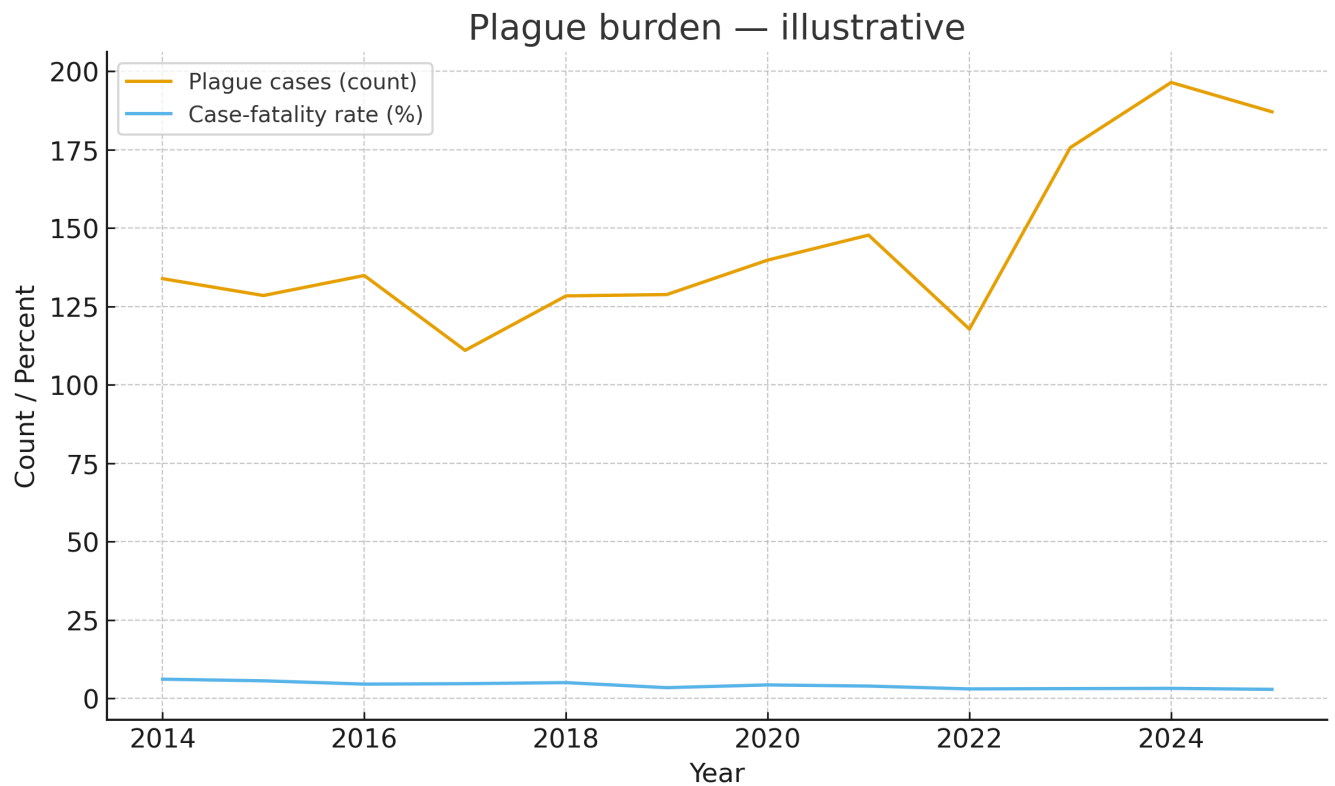


Figure . Seasonality index (illustrative)

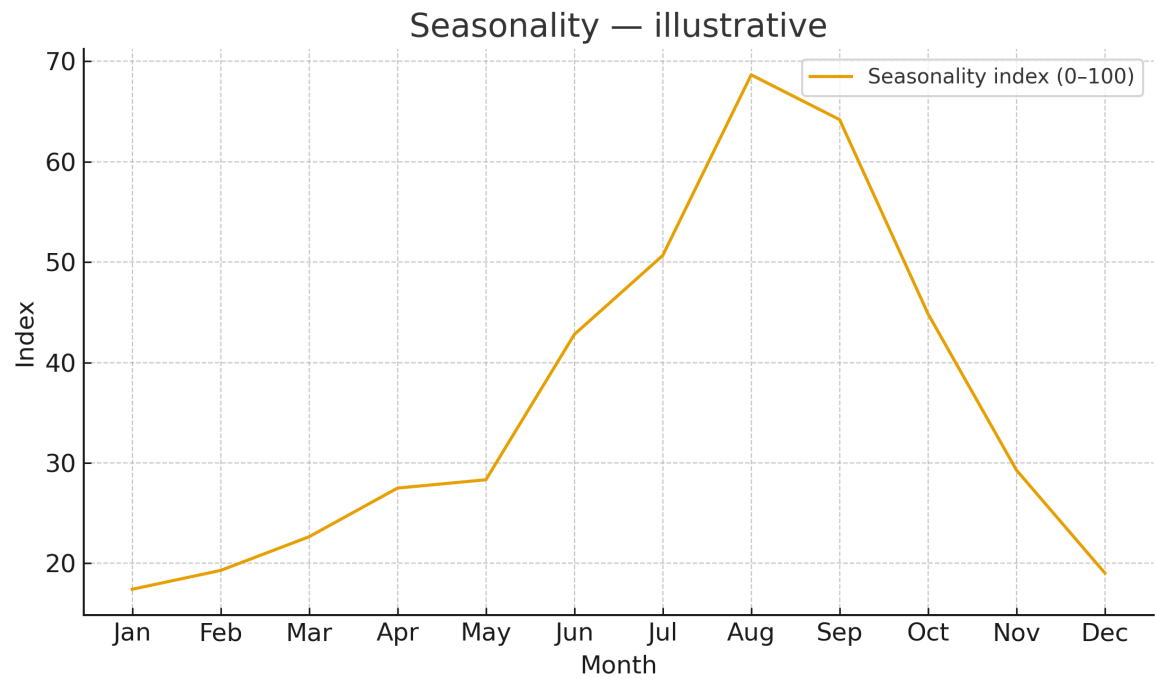


Figure 13.8-4. Alert-to-action timeliness (illustrative)

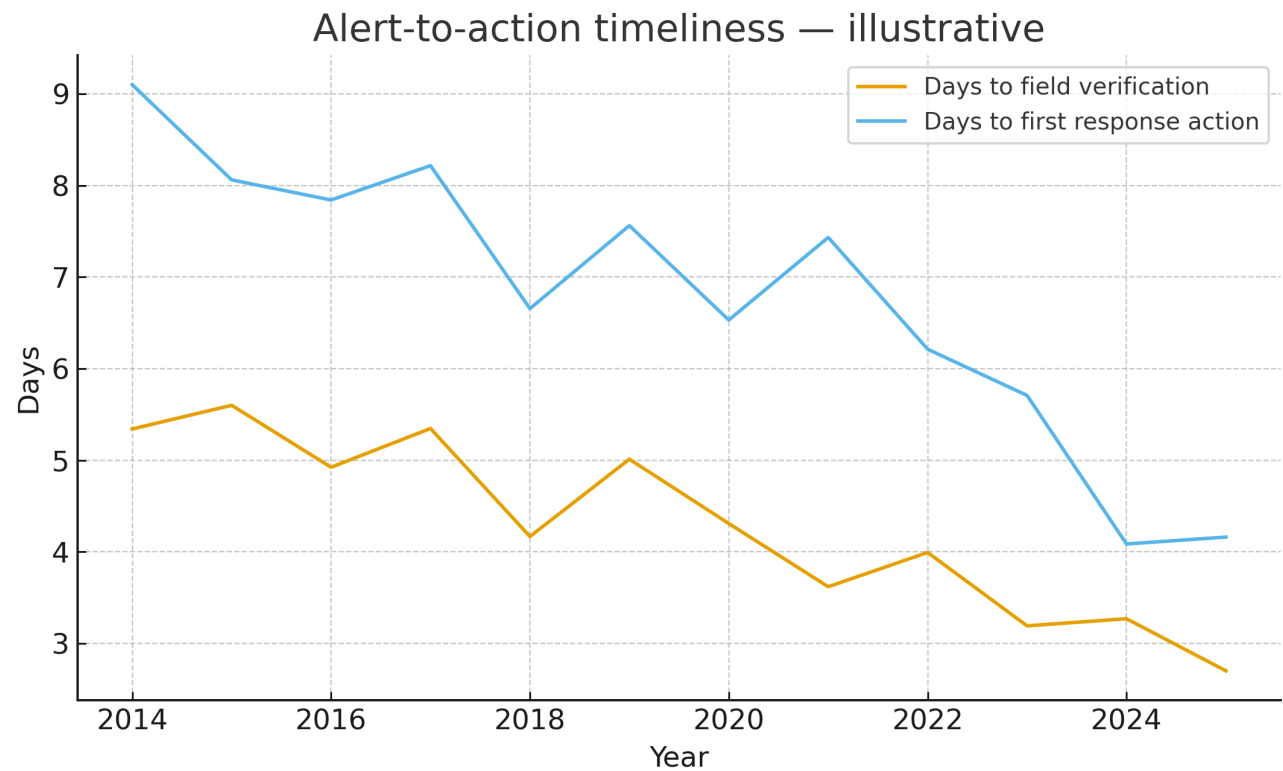


Figure . IPC readiness score (illustrative)

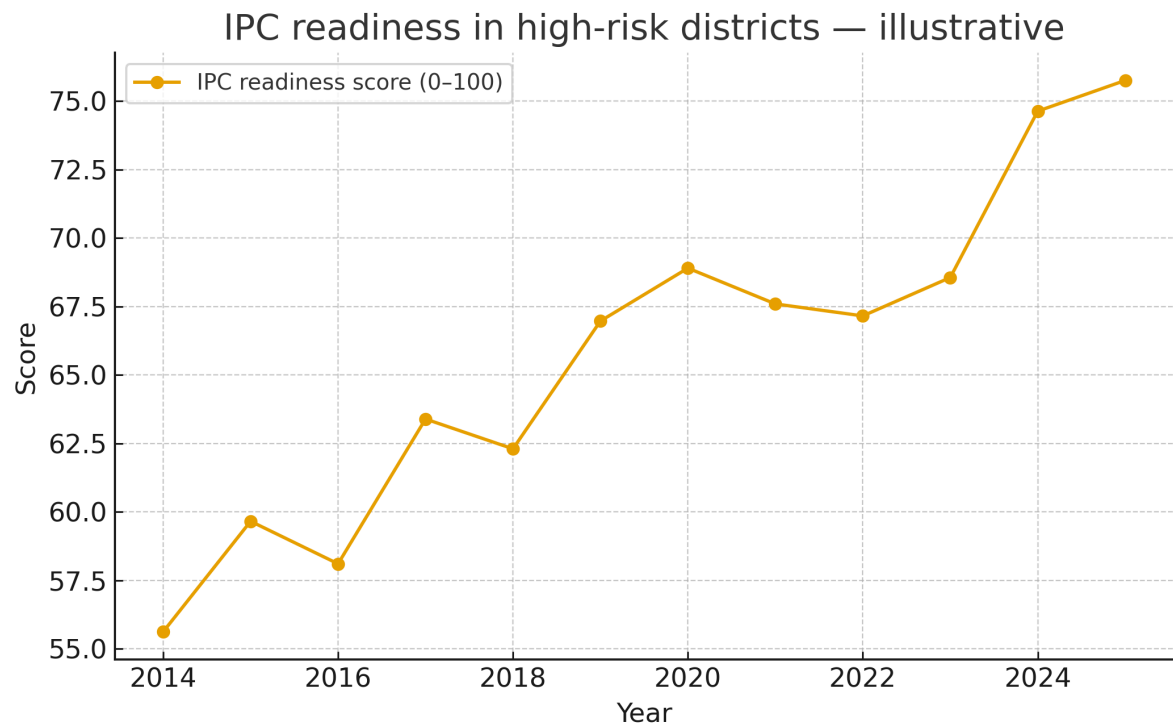


Table 13.8-A. Ecology & risk settings (Ethiopia focus)

Domain	Key points (Ethiopia context)
Reservoirs	Wild and domestic rodents (e.g., Rattus spp., Arvicanthis); occasional lagomorphs.
Vectors	Xenopsylla cheopis and related fleas; human ectoparasites implicated rarely in crowded settings.
High-risk zones	Highland foci with rodent die-offs; grain stores/markets; crowded or displaced settings.
Seasonality	Often rises following rainy months when rodent/flea dynamics shift; local variation.
Occupational/behavioral risks	Farmers, grain handlers, market workers; handling sick/dead rodents without protection.

Table 13.8-B. Clinical forms & case definitions (programmatic)

Form/definition	Operational summary
Bubonic plague	Painful swollen lymph nodes (buboes), fever; may progress to septicemic/pneumonic if untreated.
Pneumonic plague	Severe pneumonia with cough, bloody sputum, fever; person-to-person via droplets; requires rapid IPC.
Septicemic plague	Sepsis picture; DIC; can occur without buboes.
Suspected case	Compatible illness in risk area/season or epidemiologic link to rodents/fleas/patients.
Confirmed case	<i>Y. pestis</i> detected by RDT/culture/PCR or epidemiologic link to confirmed case.

Table 13.8-C. Laboratory & biosafety summary

Domain	Notes
Specimens	Bubo aspirate, blood, sputum (pneumonic); handle with biosafety precautions.
Point-of-care	RDTs where validated; confirm at reference lab (culture/PCR).
Biosafety	Appropriate PPE; transport SOPs; avoid aerosolization; lab tiers & referral network.
QA/QC	External proficiency panels; turnaround time monitoring.

Table 13.8-D. Rapid response checklist

Domain	Key actions
Coordination	Incident management; roles; partner roster; security & logistics.

Case management	Empiric antibiotics per guideline; oxygen support; referral criteria; cohorting of pneumonic cases.
IPC/triage	Respiratory isolation for suspected pneumonic plague; PPE; waste management; environmental cleaning.
Vector/rodent control	Insecticide for fleas before rodent control to avoid flea jump; rodent proofing of stores; safe carcass handling.
Risk communication	Simple messages on early care-seeking, avoiding rodents/fleas, and cough etiquette.
After-Action Review	AAR within 30 days; implement improvement plan.

Table 13.8-E. One Health signals & environmental intelligence

Source	What to watch & what to do
Animal health	Rodent die-offs; animal illnesses near households/markets; abattoir signals.
Environmental	Grain storage conditions; sanitation; solid-waste; rainfall anomalies.
Community intel	Rumor logs; HEW/school reports; hotspot mapping and micro-plans.

Table 13.8-F. Indicators for surveillance & response

Indicator	Definition/target
Timeliness — alert→verify	Median days (target ≤ 3)
Timeliness — verify→response	Median days (target ≤ 5)
Lab performance	# specimens tested; positivity; turnaround time; participation in QA
IPC readiness	Facilities meeting minimum standards; drills conducted

Rodent/flea indices	Trap success and flea index trends in sentinel districts
Clinical outcomes	CFR by form (bubonic, pneumonic) and facility readiness

Plain-language summary

Plague is a serious disease caused by a bacterium carried by fleas that live on rodents. In Ethiopia, some highland areas report cases from time to time. People can get sick after flea bites or when handling infected animals, and the lung form (pneumonic plague) can spread from person to person. The best protection is to act quickly when fevers and swollen lymph nodes appear in risk areas, use the right antibiotics, and apply infection-prevention steps, especially for suspected pneumonic cases. Reducing rat habitats near homes and grain stores, controlling fleas safely, and watching for unusual rodent deaths help prevent outbreaks. Working together across human health, animal health, and environmental services makes communities safer.

References — Section 13.8 (initial list; add Ethiopia-specific citations in later sections)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR resources —** <https://www.moh.gov.et/>
- **EPHI — Plague readiness & laboratory networks —** <https://www.ephi.gov.et/>
- **WHO — Plague fact sheets & guidance —** <https://www.who.int/health-topics/plague>
- **FAO — One Health & zoonoses resources —** <https://www.fao.org/one-health/>

13.9) Crimean-Congo Hemorrhagic Fever (CCHF)

This section distills Ethiopia-relevant CCHF content: burden and CFR trends, seasonality, occupational and regional risk, alert-to-action timeliness, facility readiness, case definitions and triage, laboratory algorithms, programmatic clinical notes, and RCCE. Figures are illustrative and should be replaced with official IDSR/lab/One Health datasets before publication.

Figure . CCHF burden — suspected/confirmed and CFR (illustrative)

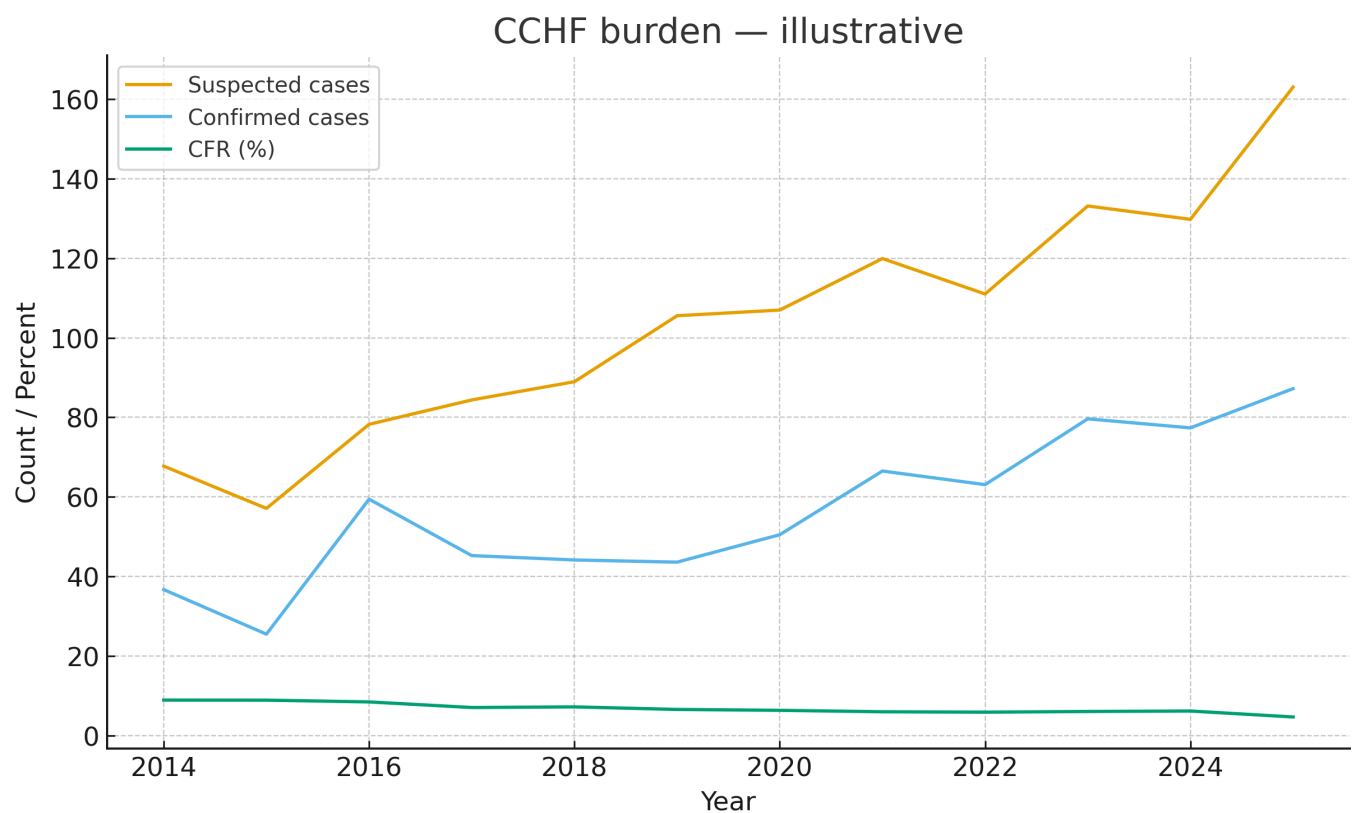


Figure . Seasonality index (illustrative)

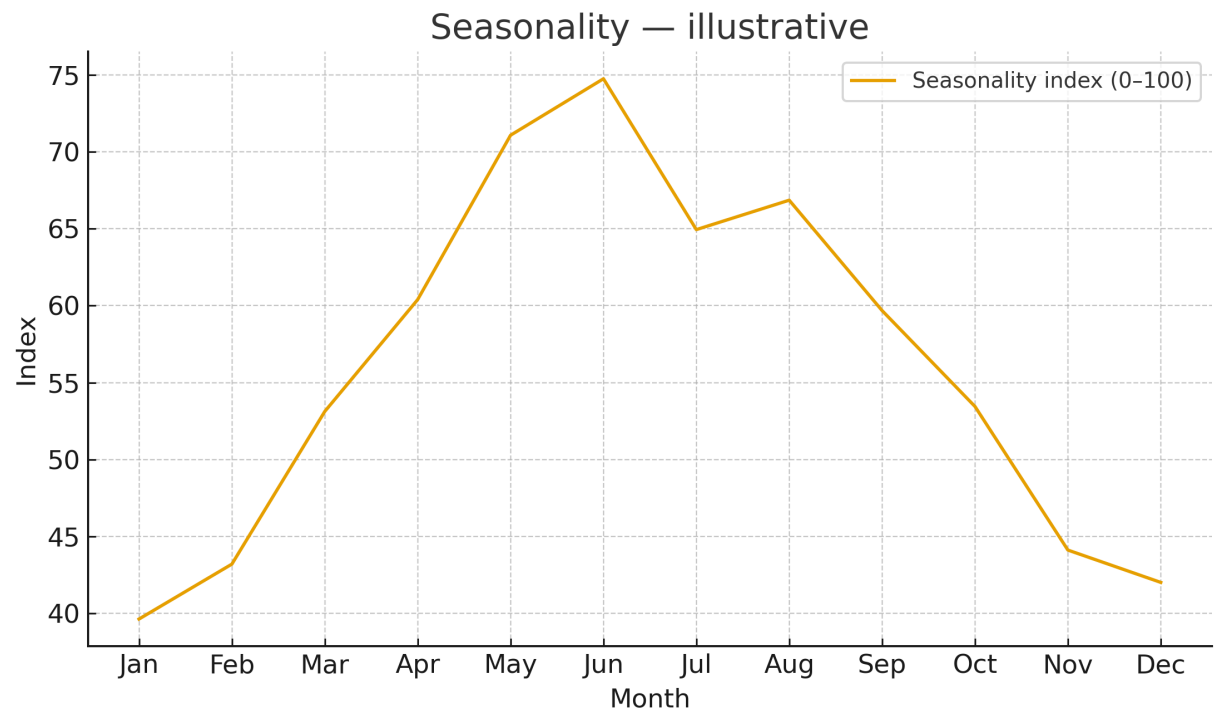


Figure . Probable exposure by occupation — illustrative (latest year)

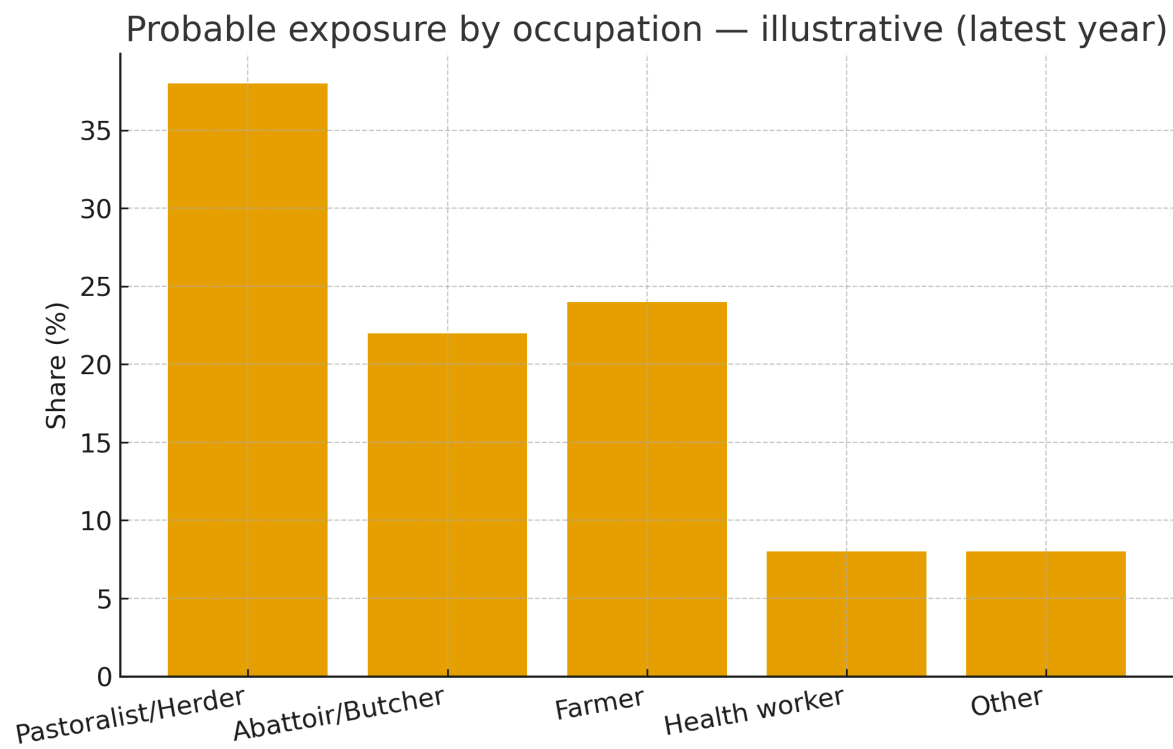


Figure . Alert-to-action timeliness (illustrative)

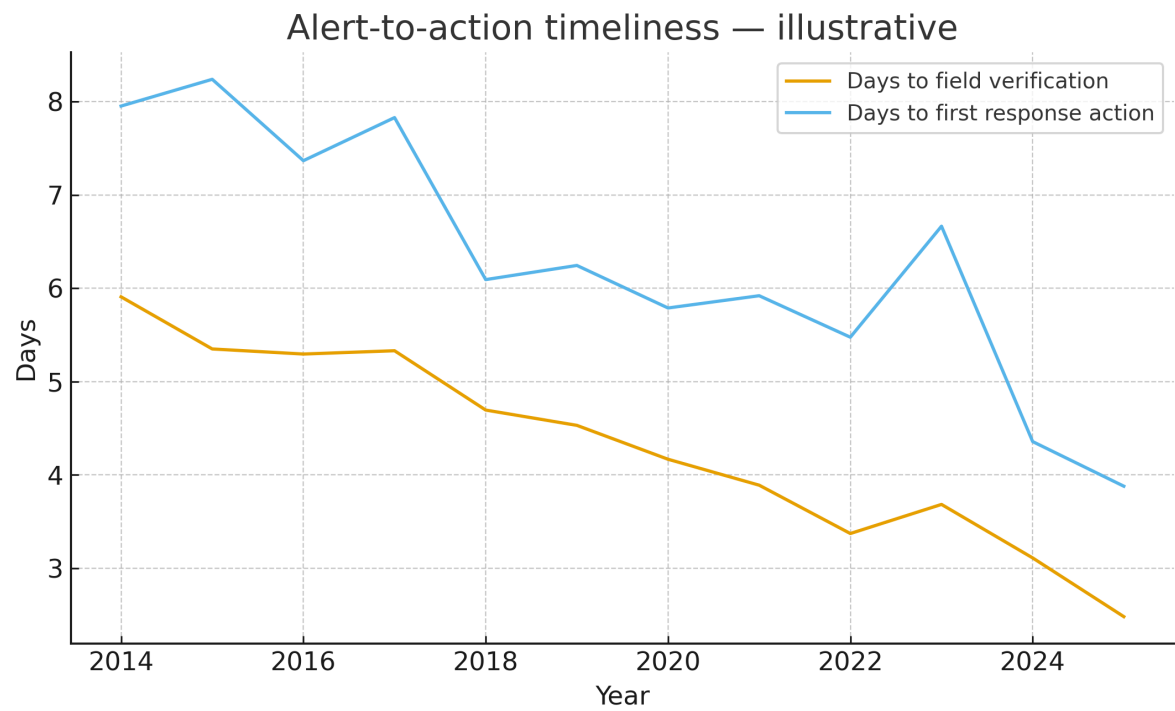


Figure . Facility readiness score (illustrative)

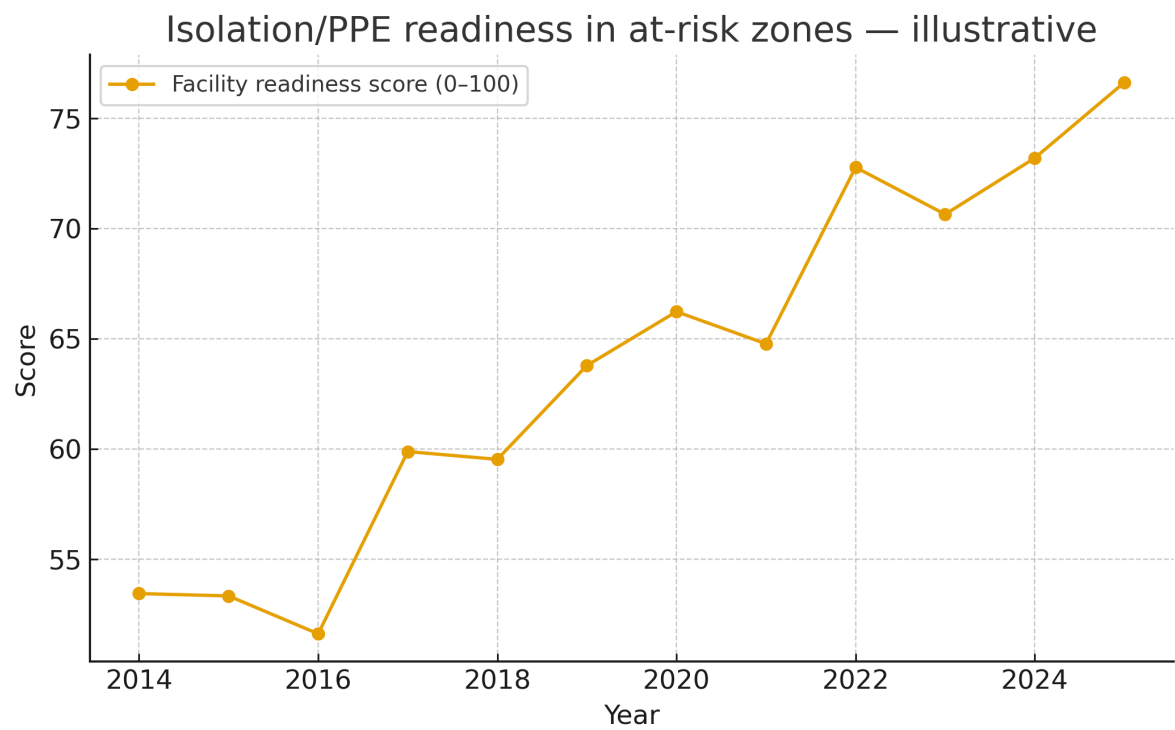


Table 13.9-A. Transmission ecology & risk settings

Domain	Key points (Ethiopia context)
Vectors/reservoirs	Hyalomma and related ticks; livestock (cattle, sheep, goats) as amplifiers; small mammals; birds in long-range dispersal.
Transmission to humans	Tick bites; crushing ticks with bare hands; slaughtering or handling infected animal tissues; healthcare exposure to blood/bodily fluids.
High-risk zones	Pastoralist belts; abattoirs/markets; border trade routes; drought-to-rain transition seasons.
Seasonality	Often higher during dry/early rainy seasons when ticks are more active and livestock movements increase.
One Health links	Joint signals from veterinary reports (animal abortions/hemorrhage), tick surveys, and human fever clusters.

Table 13.9-B. Case definitions & triage (programmatic)

Category	Operational summary
Suspected case	Acute fever ± myalgia, GI symptoms; bleeding tendencies or severe illness in risk season/area or after tick/livestock exposure.
Probable case	Suspected case with epidemiologic link to confirmed/probable case or high-risk exposure.
Confirmed case	RT-PCR/serology per lab algorithm.
Triage red flags	Bleeding, shock, jaundice, altered mental status; urgent isolation and IPC.

Table 13.9-C. Laboratory & biosafety summary

Domain	Notes
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Specimens	EDTA blood/serum; handle with biosafety; triple packaging; cold chain as indicated.
Testing	RT-PCR for acute cases; ELISA IgM/IgG for later phases; confirmatory algorithms.
Biosafety	Appropriate PPE; class II BSC; waste management; transport SOPs; exposure response plan.
QA/QC	Panels, external proficiency, and turnaround time monitoring.

Table 13.9-D. Clinical management — program notes

Domain	Program note
Supportive care	Early aggressive supportive care; fluids, hemodynamic support, transfusion as indicated.
Antivirals	Ribavirin policy varies by guideline; follow national guidance and WHO recommendations.
Infection prevention	Strict standard/contact precautions; droplet precautions with aerosol-generating procedures.
Referral	Pre-defined referral pathways to capable centers; ambulance IPC and cleaning protocols.

Table 13.9-E. RCCE audiences & key messages

Audience	Key messages
Pastoralist messaging	Tick avoidance, clothing, repellents; safe tick removal; avoid crushing ticks by hand.
Abattoir/market workers	Gloves, aprons, face/eye protection; cuts covered; hand hygiene; safe blade handling.

Households	Cook meat thoroughly; manage animal birthing with protection; early care-seeking for severe fever/bleeding.
Healthcare workers	PPE use; safe phlebotomy; waste management; post-exposure steps.

Table 13.9-F. Surveillance & response indicators

Indicator	Definition/target
Timeliness — alert→verify	Median days (target ≤ 3)
Timeliness — verify→response	Median days (target ≤ 5)
Lab performance	# specimens tested; positivity; turnaround time; QA participation
Facility readiness	% facilities meeting minimum isolation/PPE readiness in at-risk zones
Occupational exposure	Share of cases with documented occupational risk; use findings to tailor RCCE
Outcome	CFR among confirmed; days from onset to isolation

Plain-language summary

CCHF is a severe viral disease spread mainly by ticks and contact with animal blood. People at highest risk include herders, abattoir workers, and farmers, but anyone can be affected. The best protection is to prevent tick bites, wear protective clothing and gloves when handling animals, and make sure health facilities use protective equipment when caring for very sick patients. Programs should test suspected cases quickly, isolate early, and work with veterinary services to watch tick and animal signals. When alerts are verified and action starts within a few days, outbreaks can be limited and lives can be saved.

References — Section 13.9 (initial list; add Ethiopia-specific citations in later sections)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR resources —**
<https://www.moh.gov.et/>
- **EPHI — Viral hemorrhagic fevers & laboratory networks —**
<https://www.ephi.gov.et/>
- **WHO — Crimean-Congo haemorrhagic fever —** <https://www.who.int/health-topics/crimean-congo-haemorrhagic-fever>
- **FAO/WOAH — One Health CCHF resources —** <https://www.fao.org/one-health/>

13.10) Rift Valley Fever (RVF)

Figures are illustrative and should be replaced with official datasets prior to publication.

Figure . RVF — human suspected/confirmed & livestock outbreaks (illustrative)

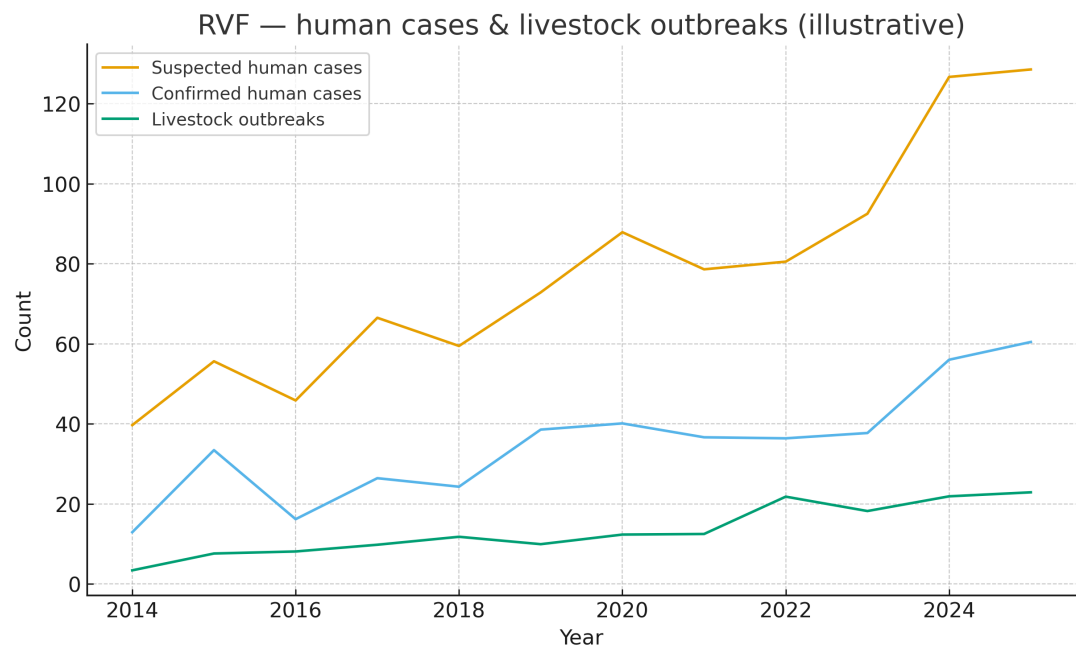


Figure . Environmental drivers — rainfall anomaly & vector index (illustrative)

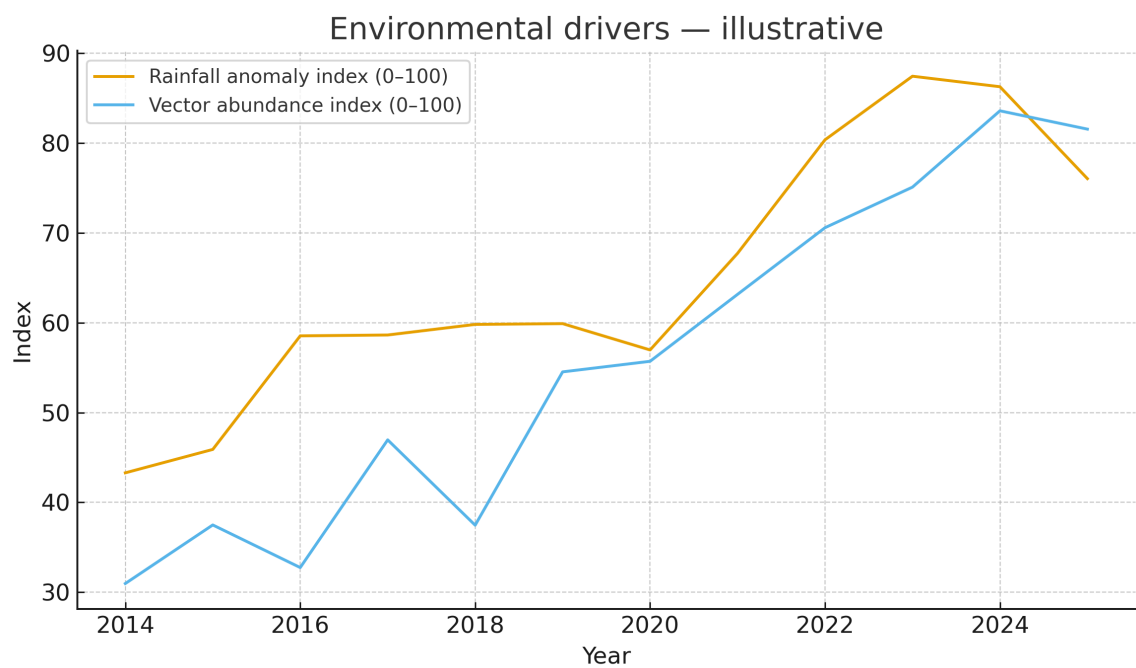


Figure . Seasonality index (illustrative)

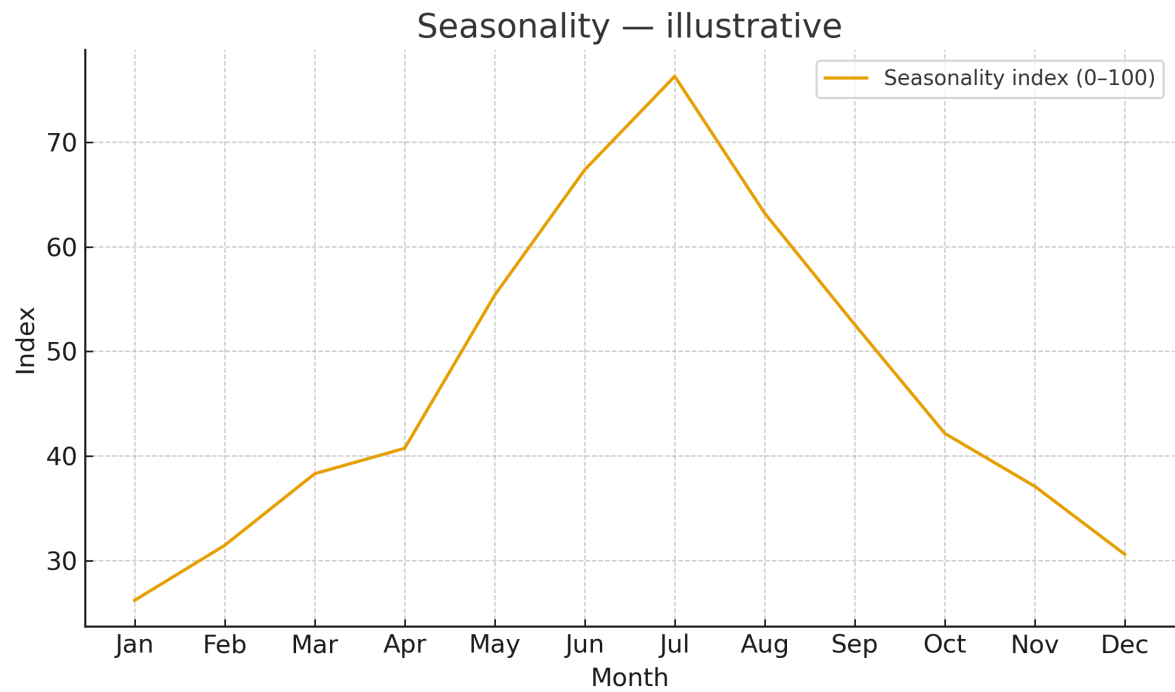


Figure . Facility readiness score (illustrative)

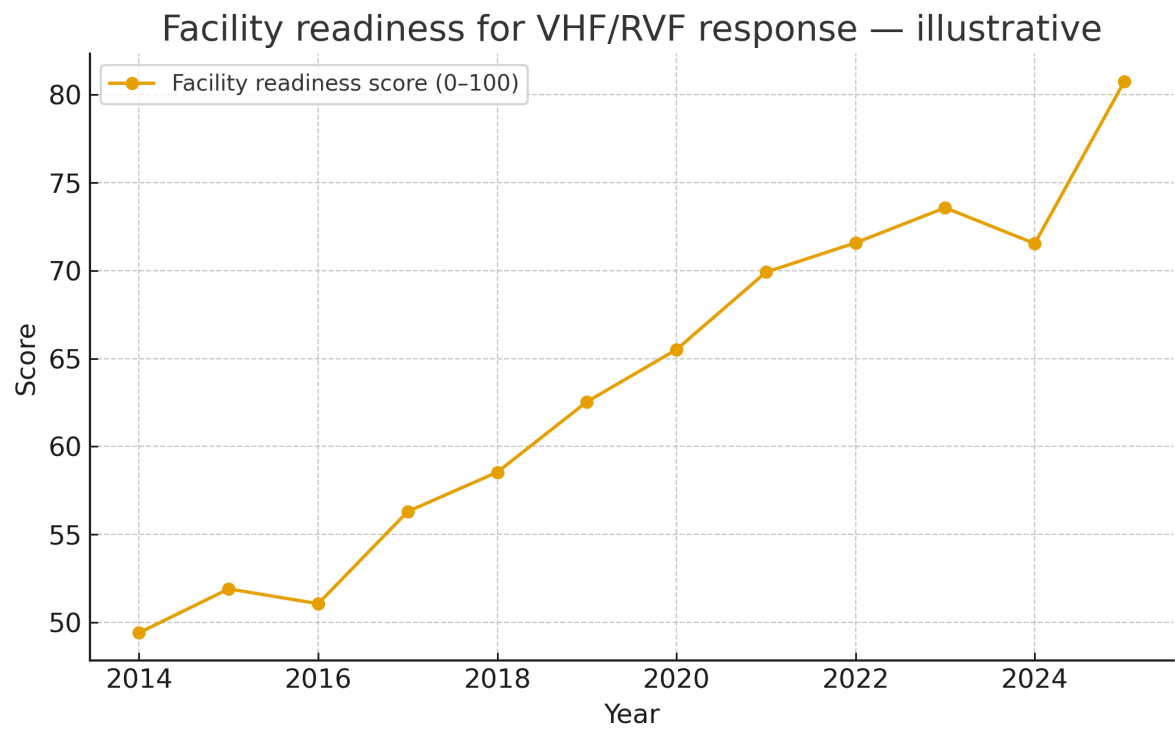


Table 13.10-A. Transmission ecology & risk settings

Domain	Key points (Ethiopia context)
Reservoirs/amplifiers	Domestic ruminants (sheep, cattle, goats, camels); wildlife in some settings.
Vectors	Floodwater Aedes and Culex species.
Human infection routes	Mosquito bites; contact with animal tissues/blood; aerosol in labs/abattoirs (rare).
High-risk zones	Pastoralist corridors, floodplains, irrigation schemes, market hubs.
One Health triggers	Livestock abortions, neonatal mortality, febrile hemorrhagic disease in animals.

Table 13.10-B. Case definitions & triage (programmatic)

Category	Operational summary
Suspected human case	Acute fever with severe myalgia/headache ± jaundice or bleeding; exposure to livestock/mosquitoes in risk area/season.
Probable human case	Suspected with epi link to confirmed/probable case or high-risk exposure.
Confirmed human case	RT-PCR/serology per algorithm.
Triage & IPC	Early isolation; PPE; safe phlebotomy; waste management; referral if severe.

Table 13.10-C. Laboratory & biosafety summary

Domain	Notes
Specimens	EDTA blood/serum; biosafety; triple packaging; transport SOPs.
Testing	RT-PCR for acute diagnosis; ELISA IgM/IgG later; confirmatory steps as needed.

Biosafety	PPE; class II BSC; waste streams; exposure response plan.
QA/QC	Panels, EQA participation, turnaround monitoring.

Table 13.10-D. Veterinary interventions & movement control

Intervention	Program notes
Livestock vaccination	Policy varies; coordinate with veterinary authorities.
Vector management	Larval source management after floods; targeted adult control.
Movement control	Temporary restrictions from affected areas; inspections at markets/abattoirs.
Abattoir biosecurity	PPE; stunning/bleeding protocols; waste handling; disinfection.

Table 13.10-E. RCCE audiences & key messages

Audience	Key messages
Pastoralists	Mosquito protection; avoid handling aborted fetuses without PPE; report animal events.
Farmers/traders	Gloves & eye protection when handling sick animals; manage standing water.
Households	Cook meat/milk thoroughly; avoid raw blood; seek care for severe fever.
Health workers	PPE; safe specimen handling; early isolation and notification.

Table 13.10-F. Surveillance & response indicators

Indicator	Definition/target
Timeliness — alert→verify	Median days (target ≤ 3)
Timeliness — verify→response	Median days (target ≤ 5)

Human surveillance	# suspected/confirmed; lab positivity; onset→isolation interval
Animal surveillance	Abortions/mortality; serology where feasible; vaccination coverage
Environmental	Rain/flood alerts; vector indices
Readiness	% facilities meeting minimum VHF readiness

Plain-language summary

Rift Valley fever is a virus that mostly affects animals but can also infect people. Heavy rains and flooding create many mosquitoes that spread the virus. People who work with animals are at higher risk, but simple steps—avoiding mosquito bites and wearing gloves and eye protection when handling animals—reduce danger. Health facilities should isolate suspected cases and send samples to the lab quickly, while veterinary teams manage animal health, vaccination policy, and movement. By watching weather alerts, tracking animal health signals, and acting early, communities can prevent large outbreaks.

References — Section 13.10 (initial list)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR resources —** <https://www.moh.gov.et/>
- **EPHI — VHF/RVF laboratory networks —** <https://www.ephi.gov.et/>
- **WHO — Rift Valley fever —** <https://www.who.int/health-topics/rift-valley-fever>
- **FAO/WOAH — RVF One Health resources —** <https://www.fao.org/one-health/>

13.11) Tick-Borne Relapsing Fever (TBRF)

This section distills Ethiopia-relevant TBRF content: burden and CFR trends, seasonality, housing/behavioral risk, regional risk proxy, microscopy positivity, and alert-to-action timeliness. Tables cover ecology and vectors, case definitions and diagnostics, clinical management notes, housing/vector control, and surveillance indicators. Figures are illustrative and should be replaced with official IDSR/lab/entomology/housing datasets before publication.

Figure . TBRF burden — suspected/confirmed & CFR (illustrative)

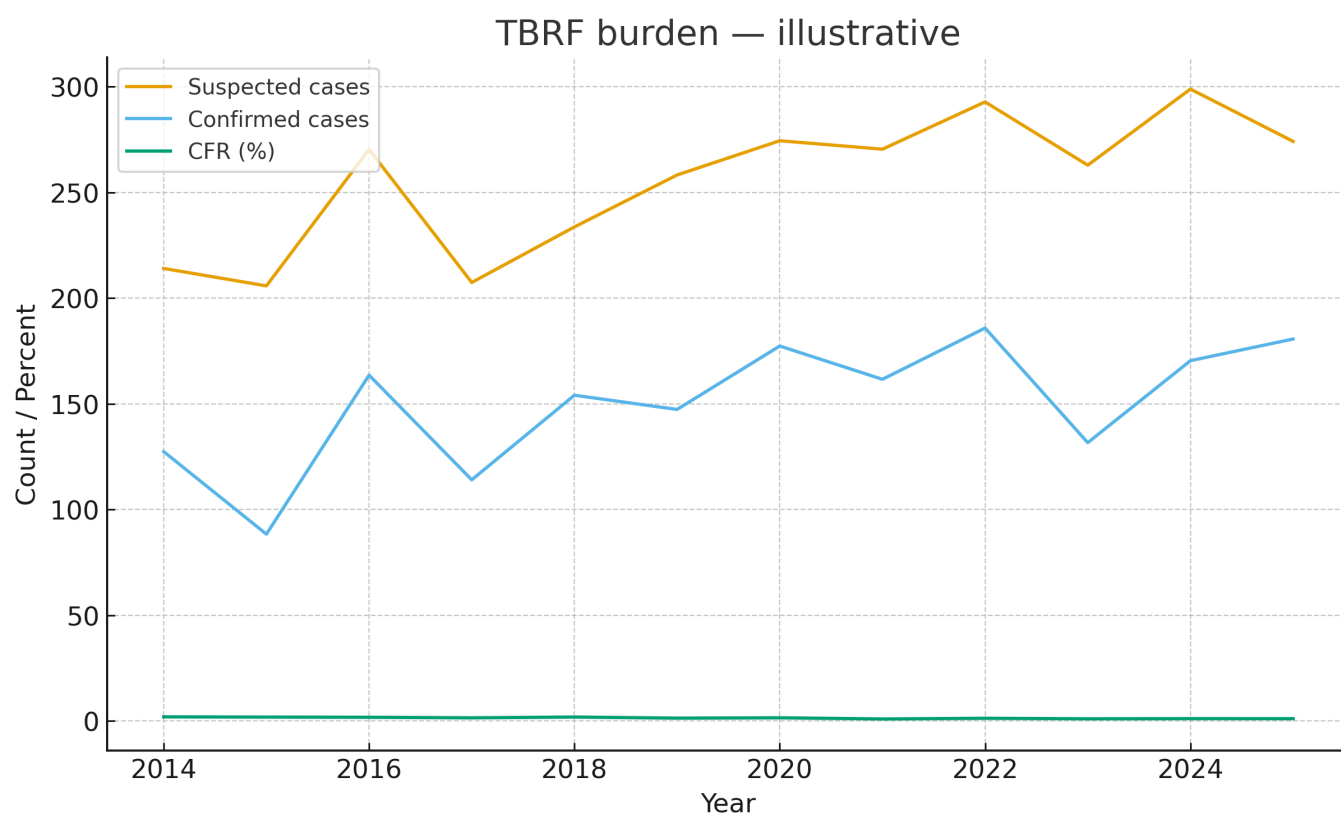


Figure . Seasonality index (illustrative)

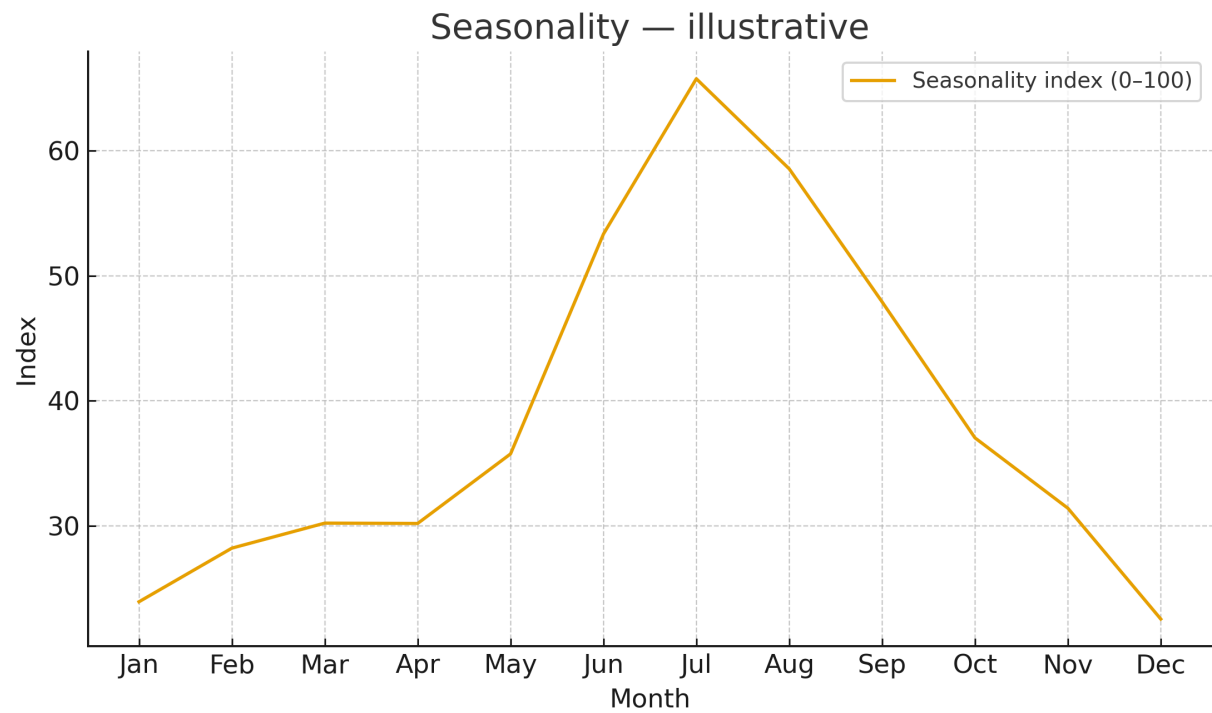


Figure . Housing/behavioral exposure trend (illustrative)

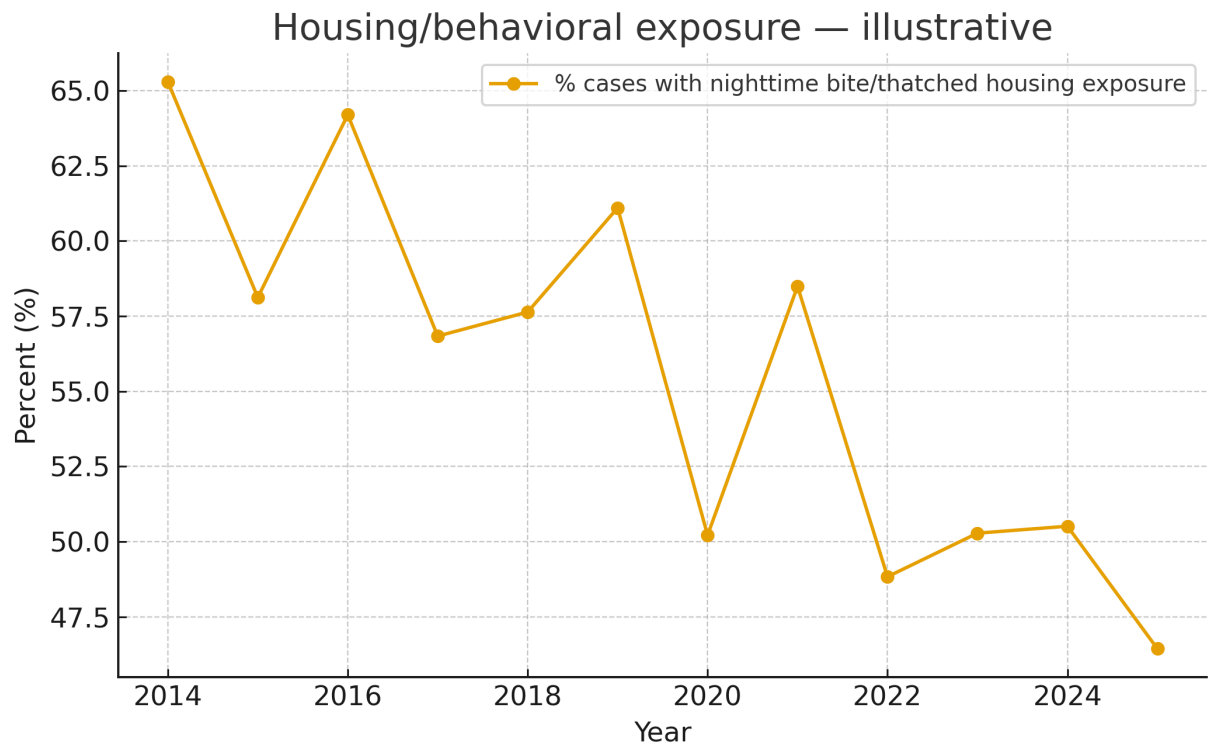


Figure . Microscopy positivity among suspected — illustrative

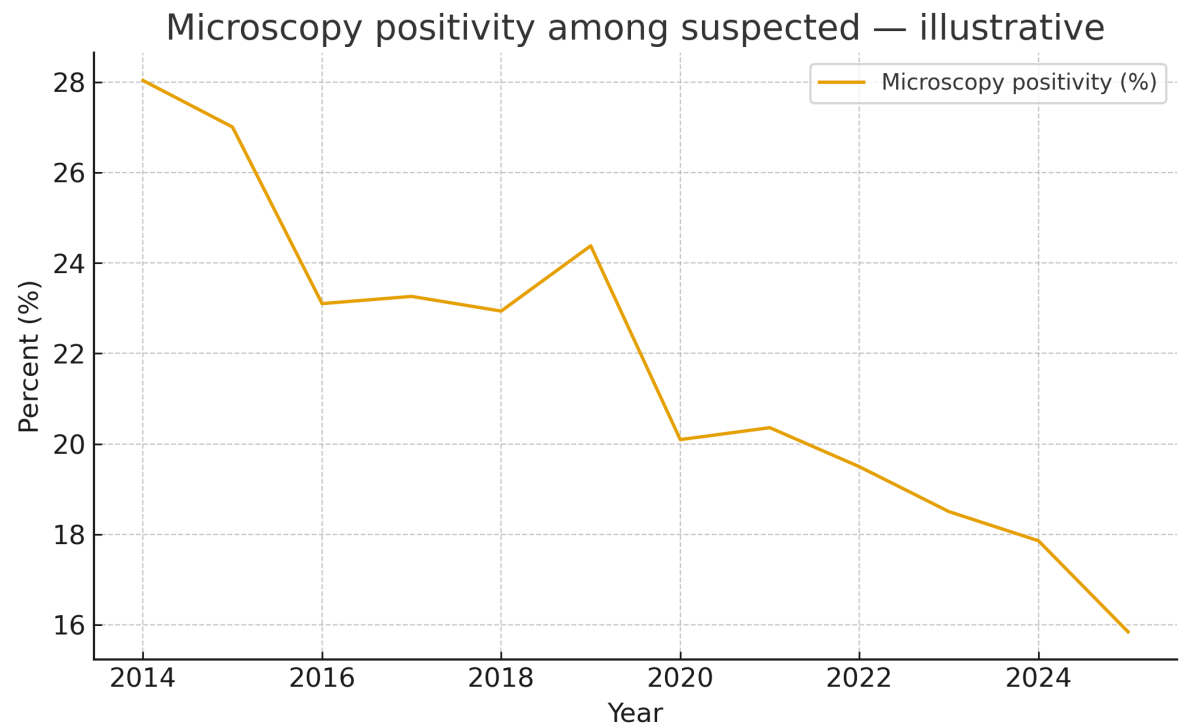


Figure . Alert-to-action timeliness (illustrative)

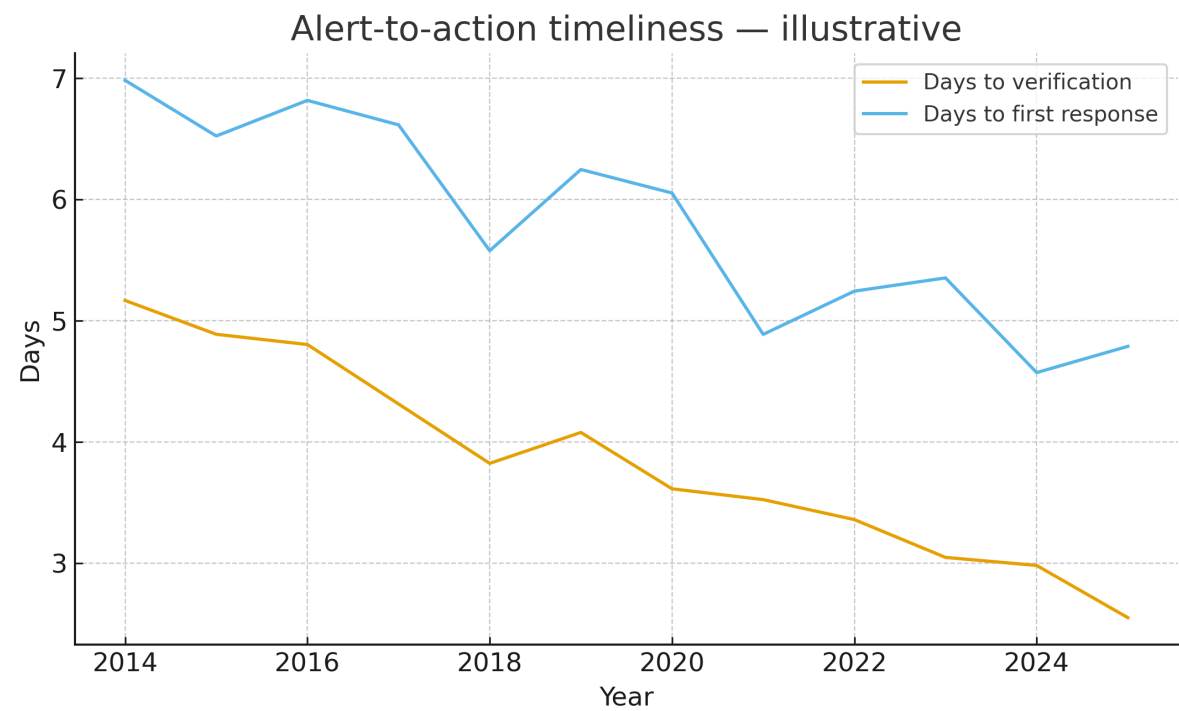


Table 13.11-A. Ecology, vectors & household risk (Ethiopia focus)

Domain	Key points (Ethiopia context)
Agent	Relapsing fever <i>Borrelia</i> (e.g., <i>B. duttonii</i>).
Vectors	Soft ticks (<i>Ornithodoros</i> spp.) living in wall/roof cracks and animal shelters; feed at night.
Settings at risk	Traditional mud/thatched housing; caves; animal shelters; displacement sites with poor housing.
Seasonality	Often rises after rains when rodent hosts and ticks proliferate; local variations.
One Health links	Rodent/small-mammal surveys; housing improvement programs; vector surveillance in shelters.

Table 13.11-B. Case definitions & diagnostic algorithms (programmatic)

Category	Operational summary
Suspected case	Acute undifferentiated fever with history of relapsing episodes or nocturnal tick exposure; in risk area.
Probable case	Suspected case with epidemiologic link to confirmed/probable case or household cluster.
Confirmed case	Visualization of spirochetes on microscopy during fever spike or PCR where available.
Differential diagnosis	Malaria, typhus, leptospirosis, sepsis; apply local fever algorithm.

Table 13.11-C. Diagnostics & biosafety summary

Domain	Notes
Microscopy	Thick/thin blood films or dark-field during fever spikes; repeat if initial negative.

PCR/serology	Where available; confirm species; handle with biosafety.
Specimen handling	Standard precautions; avoid needle-stick injuries; transport SOPs.
QA/QC	Blinded re-checks; external proficiency; turnaround time monitoring.

Table 13.11-D. Clinical management & public-health notes

Domain	Program note
Antimicrobials	National guideline regimens; anticipate Jarisch-Herxheimer reaction after first dose.
Supportive care	Fluids, antipyretics; referral if severe.
Public health	Treat household/close contacts per policy; health education; house improvement advice.

Table 13.11-E. Housing & vector control actions

Action area	Operational notes
Housing improvement	Plaster cracks, improve roofing; separate animal shelters; raise beds from floor.
Vector control	Targeted residual treatments in shelters/walls; rodent management; community engagement.
Behavioral	Sleeping off the ground, using bed nets/screens, avoiding sleeping in caves/unused huts.

Table 13.11-F. Surveillance & response indicators

Indicator	Definition/target
Timeliness — alert→verify	Median days (target ≤ 3)
Timeliness — verify→response	Median days (target ≤ 5)
Lab performance	# microscopy tests; positivity; re-check concordance; turnaround time

Housing risk	% cases from households with identifiable risk factors
Outcomes	CFR among confirmed; days from onset to first dose
Community engagement	# households reached with housing improvement messages

Plain-language summary

Tick-borne relapsing fever is caused by spiral-shaped bacteria spread by soft ticks that hide in traditional house walls and animal shelters. People are usually bitten at night. The illness brings high fever that returns after short breaks. It can be cured with antibiotics but needs careful monitoring for short-term reactions after the first dose. Communities can lower risk by sealing wall cracks, separating animal shelters from sleeping areas, and using bed nets or sleeping off the ground. Health programs should strengthen testing and act quickly when clusters appear, while also educating families about safer housing.

References — Section 13.11 (initial list)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR resources —** <https://www.moh.gov.et/>
- **EPHI — Zoonoses/Vector-borne diseases & laboratories —** <https://www.eph.gov.et/>
- **WHO — Relapsing fever overview —** <https://www.who.int/health-topics/relapsing-fever>
- **CDC — Tick-borne relapsing fever —** <https://www.cdc.gov/relapsing-fever/>

13.12) Dengue

This section synthesizes Ethiopia-relevant dengue program content: trends in suspected/confirmed cases and CFR, entomological and rainfall drivers, seasonality, urban risk patterns, facility readiness, case definitions and triage, diagnostics and surveillance, clinical management notes, vector control, and performance indicators. Figures are illustrative and should be replaced with official IDSR/lab/entomology datasets before publication.

Figure . Dengue burden — suspected/confirmed & CFR (illustrative)

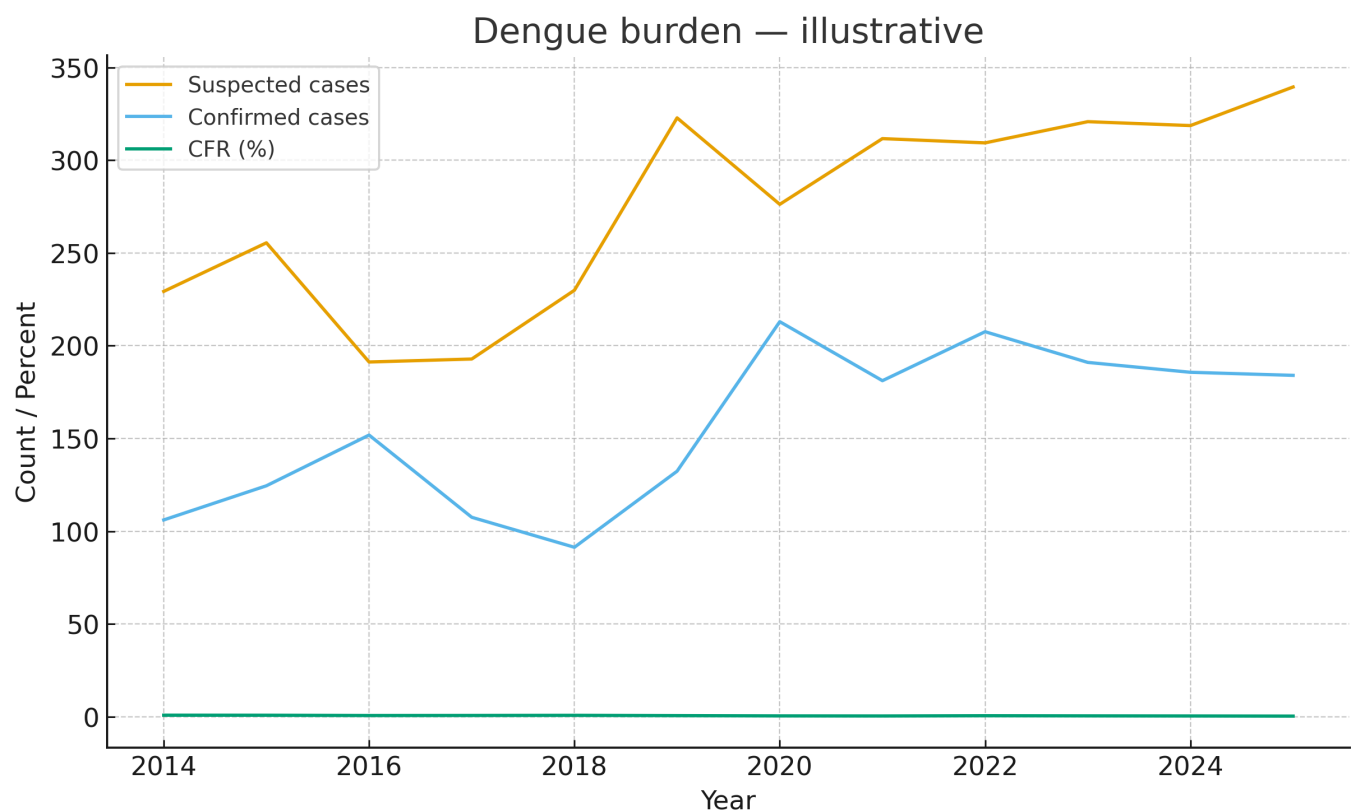


Figure . Entomology & environmental drivers (illustrative)

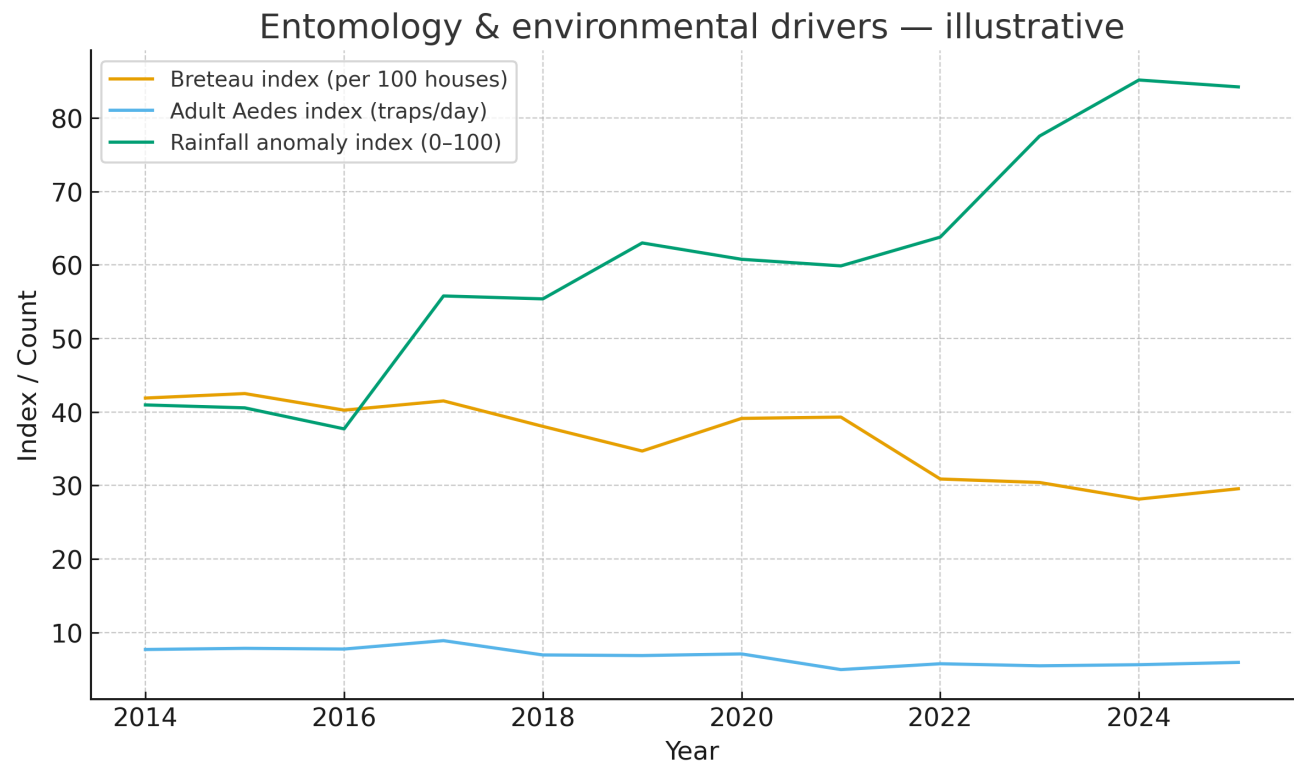


Figure . Seasonality index (illustrative)

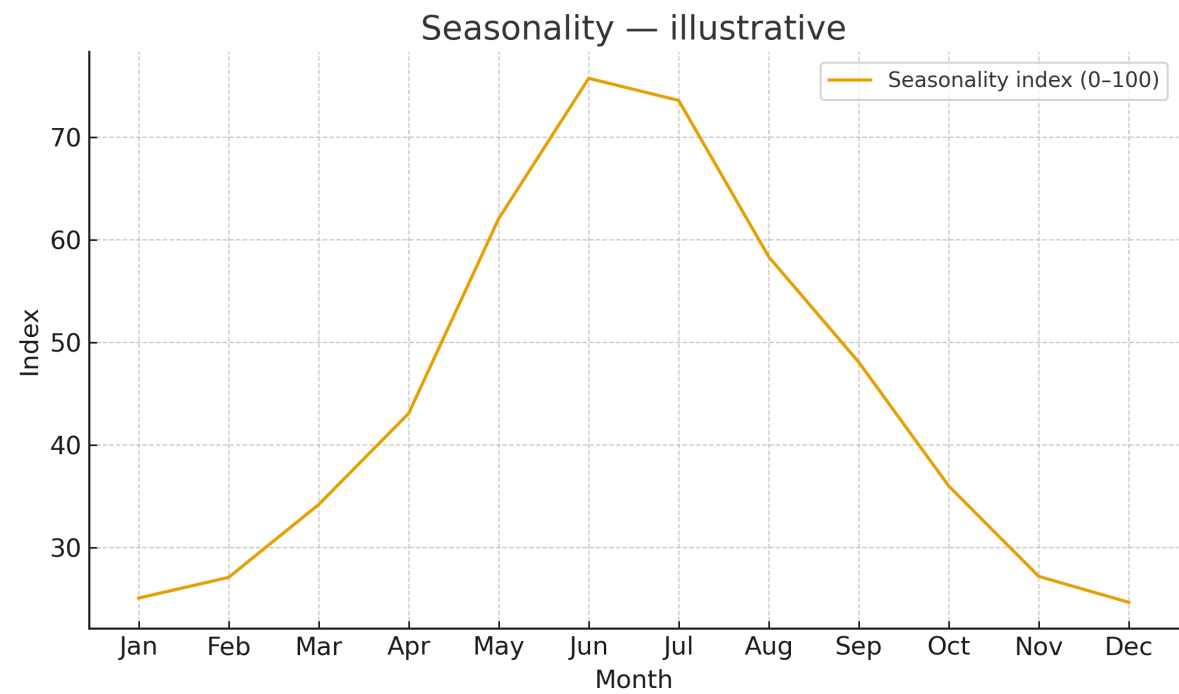


Figure . Facility readiness score for DHF/DSS (illustrative)

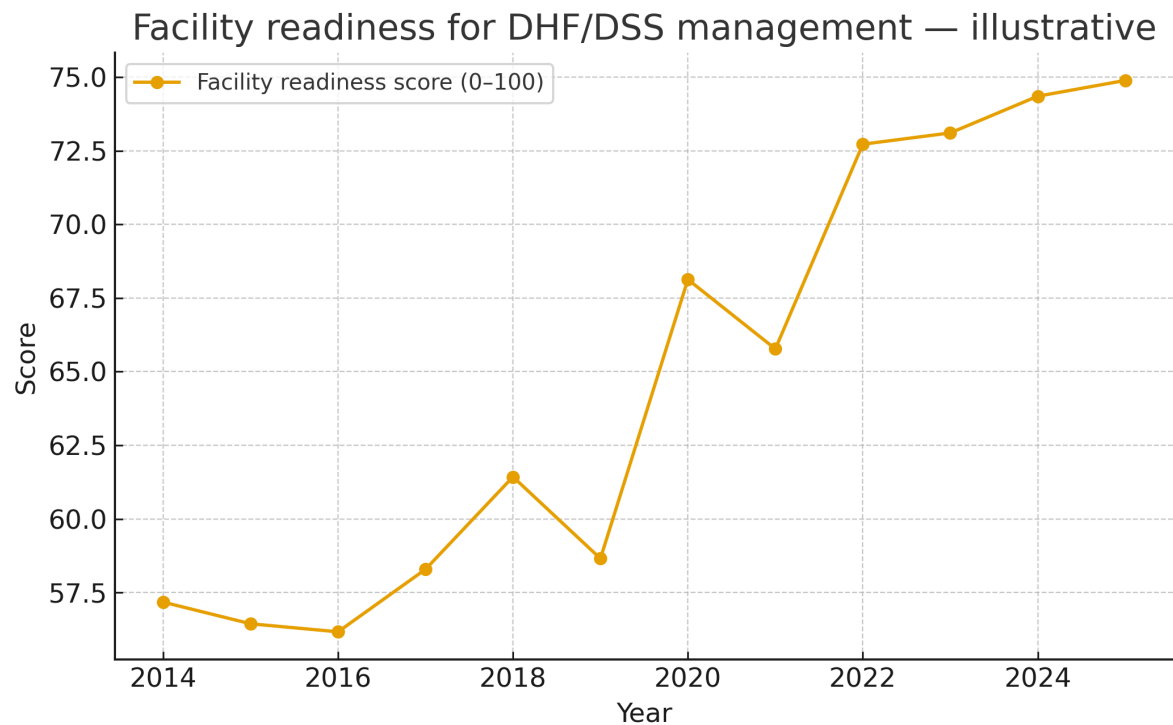


Table 13.12-A. Transmission ecology & urban risk (Ethiopia)

Domain	Key points (Ethiopia context)
Vectors	Aedes aegypti (urban/peri-urban) and Aedes albopictus (peri-urban/rural expansion).
Breeding sites	Containers: tires, buckets, tanks, flower pots; construction sites; clogged drains.
Human drivers	Urban growth, water storage practices, solid-waste accumulation, mobility.
Seasonality	Peaks during/after rains; micro-climate and water storage can sustain dry-season transmission.
One Health/urban links	Solid waste, water supply continuity, construction permitting, school/community action.

Table 13.12-B. Case definitions & triage (programmatic)

Category	Operational summary
Suspected dengue	Acute fever with ≥ 2 : headache, retro-orbital pain, myalgia/arthralgia, rash, leukopenia, nausea/vomiting.
Warning signs	Abdominal pain, persistent vomiting, mucosal bleed, lethargy/restlessness, hepatomegaly, rising HCT with falling platelets.
Severe dengue	Severe plasma leakage (shock/respiratory distress), severe bleeding, severe organ involvement.
Triage note	Early fluids for warning signs; avoid NSAIDs; escalate if shock or bleeding develops.

Table 13.12-C. Diagnostics & surveillance

Domain	Notes
RDTs	NS1 antigen and/or IgM/IgG; interpret by day of illness and prior infection.
PCR/ELISA	Confirmatory testing and serotype identification where available.
Lab safety	Standard precautions; sharps safety; sample transport SOPs.
Indicators	Test positivity, time onset→diagnosis, serotype shifts.

Table 13.12-D. Clinical management — program notes

Domain	Program note
Outpatient care	Oral rehydration; return precautions for warning signs.
Inpatient care	Judicious IV fluids guided by HCT/clinical response; monitor urine output; blood products if indicated.

Special groups	Pregnancy, infants, elderly, comorbidities; closer monitoring.
Pharmacovigilance	Avoid aspirin/NSAIDs; use acetaminophen for fever.

Table 13.12-E. Vector control & urban health actions

Action	Implementation notes
Source reduction	Weekly container emptying/covering; tire management; construction site inspections.
Larval control	Larvicides for non-drainable containers; biological control where feasible.
Adult control	Targeted space spraying during outbreaks; evaluate via adult indices.
Community engagement	School clean-up days; waste management campaigns; household checklists.

Table 13.12-F. Surveillance & response indicators

Indicator	Definition/target
Timeliness — alert→verify	Median days (target ≤ 3)
Timeliness — verify→response	Median days (target ≤ 5)
Case metrics	# suspected/confirmed; test positivity; hospitalization rate; CFR
Entomology	House index, Container index, Breteau index; adult trap counts
Readiness	% facilities with dengue care bundles (fluids, HCT, rapid tests)

Plain-language summary

Dengue is a viral disease spread by *Aedes* mosquitoes that often live near people and breed in small water containers. Most patients get fever, headache, and body aches. A small number develop dangerous dehydration or bleeding. Families can lower risk by getting rid of standing water around homes, keeping containers covered, and protecting against mosquito bites. Health centers should quickly check blood counts, give fluids when needed, and avoid pain medicines like aspirin that increase bleeding risk. Cities can help by improving waste collection, fixing drains, and organizing regular clean-up campaigns.

References — Section 13.12 (initial list; add Ethiopia-specific citations in later sections)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR resources —**
<https://www.moh.gov.et/>
- **EPHI — Arboviruses & laboratory networks —** <https://www.ephi.gov.et/>
- **WHO — Dengue and severe dengue —** <https://www.who.int/health-topics/dengue-and-severe-dengue>
- **PAHO/WHO — Dengue guidelines & entomology indicators —**
<https://www.paho.org/en/topics/dengue>

13.13) Scrub Typhus & Other Rickettsioses

Figures are illustrative and should be replaced with official datasets prior to publication.

Figure . Burden — suspected/confirmed & CFR (illustrative)

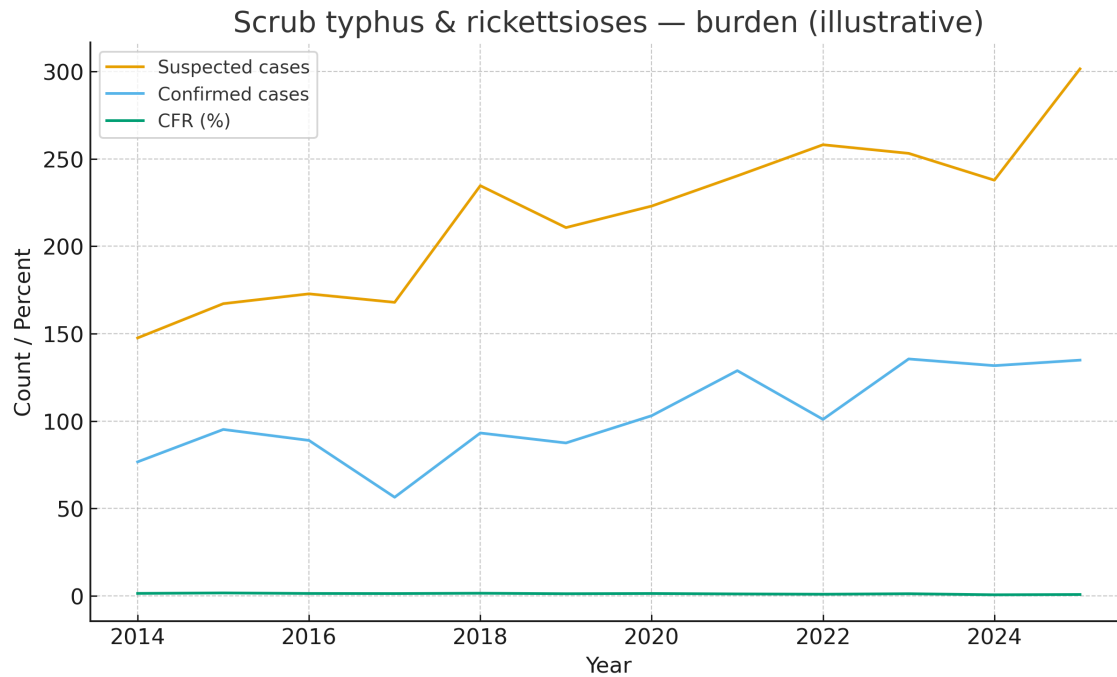


Figure . Seasonality index (illustrative)

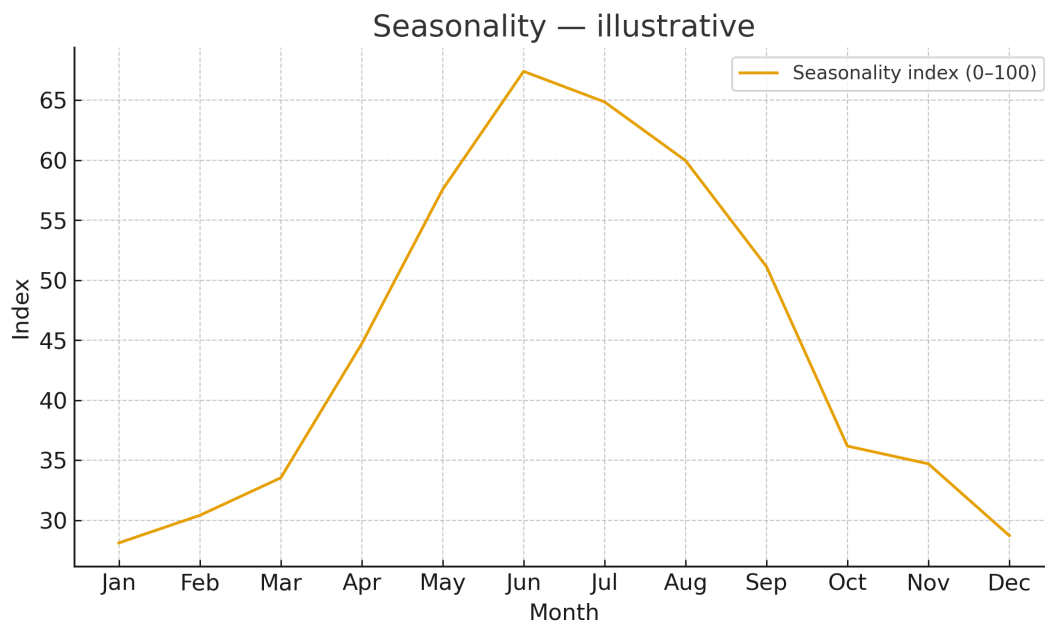


Figure . Exposure profile — illustrative (latest year)

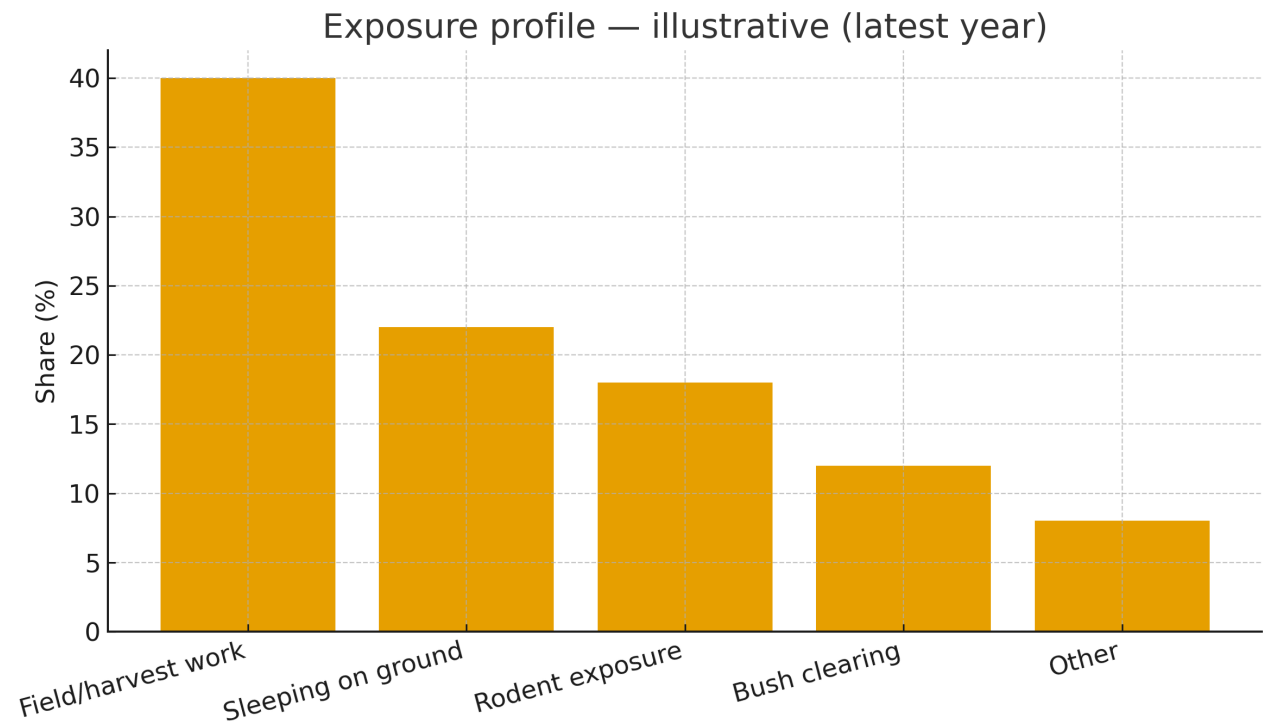


Figure 13.13-5. Diagnostics positivity & facility readiness — illustrative

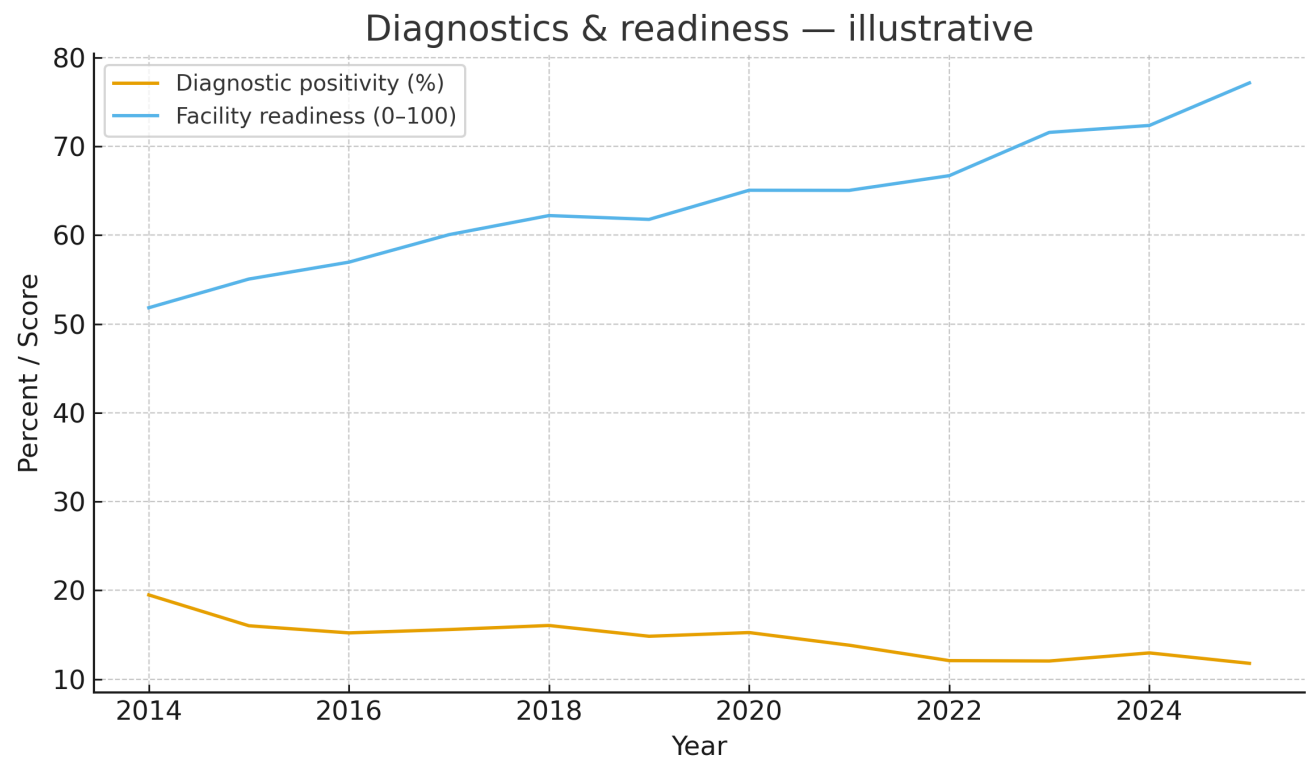


Figure . Alert-to-action timeliness — illustrative

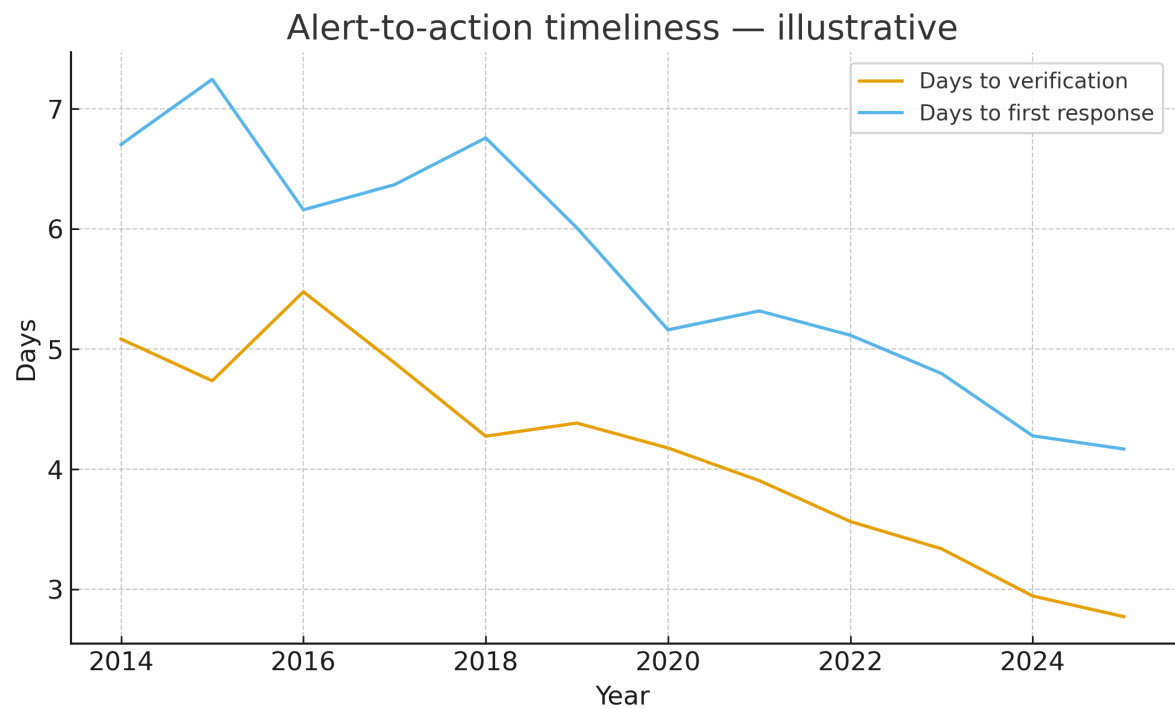


Table 13.13-A. Etiology, vectors & reservoirs

Domain	Key points
Pathogens	<i>Orientia tsutsugamushi</i> ; <i>Rickettsia</i> spp.
Vectors	Chigger mites; ticks/fleas/lice
Reservoirs	Rodents/small mammals; various animals for rickettsiae
Risk settings	Fields, bush, harvest, crowded/poor housing (louse-borne)

Table 13.13-B. Case definitions & clinical features (programmatic)

Category	Operational summary
Suspected	Undifferentiated fever ± eschar/rash; exposure history
Probable	Suspected + epi link or typical eschar/rash

Confirmed	PCR or paired serology; validated RDTs where available
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Table 13.13-C. Diagnostics & biosafety summary

Domain	Notes
RDTs	Interpret by day of illness; cross-reactivity possible
PCR/ELISA/IFA	Confirmatory/typing where available
Specimen handling	Standard precautions; triple packaging; transport SOPs

Table 13.13-D. Clinical management — program notes

Domain	Program note
First-line	Doxycycline per guideline; alternatives for pregnancy/children per policy
Supportive	Fluids, antipyretics; escalate if organ involvement
Differentials	Malaria, typhoid, leptospirosis, TBRF, sepsis

Table 13.13-E. Vector/behavioral prevention actions

Action area	Operational notes
Personal	Avoid sitting/sleeping on ground; repellents; long clothing; wash after field work
Environmental	Clear vegetation; manage rodents; improve housing
Occupational	Protective clothing during harvest/bush-clearing; HEW messaging

Table 13.13-F. Surveillance & response indicators

Indicator	Definition/target
Timeliness — alert→verify	Median days (target ≤ 3)

Timeliness — verify→response	Median days (target ≤ 5)
Diagnostics	# tested; positivity; turnaround; stock-outs
Case management	% starting doxycycline within 24 hours when suspected
Outcomes	CFR; days onset→diagnosis
Community engagement	# households reached in peak months

Plain-language summary

Scrub typhus and related infections can present like many common fevers. A small black scab (“eschar”) at the bite site is a helpful clue when present. Most patients recover quickly when treated early with the right antibiotic. Farm work, sleeping on the ground, and thick vegetation near houses can raise risk. Simple steps—avoiding bare-ground sleeping, wearing long clothing in fields, clearing brush, and managing rodents—reduce exposure. Clinics should consider these infections in fever algorithms, start treatment promptly when suspected, and record cases carefully to see patterns over time.

References — Section 13.13 (initial list)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR resources —**
<https://www.moh.gov.et/>
- **EPI — Zoonoses/Vector-borne diseases & laboratories —**
<https://www.epi.gov.et/>
- **WHO — Rickettsial diseases overview —** <https://www.who.int/health-topics/rickettsial-diseases>
- **CDC — Scrub typhus & rickettsial diseases —**
<https://www.cdc.gov/typhus/scrub/index.html>

13.14) Rift-Valley–like Febrile Illness Clusters (Syndromic Hotspots)

This section outlines how Ethiopia can detect and manage clusters of “Rift-Valley–like” febrile illness when the cause is not yet known. We track how many clusters are investigated, how often an etiology is found, the likely environmental drivers (rain/flood indices), seasonality, regional hotspots, and timeliness from alert to action. Figures are illustrative and should be replaced with official IDSR/laboratory/One Health datasets before publication.

Figure . Clusters investigated per year — illustrative

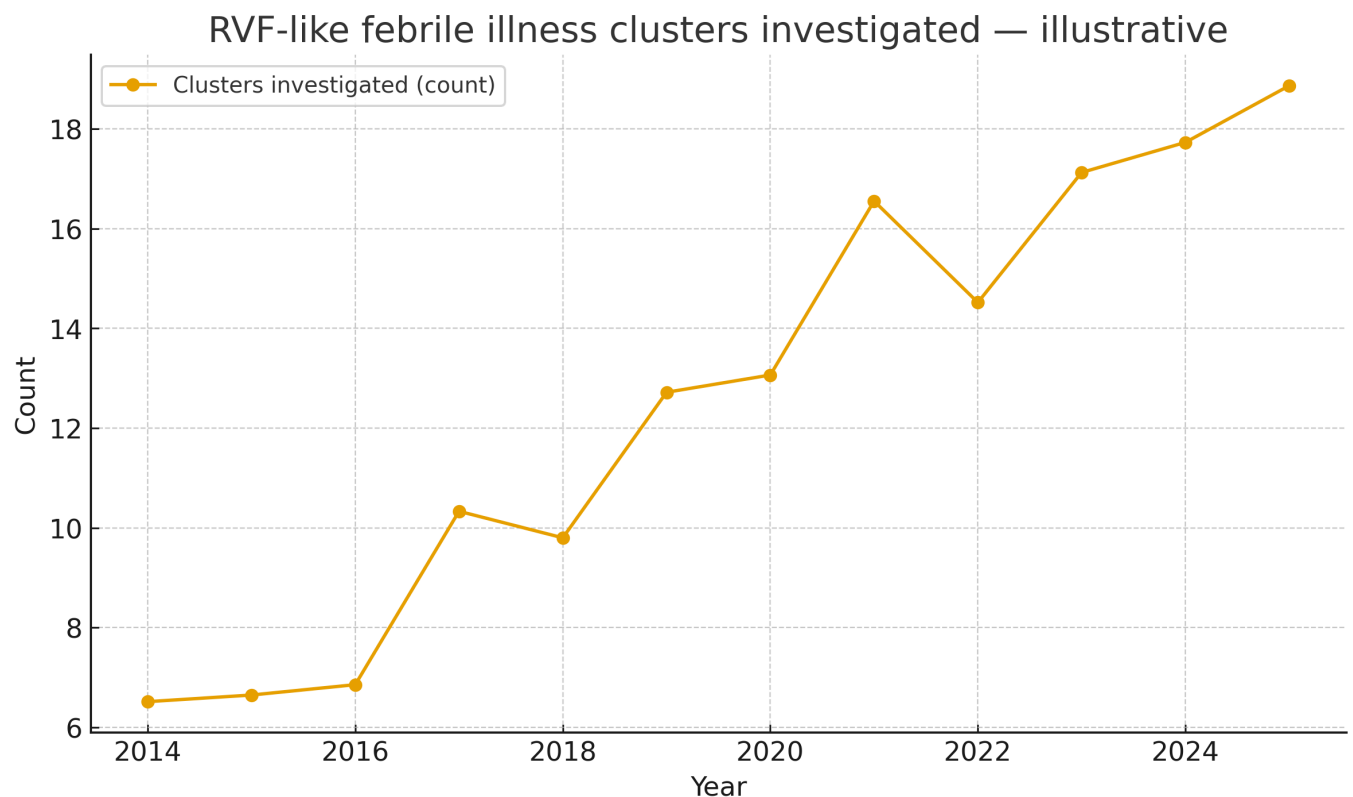


Figure . Etiologic classification shares — illustrative

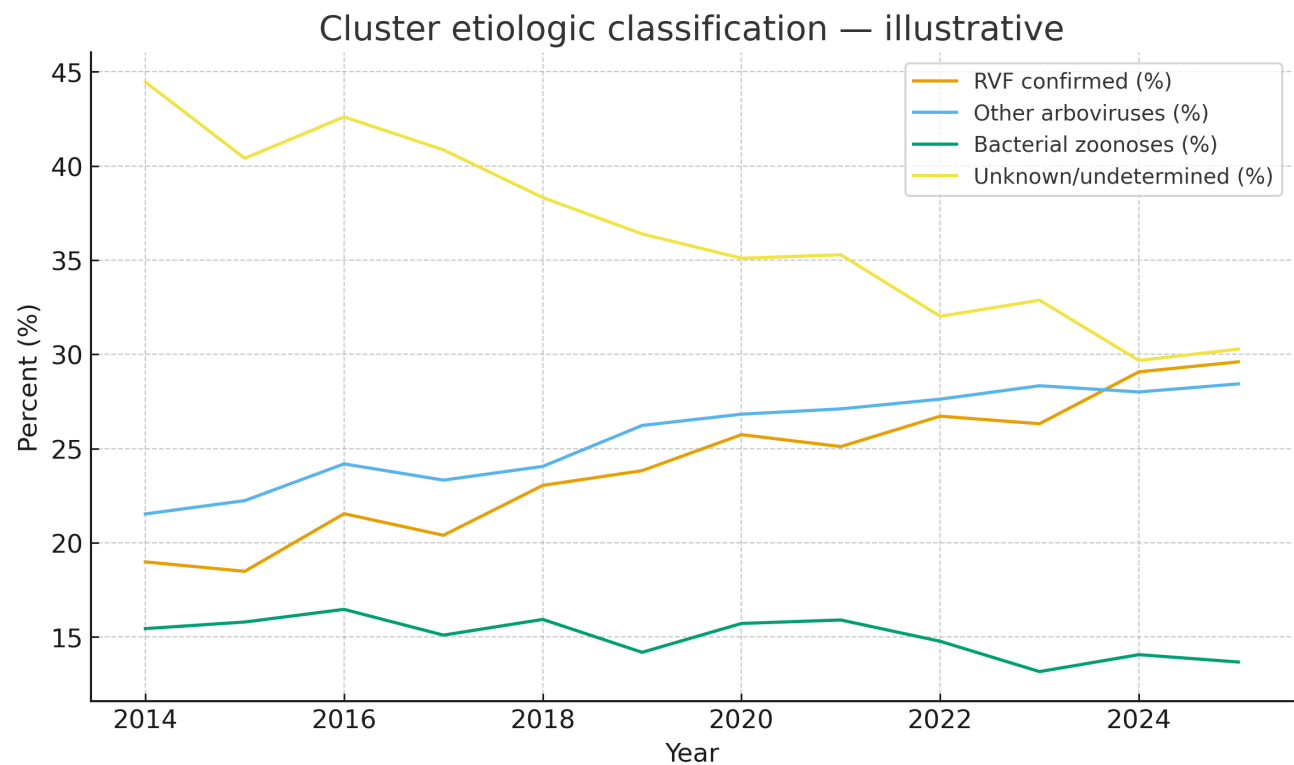


Figure . Environmental drivers — rainfall & flood indices — illustrative

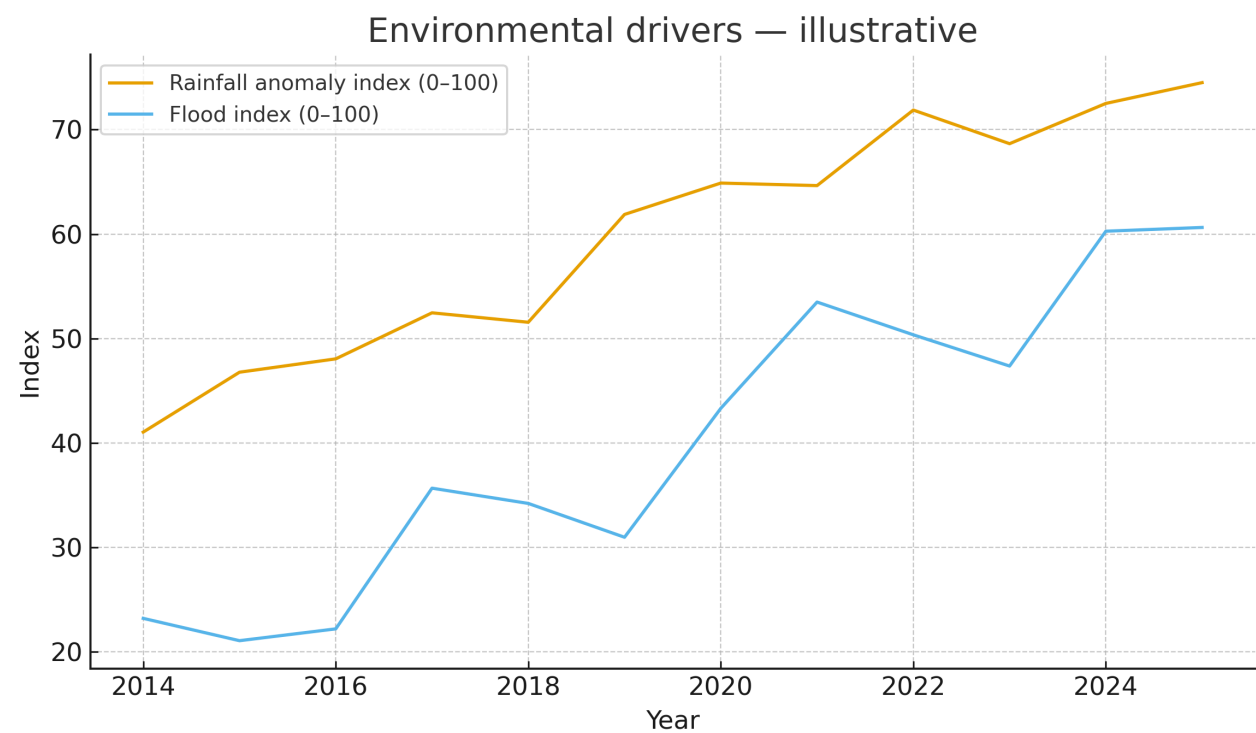


Figure . Seasonality index — illustrative

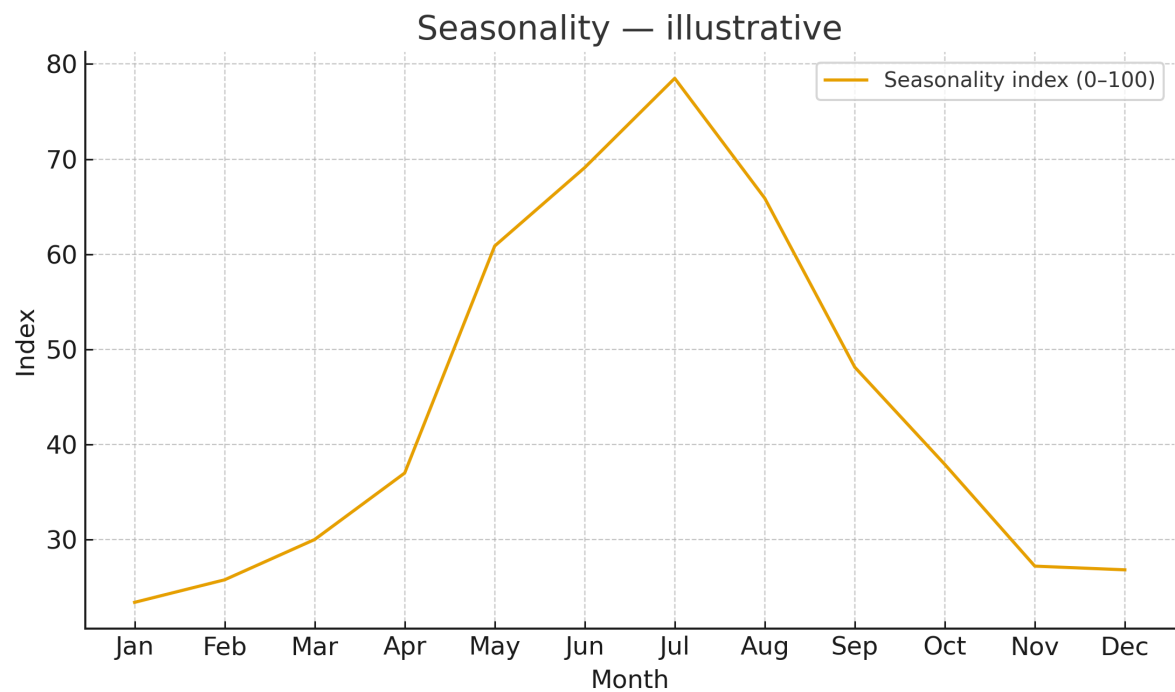


Figure . Alert-to-action timeliness — illustrative

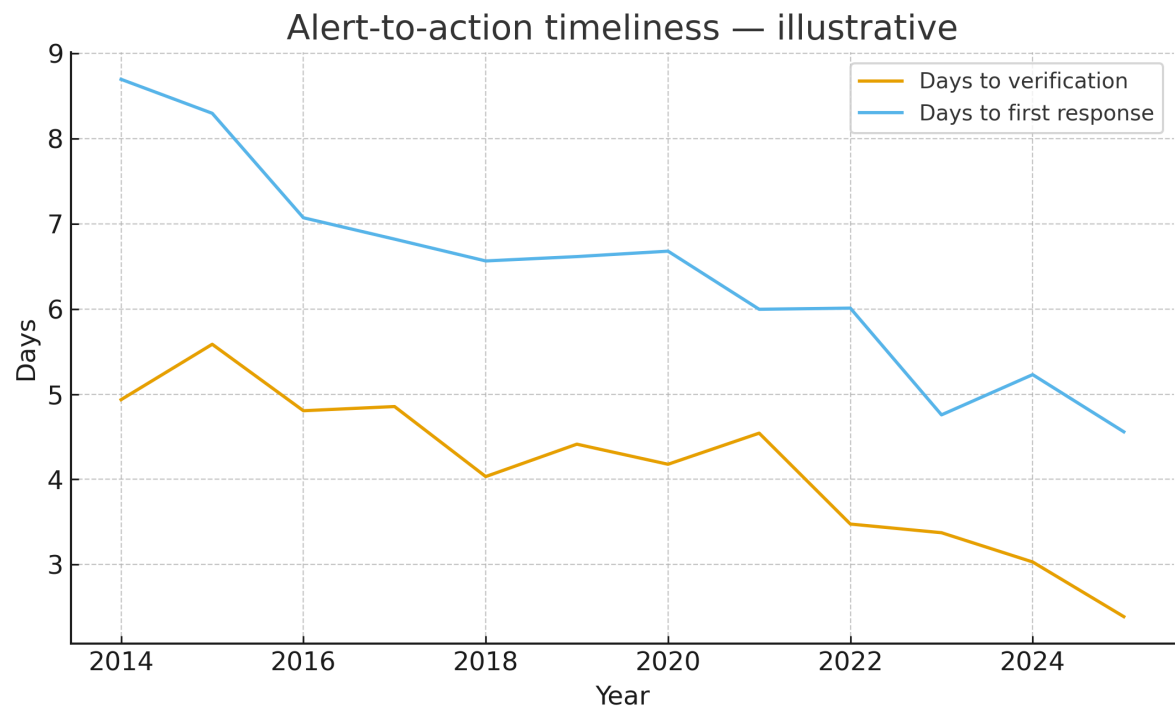


Table 13.14-A. Syndromic case definition & triggers

Domain	Operational guidance
Syndrome trigger	Cluster of acute febrile illness ($\pm$ jaundice/bleeding) in pastoralist/floodplain districts or near livestock abortion events.
Minimum cluster size	≥ 3 epidemiologically linked cases within 14 days (programmatic definition; adapt locally).
Immediate actions	Risk assessment, IPC at facility, line listing, rapid sample collection, vector/animal signals review.

Table 13.14-B. Investigation workflow (first 72 hours)

Time window	Priority tasks
Day 0–1	Notification, verify signal, deploy team; establish incident management; PPE and triage in facility.
Day 1–2	Case finding & line list; collect specimens (human/animal); initiate vector assessment; start RCCE.
Day 2–3	Preliminary lab results; environmental assessments; targeted control (vector/source reduction); daily briefs.

Table 13.14-C. Laboratory differential panel (context-adapted)

Category	Assays/notes
Arboviruses	RVF RT-PCR/ELISA; dengue/chikungunya/West Nile panels as available.
Bacterial zoonoses	Leptospira PCR/serology; Brucella serology; rickettsial panels where indicated.
Malaria	RDT/microscopy for all febrile cases.
Specimen handling	Triple packaging; maintain cold chain; chain-of-custody forms.

Table 13.14-D. IPC & clinical stabilization package (program note)

Component	Operational note
Triage	Screen for warning signs; separate suspect hemorrhagic fever cases; fast-track fluids/oxygen as indicated.
PPE & zones	Standard/contact precautions; droplet with aerosol-generating procedures; define clean/dirty zones.
Waste/linen	Safe handling and disposal; decontamination protocols.
Referral	Criteria and transport IPC; communicate with receiving facility.

Table 13.14-E. One Health & environmental intelligence

Source	Signals & actions
Animal health	Livestock abortions/deaths; serology where feasible; vaccination policy review.
Environment	Rain/flood alerts; standing water; irrigation schemes; vector breeding mapping.
Community intel	Rumor logs; HEW reports; cross-border movement notes; market/abattoir signals.

Table 13.14-F. Performance indicators

Indicator	Definition/target
Timeliness — alert→verify	Median days (target ≤ 3)
Timeliness — verify→response	Median days (target ≤ 5)
Case finding	# cases line-listed per cluster; % with specimens collected
Lab performance	Turnaround time; positivity by pathogen; % clusters with confirmed etiology
IPC readiness	% facilities meeting minimum standards during response

After-Action Review	AAR completion within 30 days; action items closed within 90 days
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Plain-language summary

Sometimes a group of people in the same place get a serious fever at the same time, and the cause is not immediately known. These clusters often appear after heavy rains and floods in areas where people and animals mix. The safest approach is to act fast: separate the sick, use protective equipment, collect samples for testing, and reduce mosquito-breeding water and other risks while waiting for lab results. Talking openly with communities, checking animal health, and watching weather alerts help prevent more infections. When health teams move from alert to verification and then to first actions within just a few days, outbreaks are smaller and fewer people are harmed.

References — Section 13.14 (initial list; add Ethiopia-specific citations in later sections)

- **Federal Ministry of Health (Ethiopia) — IDSR/EPR resources —**
<https://www.moh.gov.et/>
- **EPHI — Public Health Emergency Management (PHEM) —** <https://www.ephi.gov.et/>
- **WHO — Integrated Disease Surveillance and Response (IDSR) —**
<https://www.afro.who.int/technical-areas/surveillance/idsr>
- **FAO/WOAH — One Health resources —** <https://www.fao.org/one-health/>

13.15) Cross-Cutting Operational Readiness (Supply Chains, Workforce, Data & Governance)

Figures are illustrative placeholders; replace with official logistics, HRH, IDSR/DHIS2, and financing datasets before publication.

Figure 13.15-1. Supply chain performance — illustrative

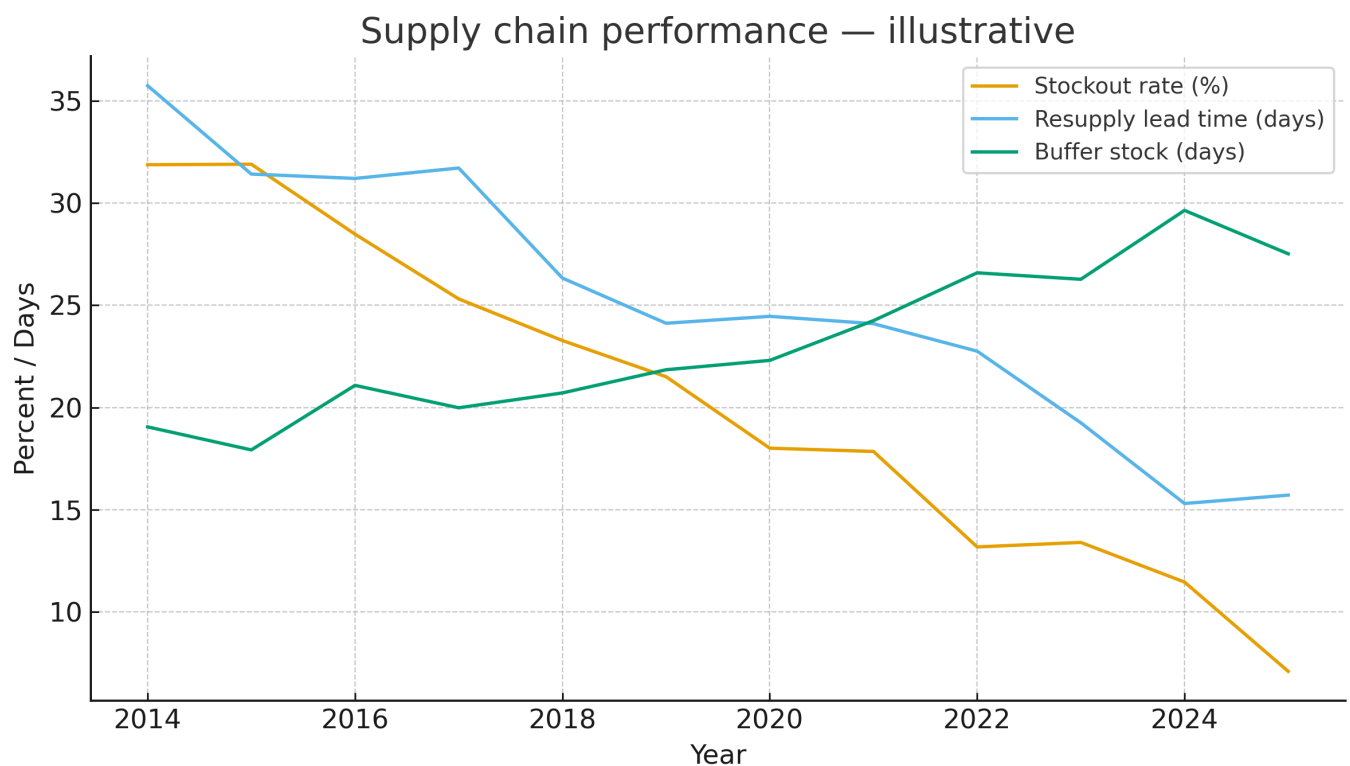


Figure . Outbreak workforce — illustrative

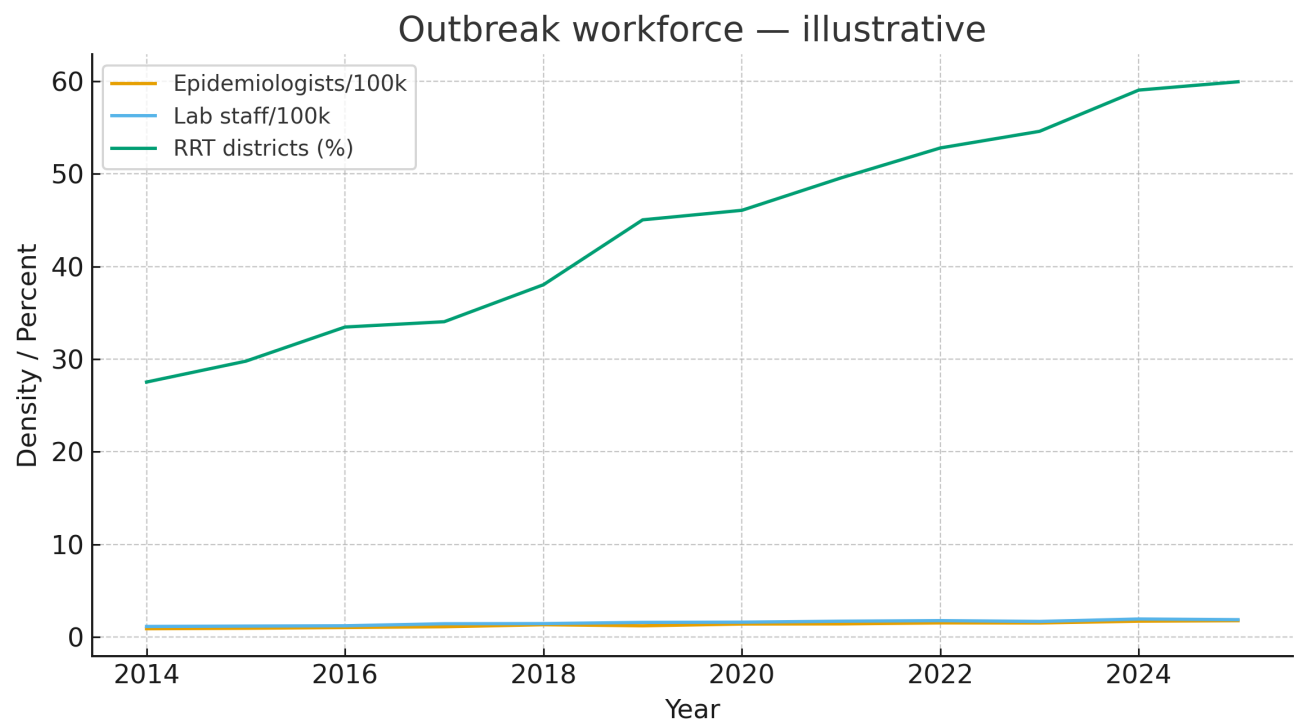


Figure . Surveillance & information systems — illustrative

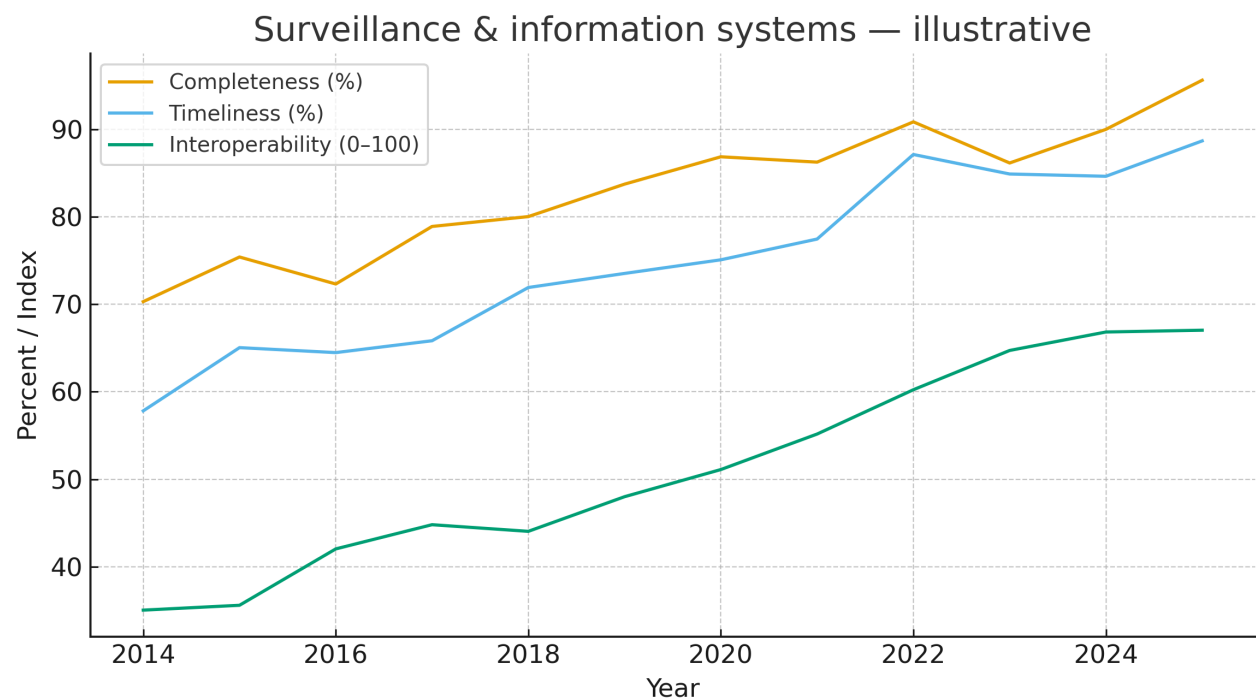


Figure . Governance & financing — illustrative

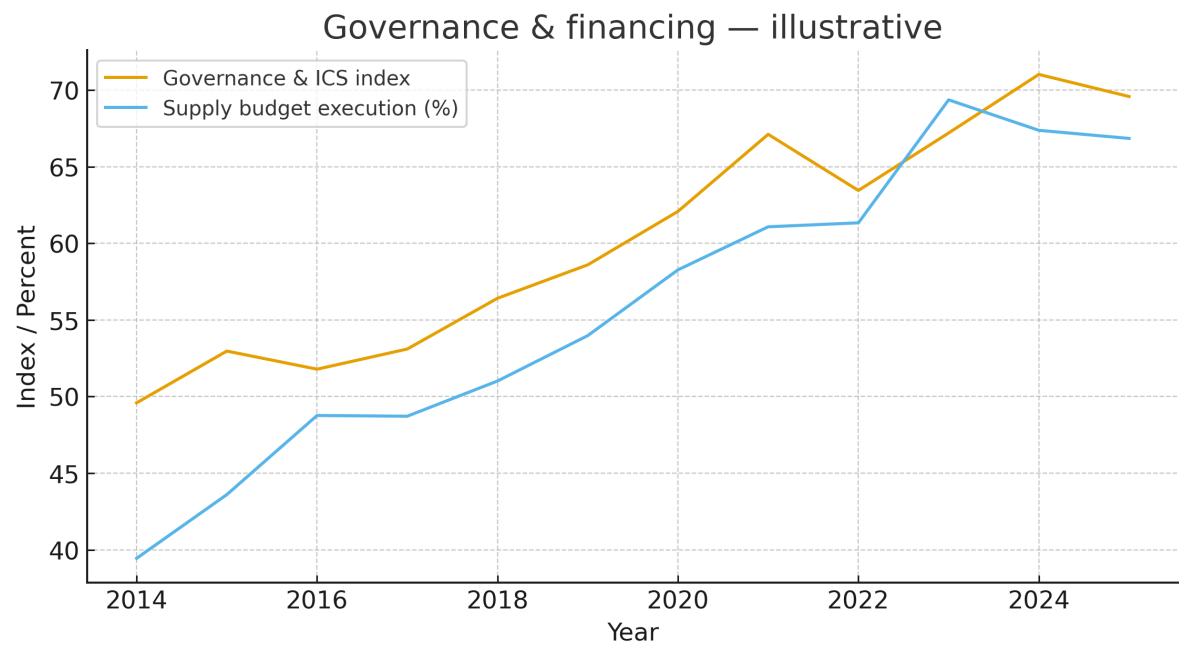


Figure . Readiness exercises — illustrative

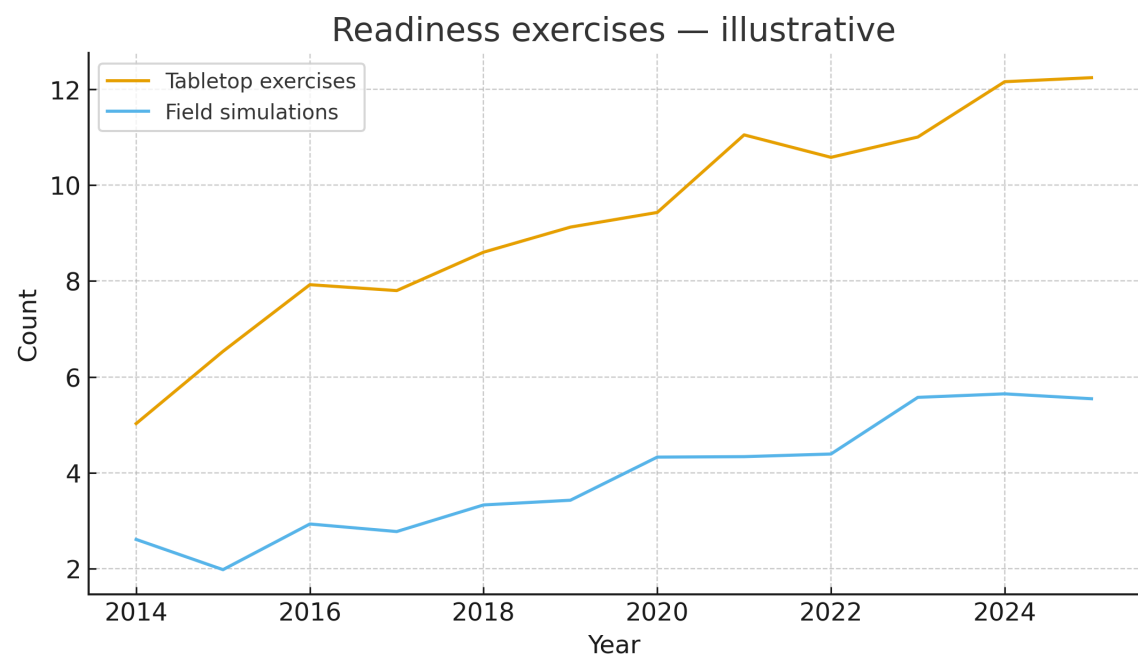


Figure . Regional operational readiness (latest year) — illustrative

Table 13.15-A. Readiness maturity model (levels 1–5)

Domain	Level 1	Level 2	Level 3	Level 4	Level 5
Supply chain	1 Fragmented	2 Basic	3 Managed	4 Integrated	5 Optimized
Workforce (HRH)	1 Ad hoc	2 Mapped	3 Trained	4 Deployed	5 Surge-capable
Data systems	1 Paper	2 Hybrid	3 DHIS2/IDSR	4 Interoperable	5 Real-time analytics
Governance	1 Informal	2 SOPs	3 ICS trained	4 Exercises	5 Enabled & financed

Table 13.15-B. Ethiopia quick-win actions (12–18 months)

Area	Action (12–18 months)
Supply chain	Min/max policy; pre-position outbreak kits at zonal hubs
Workforce	RRT training sprints; surge pool incentives
Data systems	Automate IDSR→DHIS2; lab result feeds; timeliness dashboard
Governance	Institutionalize incident management; annual multi-sector exercises

Table 13.15-C. Core KPIs for a national readiness scorecard

KPI	Definition
Stockout rate	% facilities with zero stockouts (last 30 days)
Lead time	Median days central→facility (emergency orders)
RRT coverage	% districts with active trained RRT (≤24 months)

Reporting timeliness	% IDSR weekly reports on time
Interoperability	# automated interfaces live (HMIS–IDSR–Lab)
Budget execution	% annual emergency commodity budget executed

Table 13.15-D. Illustrative risk register (snippet)

Risk	Drivers	Mitigation	Owner
Pipeline disruption	Border delays; supplier failure	Increase buffer; secondary vendors; framework contracts	SCM focal
RRT attrition	Transfers/turnover	Refresher; surge pool; incentives	HRH/RRT lead
Data outage	DHIS2/IDSR downtime	Offline capture; backups; SMS fallback	HMIS/ICT
Governance gaps	Slow procurement; unclear roles	Emergency procurement SOP; ICS refresher	MOH legal/EPR

Plain-language summary

Stopping outbreaks early needs four pillars working together: reliable supplies, trained responders, fast data, and clear leadership with funds. Pre-positioned kits, district rapid-response teams, automated lab-to-reporting links, and regular exercises help Ethiopia act quickly and reduce impact.

References — Section 13.15 (initial list)

- **Federal Ministry of Health (Ethiopia) — Logistics, HMIS & EPR —**
<https://www.moh.gov.et/>
- **EPHI — IDSR/PHEM & laboratories —** <https://www.ephi.gov.et/>
- **WHO — Health emergency preparedness & IHR core capacities —**
<https://www.who.int/emergencies/operations>
- **UNICEF — Supply & logistics in health emergencies —**
<https://www.unicef.org/supply/>
- **GHSA — Global Health Security Agenda resources —** <https://ghsagenda.org/>

Chapter 13 — Other Vectored Diseases (Ethiopia + Global Lens)

Landing-Page Summary

This chapter consolidates Ethiopia's non-malaria vector- and rodent-associated threats into one operational view, emphasizing disease ecology, populations and places at risk, surveillance signals, and practical steps that reduce illness and death. The focus is actionable and Ethiopia-specific while aligned to global standards.

At-a-glance key messages

- Risk is seasonal and spatially clustered: pastoralist corridors, floodplains, urban container-breeding zones, and highland caves/shelters.
- One Health intelligence is vital: animal health events and rainfall/flood alerts frequently precede human cases.
- Fast basics save lives: early isolation, PPE, fluids where indicated, and quick specimen collection while confirmation is pending.
- Data links matter: HMIS/IDSR/Lab interoperability and timely analytics speed action.
- Preparedness is measurable: stockouts, lead time, RRT coverage, reporting timeliness, and exercise frequency are trackable KPIs.

How to use this chapter

- Plan seasonally and pre-position supplies before rains and livestock movements.
- Target hotspots using regional risk proxies and local intelligence.
- Standardize case management with concise definitions and lab algorithms; escalate based on warning signs.
- Close the loop with After-Action Reviews that assign owners and deadlines for fixing gaps.

Chapter Summary

Ethiopia faces a portfolio of non-malaria vector- and rodent-associated diseases with risks that shift by climate, livelihoods, and settlement patterns. This chapter covers (1) Crimean-Congo hemorrhagic fever (CCHF), (2) Rift Valley fever (RVF), (3) tick-borne relapsing fever (TBRF), (4) dengue, (5) scrub typhus & other rickettsioses, (6) plague, and (7) Rift-Valley-like febrile illness clusters (syndromic hotspots), plus cross-cutting operational readiness. In the lowland pastoral belts and border trade corridors, ticks and animal blood exposure elevate CCHF risk; RVF risk rises with heavy rains and flooding that expand flood-water mosquitoes; urban and fast-growing towns face dengue driven by container-breeding *Aedes* and waste/water storage practices; highland districts with traditional mud-and-thatch housing and co-located animal shelters sustain soft-tick cycles for TBRF; rodent-flea ecologies in certain highland and peri-highland districts maintain the risk of plague flare-ups; and agricultural/brushy ecologies raise the profile of scrub typhus and related rickettsioses. Syndromic RVF-like clusters warrant rapid investigation when etiology is uncertain.

Across these hazards, One Health intelligence—livestock abortions/deaths, animal illness, vector indices, and rainfall/flood alerts—often precedes human cases. Turning signals into action requires prepared facilities, trained staff, and interoperable data. Standardized triage and isolation, early specimen collection, and supportive care reduce mortality even before confirmation. Pragmatic laboratory algorithms (e.g., RT-PCR/ELISA panels for hemorrhagic fevers; microscopy/PCR for relapsing fever; NS1/IgM and PCR for dengue; culture/PCR for *Yersinia pestis* when plague is suspected) enable stepwise confirmation without delaying protection.

Operational readiness determines outbreak size. Stockouts (PPE, sample media, fluids), long resupply lead times, and weak buffer stocks slow responses. District rapid-response teams (RRTs) equipped with transport and allowances shorten alert→verification and verification→first-action intervals. Completeness and timeliness of surveillance improve with automated HMIS–IDSR–lab interfaces and dashboards. Regular tabletop and field exercises clarify roles, test incident management, and expose procurement/legal bottlenecks before crises.

Risk communication and community engagement (RCCE) must be tailored: pastoralists and abattoir workers on tick avoidance and safe animal handling; urban households on weekly container management and school-led clean-ups; highland communities on sealing wall cracks and separating animal shelters; flood-prone districts on water management to reduce mosquito breeding. These steps, paired with respectful clinical care and transparent communication, build trust and resilience.

A practical 12–18-month agenda can accelerate progress: set min–max stock policies and pre-position outbreak kits at zonal hubs; train and enable RRTs in every district; automate data flows and publish timeliness/completeness metrics; institutionalize incident management with emergency procurement authority. Together, these steps raise Ethiopia’s speed from signal detection to decisive action—reducing illness, death, and economic disruption.

Glossary (Selected Terms)

AAR (After-Action Review): Structured review post-response/exercise to capture lessons and assign follow-ups.

Adult index: Adult mosquitoes captured per trap per day; used to time and evaluate control.

Aedes aegypti/albopictus: Mosquito vectors for dengue; typically breed in artificial containers.

Breteau index: Positive containers per 100 houses inspected (dengue entomology metric).

Buffer stock: Minimum quantity reserved to absorb supply chain shocks.

CFR (Case-Fatality Ratio): Deaths among confirmed cases divided by total confirmed cases, in percent.

CCHF: Crimean-Congo hemorrhagic fever; tick-borne viral hemorrhagic fever.

DHIS2: District Health Information Software for routine reporting/analytics.

DHF/DSS: Severe dengue forms requiring careful fluid management.

EQA: External quality assessment of laboratory performance.

HMIS: Health Management Information System for routine statistics.

IDSR: Integrated Disease Surveillance and Response framework.

IPC: Infection Prevention and Control practices in facilities/communities.

Jarisch-Herxheimer reaction: Short-term reaction after starting antimicrobials (relevant to relapsing fever).

One Health: Integrates human, animal, and environmental health.

RCCE: Risk Communication and Community Engagement.

RDT: Rapid diagnostic test used near point of care.

RRT: Rapid Response Team verifying alerts and initiating first actions.

RVF: Rift Valley fever; mosquito-borne zoonosis affecting livestock and humans.

Syndromic hotspot: Cluster in time/place of similar symptoms before lab confirmation.

Timeliness/Completeness: Speed and coverage of surveillance reporting.

References & Useful URLs (Chapter 13)

- **Federal Ministry of Health (Ethiopia) — Logistics, HMIS, EPR —**
<https://www.moh.gov.et/>
- **Ethiopian Public Health Institute (EPHI) — PHEM & Laboratories —**
<https://www.eph.gov.et/>
- **WHO — Integrated Disease Surveillance and Response (IDSR) —**
<https://www.afro.who.int/technical-areas/surveillance/idsr>
- **WHO — Crimean-Congo haemorrhagic fever —** <https://www.who.int/health-topics/crimean-congo-haemorrhagic-fever>
- **WHO — Rift Valley fever —** <https://www.who.int/health-topics/rift-valley-fever>
- **WHO — Dengue and severe dengue —** <https://www.who.int/health-topics/dengue-and-severe-dengue>
- **WHO — Rickettsial diseases overview —** <https://www.who.int/health-topics/rickettsial-diseases>
- **CDC — Relapsing fever —** <https://www.cdc.gov/relapsing-fever/>
- **CDC — Plague —** <https://www.cdc.gov/plague/>
- **PAHO/WHO — Dengue guidelines & indicators —**
<https://www.paho.org/en/topics/dengue>
- **FAO/WHO — One Health resources —** <https://www.fao.org/one-health/>
- **UNICEF — Supply & logistics in health emergencies —**
<https://www.unicef.org/supply/>
- **Global Health Security Agenda (GHSA) —** <https://ghsagenda.org/>