

**Supplementary Table 2: Characteristics of individual selected studies**

Author	Year	Country	Study design	Nature of data	Data source	Spatial analysis	Model	Livestock	Disease	Software	Research tasks
Aman et al.	2020	Ethiopia	Retrospective	Clinical outbreaks	FVSD	Incidence map	Linear	Cattle, sheep & goats	FMD	QGIS	Distribution
Assefa et al.	2020	Ethiopia	Retrospective	Outbreaks	RAHL	Model based risk map	Ensemble ecological niche	Livestock	Anthrax	QGIS, biomod2	Distribution, prediction, risk factors
Chimera et al.	2022	Malawi	Retrospective	Clinical & confirmed outbreaks	DAHLD, WAHIS, Journals	Ordinary kriging, space-time scan, model based risk map	Logistic	Cattle	FMD	ArcGIS, SaTScan	Interpolation/Smoothing, prediction, clustering, risk factors
Duchateau et al.	1997	Zimbabwe	Retrospective	Outbreaks	Database	Model based risk map	Logistic	Cattle	ECF	GIS Idrisi	Prediction, risk factors
Genchwere & Kasanga.	2014	Tanzania	Cross-sectional	Serological	Survey	Incidence map, frequency table		Cattle	FMD		Distribution
Gomo et al.	2017	Zimbabwe	Retrospective	Cases	AHMC, AHI, VO	ANOVA, error bars	ANOVA	Cattle	LSD		Distribution
Guerrini et al.	2019	Zimbabwe	Retrospective	Outbreaks	DLVS	Spatial scan	Bernoulli, Poisson	Cattle	FMD	ArcGIS, SaTScan	Clustering, risk factors
Jemberu et al.	2016	Ethiopia	Retrospective	Clinical outbreaks	Survey	Incidence map	Logistic	Cattle	FMD	QGIS	Distribution, risk factors
Kamboyi et al.	2019	Zambia	Cross-sectional	Laboratory	Survey	Incidence map	Logistic	Cattle	Anthrax	ArcGIS	Distribution, risk factors
Kerfua et al.	2018	Uganda/Tanzania	Retrospective	Clinical & laboratory outbreaks	NADDEC, DVO	Incidence map	Poisson	Cattle	FMD	QGIS	Distribution, risk factors
Kivali et al.	2020	Kenya	Cross-sectional	Serological	Survey	Incidence map, KDE		Cattle	AAT	ArcGIS, spatstat	Distribution, smoothing
Koepfel et al.	2022	South Africa	Retrospective	Laboratory cases	DALRRD	Space-time scan	Poisson	Cattle, goat, sheep & pigs	Rabies	QGIS, SaTScan	Clustering
Kouato et al.	2018	Niger	Retrospective	Clinical cases	SUMAL	Incidence map	Regression trees	Cattle	FMD	QGIS	Distribution, risk factors
Lelenguyah et al.	2023	Kenya	Cross-sectional	Disease ranks	Survey	Rank score map		Cattle, sheep & goats	FMD, ECF, LSD, Anaplasmosis, CCPP, Foot rot, PPR, & SGP	ArcMap	Distribution
Me'tras et al.	2012	South Africa	Retrospective	Diagonised cases	WAHIS	Incidence map, space-time K function		Cattle, sheep & goats	RVF	splancs	Distribution, interaction

Motto et al.	2023	Tanzania	Cross-sectional	Serological	Survey	Prevalence map	Logistic	Cattle	Leptospirosis		Distribution, risk factors
Mouiche et al.	2021	Cameroon	Retrospective & Cross-sectional	Laboratory outbreaks	MoLFAI	Incidence map	Logistic	Pigs	ASF	QGIS	Distribution, risk factors
Mubamba et al.	2016	Zambia	Retrospective	Cases	PVO, DamasyI Database	Incidence map, frequency table	Moving average (MA)	Chickens	NCD	Epi Map	Distribution, forecasting
Muhanguzi et al.	2014	Uganda	Cross-sectional	Serological	Survey	Model based risk map	Generalised estimation equations (GEE)	Cattle	AAT	ArcMap	Distribution
Munyua et al.	2016	Kenya	Retrospective	Serological	KDVS	Model based risk map	Logistic	Cattle, sheep & goats	RVF	ArcGIS	Prediction, risk factors
Mwakapuja et al.	2013	Tanzania	Cross-sectional	Serological	Survey	Incidence map, spatial scan		Cattle	BTB	ArcGIS, SaTScan	Distribution, clustering
Nderitu et al.	2021	Kenya	Retrospective	Clinical & laboratory cases	VEEU, CDVS	Prevalence/Incidence map, SDE	Poisson	Cattle, sheep & goats	Anthrax	QGIS	Distribution, risk factors
Ndolo et al.	2022	Kenya	Retrospective	Clinical & laboratory outbreaks	KDVS, RVIL	Model based risk map, CAR	Zero inflated Poisson (ZINP) CAR	Cattle, goats, sheep & pigs	Anthrax	QGIS, INLA	Distribution, prediction, risk factors
Nkamwesiga et al.	2022	Uganda	Retrospective	Laboratory outbreaks	MAAIF	Moran I, space-time cube, Getis-Ord Gi*, model based risk map, Mann-Kendall	Negative binomial (NB), logistic	Sheep & goats	PPR	ArcMap	Prediction, clustering, risk factors, emerging hot spots
Ochwo et al.	2018	Uganda	Retrospective	Clinical & laboratory cases	MAAIF	Incidence/Relative risk map, space, time, space-time scan	Poisson	Cattle	LSD	QGIS, SaTScan	Distribution, clustering
Picado et al.	2011	Tanzania	Retrospective	Clinical outbreaks	MoLDF	Space-time K function, space-time scan	Permutation	Cattle	FMD	SaTScan, splines	Clustering, interaction
Sindato et al.	2014	Tanzania	Retrospective	Suspected & laboratory outbreaks	MoLDF, VIC	Space-time scan	Permutation, logistic	Cattle, sheep & goats	RVF	ArcGIS, SaTScan	Clustering, risk factors
Sinkala et al.	2014	Zambia	Retrospective	Clinical & laboratory cases	CVRL, Journals	Incidence map, space-time scan	Permutation	Cattle	FMD	ArcGIS, SaTScan	Distribution, clustering
Sirdar et al.	2021	South Africa	Retrospective	Clinical & laboratory cases	WAHIS	Ordinary kriging, Cuzick and Edwards' kNN, space, time, space-time scan	Bernoulli	Cattle	FMD	ArcGIS, SaTScan	Interpolation/Smoothing, clustering
Telford et al.	2023	Uganda	Cross-sectional	Serological	Survey	Semi-variogram, model based risk map, Matern	Geostatistical logistic Matern	Cattle, sheep & goats	CCHFV		Prediction, risk factors
Woldemariam et al.	2022	Ethiopia	Retrospective	Clinical & laboratory outbreaks	MOA, Livestock Department	Space-time scan	Permutation	Cattle, sheep & goats	FMD	QGIS, SaTScan	Clustering

Porphyre et al.	2015	Madagascar	Cross-sectional	Clinical cases	Abattoir	Prevalence map	Logistic	Pigs	Porcine cysticercosis	QGIS	Distribution, clustering, risk factors
Chikerema et al.	2012	Zimbabwe	Retrospective	Clinical & laboratory cases	CVL, PFVO, DFVS, IMU	Incidence map	Logistic	Cattle	Anthrax	ArcView, SaTScan	Distribution
Ndhlovu et al.	2017	Zimbabwe	Retrospective	Clinical outbreaks	DVS	Space-time scan	Permutation, ANOVA	Cattle	Bovine dermatophilosis	QGIS, SaTScan	Distribution, clustering
Elelu et al.	2020	Nigeria	Cross-sectional	Serological	Survey	Prevalence map		Cattle, sheep & goats	Coxiella burnetii	QGIS	Distribution, risk factors
Ngowi et al.	2010	Tanzania	Cross-sectional	Clinical & serological	Survey	Incidence map, Ripley's K function, spatial scan	Poisson, Bernoulli	Pigs	Porcine cysticercosis	ArcView, SaTScan	Distribution, clustering
Scolamacchia et al.	2010	Cameroon	Cross-sectional	Serological	Survey	Cuzick-Edwards' kNN	Binomial	Cattle	Brucellosis, Leptospirosis, & Coxiella burnetii	Excell add-in	Clustering
Tembo et al.	2020	Zambia	Retrospective & prospective	Clinical cases	Abattoir	Incidence map, Moran I, frequency table	Logistic	Cattle	BTB	ArcGIS	Distribution, clustering, risk factors
Otieno et al.	2021	Kenya	Retrospective	Clinical & laboratory outbreaks	DVS	Model based risk map	Boosted regression trees	Cattle, sheep & goats	Anthrax	QGIS, gbm	Prediction, risk factors
Wungak et al.	2017	Nigeria	Cross-sectional	Serological	Survey	Incidence map		Cattle	FMD	ArcGIS	Distribution
Olabode et al.	2014	Nigeria	Cross-sectional	Serological	Survey	Incidence map, frequency table		Cattle	FMD		Distribution
Sindato et al.	2015	Tanzania	Cross-sectional	Serological	Survey	Prevalence map	Logistic	Cattle, sheep & goats	RVF		Distribution, risk factors
Sindato et al.	2016	Tanzania	Retrospective	Suspected & laboratory outbreaks	MoLFD, VIC	Model based risk map	MaxEnt ecological niche	Cattle, sheep & goats	RVF	MaxEnt, ArcGIS	Prediction, risk factors
Chikerema et al.	2013	Zimbabwe	Retrospective	Confirmed cases	DLPVS	Model based risk map	MaxEnt ecological niche	Livestock	Anthrax	ILWIS, MaxEnt	Prediction, risk factors
Chimera et al.	2021	Malawi	Cross-sectional	Serological	Survey	Ordinary kriging, Cuzick-Edwards' kNN		Cattle	AAT	ArcGIS	Interpolation, clustering
Duguma et al.	2015	Ethiopia	Cross-sectional	Serological	Survey	Prevalence map	Logistic	Cattle	AAT		Distribution, risk factors
Ekong et al.	2012	Nigeria	Retrospective	Laboratory outbreaks	NVRI	Cuzick-Edwards' kNN, space-time scan	Bernoulli	Poultry	Avian influenza	SaTScan, SSTAT	Clustering
Kabi et al.	2015	Uganda	Cross-sectional	Serological	Survey	Inverse distance weighting (IDW)	Generalized estimation equation	Cattle	Brucellosis	ArcMap	Interpolation, risk factors

							(GEE), logistic				
Krumkamp et al.	2022	Madagascar	Cross-sectional	Laboratory	Survey	Cuzick and Edwards' kNN, spatial scan	Bernouli	Cattle & sheep	Cryptosporidiosis	spatstat, smacpod, sp, ragdal	Clustering
Lepheana et al.	2020	Lesotho	Retrospective	Clinical & laboratory outbreaks	DLS	Prevalence map, frequency table			Anthrax	ArcGIS	Distribution
Proboste et al.	2021	Ethiopia	Cross-sectional	Serological	Survey	Semi-variogram, model based risk map, exponential	Geostatistical binomial exponential	Cattle	Coxiella burnetii	ArcGIS, geoR, OpenBugs	Distribution, prediction, risk factors
Munsey et al.	2019	Uganda	Cross-sectional	Serological	Survey	Spatial scan, CAR, Moran I, model based risk map	Binomial CAR, Bernouli	Cattle	FMD	SaTScan, spdep, CARBayes	Clustering, risk factors
Mukarat et al.	2020	Zimbabwe	Retrospective	Clinical & laboratory outbreaks/cases	DVS	Incidence map		Cattle, goats & pigs	Anthrax	DIVA-GIS	Distribution
Molla et al.	2017	Ethiopia	Retrospective	Clinical outbreaks/cases	FVSD	Incidence map	ARIMA, linear regression	Cattle	LSD	QGIS	Distribution
Michel et al.	2002	Burkina Faso	Cross-sectional	Serological	Survey	Moran I, model based risk map	Logistic	Cattle	AAT	MapInfo	Distribution, clustering, prediction, risk factors
Swiswa et al.	2017	Zimbabwe	Retrospective	Clinical outbreaks	DVFS	Getis-Ord Gi*		Cattle	LSD	ArcGIS	Distribution, clustering

FVSD: Federal Veterinary Epidemiology Directorate; RAHL: Regional Animal Health Laboratories; DAHLD: Department of Animal Health and Livestock Development; WAHIS: World Animal Health Information Systems; AHMC: Animal Health Management Centres; AHI: Animal Health Inspectors; VO: Veterinary Officers; DLVS: Department of Livestock and Veterinary Services; NADDEC: National Animal Disease Diagnostics and Epidemiology Centre; DALRRD: Department of Agriculture, Land Reform and Rural Development; SUMAL: Statistical Unit of the Ministry of Agriculture and Livestock; MLFAI: Ministry of Livestock, Fisheries and Animal Industries; KDVS: Kenya Department of Veterinary Services; VEEU: Veterinary Epidemiology and Economics Unit; MAAIF: Ministry of Agriculture Animal Industry and Fisheries; MLDF: Ministry of Livestock Development and Fisheries; VIC: Veterinary Investigation Centres; CVRL: Central Veterinary Research Laboratory; MOA: Ministry of Agriculture; CVL: Central Veterinary Laboratories, PFVO: Provincial Field Veterinary Offices, DFVS: Department of Field Veterinary Services, IMU: Information Management Unit; DVS: Division of Veterinary Services; DLPVS: Division of Livestock Production and Veterinary Services; PVO: Provisional Veterinary Office; NVRI: National Veterinary Research Institute; DVS: Department of Livestock Services; FVSD: Federal Veterinary Services Directorate. FMD: Foot and Mouth Disease; ECF: East Coast Fever; LSD: Lumpy Skin Disease; PPR: Peste des Petits Ruminants; CCPP: Contagious Caprine Pleuropneumonia; SGP: Sheep and Goat Pox; NCD:

Newcastle Disease; AAT: African Animal Trypanosomiasis; ASF: African Swine Fever; BTB: Bovine Tuberculosis; RFV: Rift valley fever;  
CCHFV: Crimean Congo haemorrhagic fever virus