

# Luis Enrique Hernandez Castro

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## Professional summary

Epidemiologist and data scientist with over 10 years of experience analysing infectious disease, genomic, veterinary and healthcare datasets across the NHS, academia, and international research networks. Skilled in **surveillance system design, statistical modelling, risk-factor analysis, genomics, and machine learning**. Strong track record delivering high-impact epidemiological insights, leading multi-country research projects, and communicating findings to scientific, clinical and policy audiences. Experienced in infectious disease epidemiology across human and animal populations, with expertise spanning HAI surveillance, zoonoses, vector-borne diseases, and genomic epidemiology.

## Skills summary

R / RStudio • Epidemiological modelling (GLM/GLMM, incidence trends, risk-factor analysis) • Genomic epidemiology (GWAS, NGS pipelines) • NHS datasets & HAI surveillance • Machine learning • Spatial epidemiology • Bioinformatics (PLINK, GEMMA, ASREML, Minimac3, EAGLE) • Dashboard development • Molecular biology (PCR, RADseq) • Reproducible analytical pipelines.

## Work experience

### Advanced Healthcare Scientist.

NHS Greater Glasgow and Clyde.

May 2023 – Present

- Provide **strategic analytical leadership** for HAI surveillance programmes, shaping analytical priorities and supporting evidence-based decision-making across IPC and senior management teams.
- Lead the **design and optimisation of surveillance systems** (renal HAIs, NICU gram-negative surveillance), improving data quality, early detection, and operational response.
- Act as a **senior epidemiological advisor** to IPC nurses, microbiologists, physicians, chief nurses and senior managers, influencing policy, outbreak management, and service-level improvement.
- Champion **reproducible analytical workflows**, data governance standards, and best-practice epidemiological methods across multidisciplinary teams.
- Mentor junior analysts and contribute to **workforce development**, strengthening analytical capability within the service.
- Deliver routine and *ad-hoc* HAI surveillance reports for local and national stakeholders.

- Conduct incidence trend analysis, risk factor modelling, and statistical evaluation of infection patterns.
- Perform network analysis of patient movement to identify transmission pathways.
- Produce ward closure visualisations and operational dashboards for clinical governance.
- Estimated VRE/MDRO burden across hospitals to support antimicrobial stewardship.
- Assessed catheter-associated urinary tract infections incidence across community and acute settings and contributed to quality-improvement plans.

### Research Fellow

The Roslin Institute – The University of Edinburgh

Oct 2020 – May 2023

- Led genome-wide association studies (GWAS) on dairy cattle in Kenya and Tanzania, identifying genetic and epidemiological risk factors for zoonotic infectious diseases.
- Published multiple peer-reviewed articles on immune response genetics and infectious disease epidemiology.
- Trained MSc/PhD students in epidemiological methods, statistical modelling, and computational analysis.
- Collaborated with international partners on livestock health, zoonoses, and food security research.

**Junior project manager.** The University of Glasgow (UK) and Del Rosario University (Colombia)

May – July 2020

- Coordinated rapid procurement of genomic resources for COVID-19 transmission research in Colombia and Venezuela.

**Network coordinator.** Pontifical Catholic University of Ecuador & the University of Glasgow.

Nov 2019 – Oct 2020

- Managed a multinational research network on vector-borne diseases across Venezuela, Colombia and Ecuador.
- Supported epidemiological data sharing, research coordination, and cross-country collaboration.

**Junior project manager.** The University of Glasgow

Oct 2017 – Mar 2018

- Coordinated a Citizen Science project on vector-borne diseases in Venezuela and Colombia, supporting community-based epidemiological data collection.

**Graduate teaching assistant.** The University of Glasgow  
Sep 2016 – Dec 2019

- Delivered wet-lab and computational/statistical training for life sciences and veterinary students.
- Supported teaching in epidemiology, infectious diseases, and data analysis.

## Education

**PhD in Infectious Diseases.** The University of Glasgow, UK.  
Feb 2016 – Dec 2020

Delivered complex infectious disease research involving genomics, epidemiological analysis, molecular biology and fieldwork. Developed strong project management, stakeholder coordination, data governance, and scientific communication skills. Published in leading journals (*PLOS NTD*, *Genetics*, *PNAS*).

**MSc Quantitative Methods in Biodiversity, Conservation and Epidemiology.** The University of Glasgow, UK.  
Sep 2014 - Sep 2015

Gained advanced statistical and epidemiological modelling skills (GLM/GLMM, SIR/SIRS). Strengthened scientific writing, analytical reasoning and communication.

**BSc (Hons) in Veterinary Medicine** at the University of Yucatan, Mexico.  
Sep 2007 – Sep 2012

Built foundational knowledge in infectious diseases, microbiology, physiology and public health. Developed strong communication skills through clinical work with farmers and diverse stakeholders.

## Core epidemiology competencies

- **Infectious disease surveillance** — HAI monitoring, incidence modelling, outbreak analysis
- **Statistical epidemiology** — GLMMs, risk-factor modelling, spatial epidemiology
- **Genomic epidemiology** — GWAS, NGS pipelines, pathogen genomics
- **Healthcare analysis** — burden estimation, demographic analysis
- **Global health & zoonoses** — Africa & Latin America field research
- **Surveillance system design** — NICU gram-negative systems, patient-flow networks
- **Data science for epidemiology** — R, machine learning, reproducible pipelines
- **Scientific communication** — peer-reviewed publications, stakeholder reporting
- **Project coordination** — multi-country research networks, procurement, training delivery

## Technical skills

### Epidemiological Methods

Incidence modelling • Risk-factor analysis • Spatial epidemiology • Burden estimation • Outbreak analysis

### Data Science & Programming

R / RStudio • Ruby • Linux • PERL • GLMMs • Machine learning • Reproducible pipelines

### Genomics & Bioinformatics

GWAS • Stacks • PLINK • GEMMA • ASREML • Minimac3 • EAGLE • NGS QC • Genotyping • Mapping

### Molecular Biology

DNA extraction • PCR • Gel electrophoresis • RADseq library preparation

### Software

QGIS • MS Office • GIMP • Slack • GitHub

## Interests

Sci-fi, music, travel, Mexican cuisine, gardening, dancing, politics/immigration, nature, wildlife, diversity and inclusion.

## Awards

Full MSc and PhD studentships (University of Glasgow) and multiple awards for doctoral fieldwork, training, and conference attendance.

## Publications

- **Hernandez-Castro LE**, Cook EAJ, Matika O, Mengele IJ, Motto SK, Bwatota SF, et al. Genetic estimates and genome-wide association studies of antibody response in Tanzanian dairy cattle. 2024. p. 2024.08.05.606566. doi.org/10.3389/fgene.2025.1497355.
- **Hernandez-Castro LE**, Vilacís AG, Jacobs A, Cheaib B, Casey, et al. Population genomics and geographic dispersal in Chagas disease vectors: landscape drivers and evidence of possible adaptation to the domestic setting. **PLOS Genetics**. 2022. doi.org/10.1371/journal.pgen.1010019
- **Hernandez-Castro LE**, Paterno M, Villacís AG, Andersson B, Costales JA, De Noia M, et al. 2b-RAD genotyping for population genomic studies of Chagas disease vectors: *Rhodnius ecuadoriensis* in Ecuador. **PLoS Negl Trop Dis**. 2017 Jul;11(7):e0005710. Doi: 10.1371/journal.pntd.0005710.
- Additional research contributions at <https://orcid.org/0000-0002-2342-1655>