Workshop Title: Applied Data Science for Public Health Using R

Series 4: Geospatial Health Analysis in R
Time: 9:00 AM – 5:00 PM
Mode: Hands-on with short lecture

Agenda

Time	Session	Topic	Objective
09:00 – 09:30	Welcome, context & setup	Why GIS for health; install/load packages; get data & shapefiles ready	Intro/Setup sections; Packages: sf, tmap, readr
09:30 – 10:15	Spatial data basics in R	Vector vs raster; sf objects; geometry column; inspecting & plotting quickly	Spatial data basics; Packages: sf, mapview
10:15 – 10:30	Break		
10:30 – 11:15	Projections & coordinate reference systems (CRS)	Understand/transform CRS; common EPSG codes in Malaysia; pitfalls of mixing CRS	Projections; Functions: st_crs(), st_transform()
11:15 – 12:00	Linking health data to geography	Join case counts to admin boundaries; point-in-polygon; spatial joins	Joins & point-in-polygon; Functions: st_join(), st_intersects()
12:00 – 13:00	Lunch		
13:00 – 13:45	Choropleths & thematic maps	Calculate rates/SMRs; classify & palette choices; legends & layout	Mapping; Packages: tmap, ggplot2, classInt
13:45 – 14:30	Spatial analysis basics	Neighbourhoods/weights; Moran's I & LISA; basic clustering ideas	Spatial autocorrelation; Packages: spdep, sf
14:30 – 14:45	Break		
14:45 – 15:30	Buffers, distances & accessibility	Create buffers; measure distances to facilities; simple catchment analysis	Buffers/distances; Functions: st_buffer(), st_distance()
15:30 – 16:15	Exporting & sharing outputs	Save high-res maps; export GeoPackage/GeoJSON; reproducible scripts (Rmd/Quarto)	Reproducibility; Functions: tmap_save(), st_write()
16:15 – 16:45	Mini hands-on: your dataset	Participants adapt templates with their own (or provided) health data	All above; encourage pair work
16:45 – 17:00	Wrap-up & next steps	Recap, further reading in epirhandbook, advanced topics teaser (raster, INLA)	Further resources