SpatialEpi

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Author Introduction

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About the Package

- Epidemics surveillance package
  - Methods and data for cluster detection and disease mapping
  - Performs various spatial epidemiological analyses
- Published: November 15, 2021
- URL: https://github.com/rudeboybert/SpatialEpi
- Repository: CRAN

Demonstration

Steps:

1. Load data
2. Convert data from latitude/longitude system into grid-based coordinate system
3. Plot the incidence of leukemia for each census tract

```r
1   install.packages("SpatialEpi")
2
3   library(SpatialEpi)
4
5   data(NYleukemia)
6   sp.obj <- NYleukemia$spatial.polygon
7   centroids <- latlong2grid(NYleukemia$geo[, 2:3])
8   population <- NYleukemia$data$population
9   cases <- NYleukemia$data$cases
10
11  plotmap(cases/population, sp.obj, log=TRUE, nclr=5)
12  points(grid2latlong(centroids), pch=4)
```
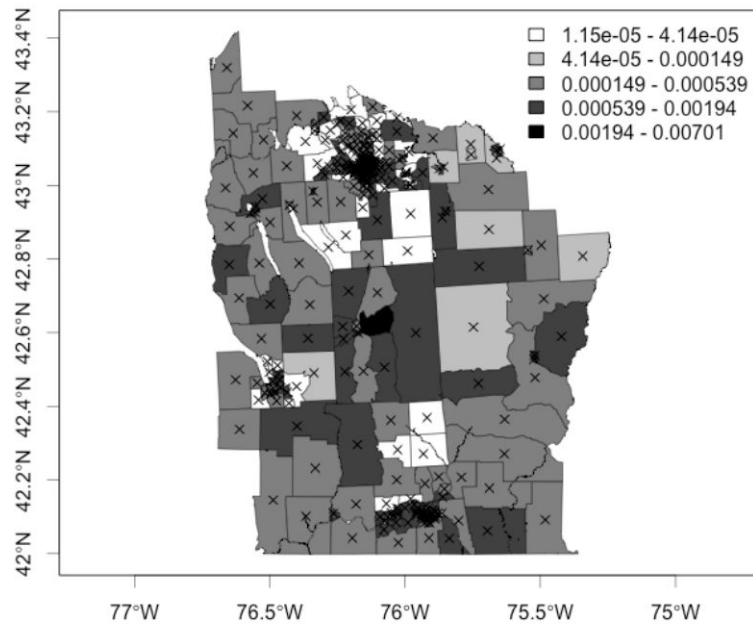
Using the Bayesian Cluster Detection Method

Bayesian approach to detecting "areas of clustering" in which the study region is partitioned into, possibly multiple, "zones" within which the risk is either at a null, or non-null, level.

```r
14  y <- cases
15  E <- expected(population, cases, 1)
16  max.prop <- 0.15
17  shape <- c(2976.3, 2.31)
18  rate <- c(2977.3, 1.31)
19  J <- 7
20  pi0 <- 0.95
21  n.sim.lambda <- 10^4
22  n.sim.prior <- 10^5
23  n.sim.post <- 10^5
24
25  # Compute output
26  output <- bayes_cluster(y, E, population, sp.obj, centroids, max.prop,
27                          shape, rate, J, pi0, n.sim.lambda, n.sim.prior,
28                          n.sim.post)
29  #plot map
30  plotmap(output$post.map$high.area, sp.obj)
```