Trachoma notes 02/04/2015

Casamance – diff from Senegal because lots of vegetation – important region for economy. Border with Gambia very fluid. Re-infection to Gambia from Casamance (Mass treated Gambia, no treatment in Casamance).

Survey of trachoma

Measured visual acuity

Estimated prevalence of trachoma,

Sample size calculation – then x4 to give you the sample size to test because of the clustering of trachoma in villages

Over sampled (half the sampling interval – ie select village every 1000 people…actually sample every 500) rural communities Sindian and Iles Karone (where there were higher expected trachoma)

Restricted selection (double sampling interval ie 2000 instead of 1000) in the urban zones

If village exceeded 1000 it was divided into two sections. (GPS coordinates noted for each community)

Of all houses had 10 per community (60 communities – total = 600 households)

Trained community members to survey – only those who passed could grade in the survey

4 teams of 10 people: 5 doing grading 5 filling in forms: household head list, list all members of the household, (like census) using this examined eyes for trachoma signs and risk factors

Individuals aged > 50 had visual acuity measured ()

Stages of trachoma:

TF follicular trachoma (white dots under eyelids) - *caused by infection with chlamydia*

TI inflammation –*caused by infection with chlamydia*

Progresses to:

TS scarring – *result of immune response to the infection*

Progresses to:

TT trachiasis (one eyelash is touching the globe of your eye) - *caused by the scarring (contraction of the tissue on the eye pulls eyelid inward)*

Progresses to:

Corneal opacity (cloudy eyes) – *consequence of scratching of eyelid on the eye potentially allowing other bacteria to get in (multiple organisms detected that could be causing this pathology)*

TF alone, TI alone or TF & TI = active trachoma –*more likely as children but not a hard and fast rule but this precedes the other conditions which follow as described above.*

For mass treatment, look for prevalence of TF (only, as TI is not specific to chlamydia) in children ages 1-9 years. If the prevalence is >10% then mass treat the whole community. If prevalence is between 5 and 10% then you should survey every child in the community – then decide on mass treatment (Mass or target treat households with TF).

TT in > 14 year olds, if present the treatment is surgery – lift eyelash away from eye

Risk factors measured:

* Facial cleanliness (dirt on face)
* Nasal discharge
* Ocular discharge
* Flies on face at time of examination

District level: N = 4

Commune level: 19 in casamance…each had c.18 villages of which a selection were part of the survey

Village level: 60 villages spread throughout those communes / districts

Go through cleaned data (from stata files)

OUTPUT QUESTIONS:

What is the prevalence for each village?

Is there spatial clustering of TF, TT or Visual acuity?

Look at the binomial output independently for the 3 outcomes

Look at the multinomial / hierarchical outputs (TT TF TI…oc)

Include risk factors for TF (is there a spatial association of these with TF)

* Village as random effect
* Examination team as a random effect

|  |  |  |
| --- | --- | --- |
| Village | Flies | Not |
| Inf |  |  |
| Not |  |  |

Analysis points

1. Useful textbook available online

<https://books.google.com/books?hl=en&lr=&id=WVHRBQAAQBAJ&oi=fnd&pg=PP1&dq=analysing+spatial+data&ots=AnvZvpTFp3&sig=VAtRV2TLES1BPrICwdnkXYF2qvo#v=onepage&q=analysing%20spatial%20data&f=false>

Simplest 1st approach. Use the guideline prevalence for each age (e.g. the proportion of cases of TF in children 1-9 years; 10%) within each region as the ‘expected’ number of cases per N individuals. Then compare the counts of positive and negative to this expected in a Chi-sq distribution with degrees of freedom 1 less than the total number of regions.

<http://www.stats.uwo.ca/faculty/kulperger/S9934a/Computing/Spatstat-pn0y.pdf>

Our null hypothesis is that the data point pattern is a realisation of complete spatial randomness whilst the alternative hypothesis is that the data pattern is a realisation of another, unspecified point process.

**We can ask**, are cases of TF clustered within villages, between villages or across regions?

Tests of Complete Spatial Randomness (Chi, Kolmogorov-Smirnov)

Do cases of TF depend on risk factor? (Chi Squared tests preferred for factors)

Do cases depend on population density? (KS tests preferred for continuous variables)

**Risk factor (TF TT VA)**

Generally, anything that indicates poverty is a risk factor for trachoma (GGLAMM)

* Shared latrine access
* Shared water source
* Salary (low)

General risk factors for visual acuity

* Is there an association with corneal oc
* Occupation

**Spatial Analysis (TF TT VA)**

Prevalence at each scale

Clustering within and between scales

Distance from the border (Gambia as protective effect)

**Implications given WHO guidance (Households, communities, communes, districts and Region)**

Look at the 10% for TF: Use the guideline prevalence for each age (e.g. the proportion of cases of TF in children 1-9 years; 10%) within each region as the ‘expected’ number of cases per N individuals. Then compare the counts of positive and negative to this expected in a Chi-sq distribution with degrees of freedom 1 less than the total number of regions.

For TT it is more complicated (<0.001 – not public health; >0.1% - public health problem)

Descriptive

TF for 1-9 year olds; TT for 15+; VA 50+

|  |  |  |  |
| --- | --- | --- | --- |
|  | TF Average (range) | TT | VA |
| Region |  |  |  |
| District |  |  |  |
| Commune |  |  |  |
| Community |  |  |  |
| Household |  |  |  |