## Single count or rate

- How the Poisson distribution arises
- Behind the Poisson distribution  - and when is it appropriate?
- Features of Poisson Distribution
- Examples
  - some with Poisson variation
  - some with "extra- Poisson" or "less-than-Poisson" var$^{n.}$
- Table & Graphs of (Poisson) probabilities
- Gaussian Approximation to Poisson Distribution
- Confidence limits for expectation of Poisson variable{table]
- Basis for "First Principles" Poisson Confidence Interval
- "Exact" CI for mean, $\mu$ , of a Poisson distribution using Link between Poisson and Chi-Square tail areas.
- Approximate CI's for mean, $\mu$ , of a Poisson distribution, based on 4 different approximations to Poisson tail areas
- Inference re a single event rate parameter (summary)
- Link between Rate and Cumulative Incidence (Risk)

### Readings
- Rothman 2002, Ch 7, pp132-134
- JH's Notes on Poisson Distribution and Inference re Rates
- Armitage Ch 3.7 & 5.2 / Colton Ch 3 / etc

## Comparison of 2 rates

- Inference re comparative parameters:

  - Rate Difference

  - Rate Ratio

    - unconditional

    - conditional [especially if small # of events]

  - SIR/SMR [more a comparison of 2 SETS of rates]

    e.g.  *"LEUKEMIA RATE TRIPLES NEAR NUKE PLANT:  STUDY"*
    *(SEE CI FOR AN SIR ..UNDER RESOURCES )*

- Sample sizes for studies that compare rates

### Readings
- Rothman 2002, Ch 7, pp 137-139; 141
- JH's Notes on Poisson Distribution and Inference re Rates
- Armitage Ch 5.2

## Other Resources

Notes & Resources on (M&M) Ch 8, 9 and '9-epi' in http://www.medicine.mcgill.ca/epidemiology/hanley/c607/

"Resources for Rates" in http://www.epi.mcgill.ca/hanley/c634/ - Tables / Chapters / Software

R Epitools package ; epitab in Stata; Genmod with Poisson distribution (SAS)