Geometrical models for seasonal variation - a simulation study
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**Comparison of Geometrical Models and Poisson Regression Modelling Seasonal Variation - A Simulation Study**

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**Introduction**

Evaluation of geometrical models and Poisson regression to determine the accuracy in quantifying seasonal variation.

**Geometrical models**

- **Edwards:**
  - Features:
    - ± variable time intervals
    - ± variable population at risk
    - ± small sample sizes
  - Simulated data:
    - True length of month
    - Varying population at risk

- **Walter & Elwood**
  - Features:
    - ± variable time intervals
    - ± variable population at risk
    - ± small sample sizes
  - Simulated data:
    - True length of month
    - Varying population at risk

**Poisson regression:**

- Features:
  - ± variable time intervals
  - ± variable population at risk
  - ± small sample sizes
- Simulated data:
  - True length of month
  - Varying population at risk

**Features:**

- **Edwards:**
  - Often false positive for small sample sizes
  - Able to handle varying time intervals and varying population at risk by adjusting counts

- **Walter & Elwood**
  - Able to handle small sample sizes
  - Able to handle varying time intervals through the season component in the linear predictor
  - Able to handle varying population at risk through offset

**Conclusion**

**Geometrical models:**
- Often false positive for small sample sizes
- Able to handle varying time intervals and varying population at risk by adjusting counts

**Poisson regression:**
- Able to handle small sample sizes
- Able to handle varying time intervals through the season component in the linear predictor
- Able to handle varying population at risk through offset

**References**