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
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Poisson regression:

linear predictor = season + offset
Features:
• + variable time intervals
• + variable population at risk
• + small sample sizes
Simulated data:
• True length of month
• Varying population at risk

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