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SEMINAR

Grupo de Análise Funcional e Aplicações
Functional Analysis and Applications Group

Unveiling the effects of individual variation in epidemiology, ecology and evolution

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Abstract

The concept of frailty was introduced in demography to describe individual variation in longevity. As the frailest individuals are removed earlier from a heterogeneous cohort, mean hazards appear to decrease over time leading to some of the most elusive effects in population dynamics. Despite the accumulation of documented fallacies associated with this type of selection within cohorts, the issue remains largely overlooked. I will expose the ubiquity of the phenomenon and propose a unified framework to infer the extent of individual variation and its effects, with examples of current interest in epidemiology, ecology, and evolution: (1) Vaccines appear less efficacious in high-incidence settings. Are they, really? (2) Why do infectious disease models have a tendency to overpredict the impact of interventions? (3) What is the real effect of Wolbachia on mosquito susceptibility to dengue viruses? (4) As populations of bacteria are exposed to antibiotics, their mortality rates decline due to selection for noninherited resistance. How does this affect the measurement of fitness effects of new mutations? (5) What does cohort selection add to the debate between neutral and niche theories of biodiversity?

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