

**The impact of contact structure on infectious disease control:
influenza and antiviral agents**

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Running head: Influenza and network structure

1. SUMMARY

Planning adequate public health responses against emerging infectious diseases requires predictive tools to evaluate the impact of candidate intervention strategies. With current interest in pandemic influenza very high, modeling approaches have suggested antiviral treatment combined with targeted prophylaxis as an effective first-line intervention against an emerging influenza pandemic. To investigate how the effectiveness of such interventions depends on contact structure, we simulate the effects in networks with variable degree distributions. The infection attack rate can increase if the number of contacts per person is heterogeneous, implying the existence of high degree individuals who are potential super-spreaders. The effectiveness of a socially targeted intervention suffers from heterogeneous contact patterns and depends on whether infection is predominantly transmitted to close or casual contacts. Our findings imply that the various contact networks' degree distributions as well as the allocation of contagiousness between close and casual contacts should be examined to identify appropriate strategies of disease control measures.

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