Annotated Bibliography

Topic: Health and Disease

Williams, P. D. (2010). Darwinian interventions: taming pathogens through evolutionary ecology. Trends in Parasitology, 26(2), 83–92. doi:10.1016/j.pt.2009.11.009

Epidemiological shifts that favor the spread of diseases: (1) anthropogenic disturbances (expansion of agro lands into undisturbed ^exposure of humans to wild species; (2) increased susceptibility bc ageing population; (3) urbanization, creation of slums

Vaccine-driven virulence evolution: treatments that reduce rate that infection is acquired or transmitted are NONselective vs. treatments that diminish mortality owing to infection or reduce pathogen exploitation select for increased exploitation and hence, greater virulence (Williams 2009)

Source-sink theory: virulent effects are the consequence of repeated evolution of adaptations that allow for utilization of novel host tissues or structures with resultant pathogenic effects

Evolutionary modeling of pathogens: immune evasion model vs. game-theoretic model

Sink-source: an ecological perspective of regions in which an organism flourishes vs. where is diminishes. Can be used to look at disease ecology and evolution.

Competitive interactions and pathogen evolution: treatment induces a switch in different strains’ abilities to compete for hosts.

Co-evolutionary arms race: treatment for pathogens creates rapid and intense selection on the pathogen and reciprocal evolutionary change via pathogen adaptations. “Red Queen”

Barton-Hall experimental evolution method allows for the prediction of possible pathogen phenotypes that could result given certain types of treatment, which can function as an early warning system.

Inhibiting the generation of variation: some RNA viruses (HIV-1 and hepC) achieve adaptability by having a very high error rate in replication which allows them to respond readily to environmental change. However, pushing this error past it’s threshold could lead to extinction of strain.

Wilkinson, R. G. (1994). The epidemiological transition: from material scarcity to social disadvantage? *Daedalus*, *123*(4), 61–77. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11639364>

Shift from material constraints to social constraints in acquiring resources. (i.e. inequality)

“Epidemiological Transition” shift from mortality due to infectious disease to that due to chronic disease (aka “lifestyle diseases”)

Relationship between SES and health WITHIN country (strong) vs. SES and health BETWEEN countries (none)