Answers to reading check #10

1. Which disease did he mention has an astounding R_0 of about 150?

   Malaria.

2. What phenomenon did Silver remark had an almost perfect one-to-one correspondence with the number of autism diagnoses over time? What general point was he making with this example?

   The frequency with which autism has been mentioned in the media (specifically, American newspapers). This may be an example of a self-fulfilling prophecy.

3. In the 1990's and early 2000's, when syphilis, gonorrhea, and other STDs were exploding in frequency among San Francisco's gay male population, what viral disease fell to its *lowest* level in that same population? And what explanation does Silver (who is gay himself, by the way) give for this?

   The HIV infection rate fell to its lowest level since the start of the AIDS epidemic, probably because gay men were "self-sorting" when choosing sexual partners: they only chose to have sex with partners who had the same HIV status that they did.

4. What fundamental assumption of the SIR model turned out not to be true among Chicago's school-aged children in the 1980's, which caused an unexpected outbreak of measles?

   Random mixing. In Chicago's culture, apparently, people tend to interact only with people their same neighborhood, so the assumption that the population is "well-mixed" – the mean-field assumption – is violated.

5. What type of modeling do Silver's colleagues say may overcome the weaknesses of stock-and-flow models like SIR?

   Agent-based modeling (ABM).