Review Questions

Answer the following questions based on the Lipsitch Model discussed in the class.

a. Suppose k = 10 contacts/day, and N_0 = 10,000,00 people. Give the percentage of contacts per day.

ANSWER:

As Contact per day = **K/No**
= 10/10,000,00 * 100
= 0.001%

b. Suppose 8% of contacts between an infectious and a susceptible person result in transmission of the disease. Give the corresponding parameter, its value, and units
ANSWER:

Parameter = **b**
Value =**0.8**
Unit =**per day**

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c. Using your answers to Parts a and b, what percentage of all possible contacts results in transmission of SARS each day?

ANSWER:
(K/No) b =0.0008%

d. If the sizes of *infectious_undetected* (I_U) and *susceptible* (S) are 500 and 9,000,00, respectively, give the total number of possible contacts.

ANSWER:
Iu*S = 500*900000
= 450,000,000

e. Determine the rate of change of those going from *susceptible* (S) to *susceptible_quarantined* (S_Q).

ANSWER:
S->Sq = qK(1-b) IuS/No

f. Evaluate the basic reproduction number, R_0, using the above values and $k = 10$ contacts/da, $b = 0.06$, $v = 0.04$, $m = 0.0975$, $w = 0.0625$, and $q = 0.1$.

ANSWER:

Ro = kb (1/v+w+m*(1-q))

= 6 * 3692.304

Ro =22153.824