The Emergence of Omicron and Its Impact

SUTRA Consortium

SUTRA Model

Key Parameters: Contact Rate β

- Measures how fast pandemic spreads in a region
  - Increases due to people not following safety protocols and more infectious mutants
  - Decreases due to lockdowns, people following safety protocols
- Closely related to Basic Reproduction Number $R_0 \approx 10\beta$

Key Parameters: Detection Factor ϵ

- Measures ratio between detected (tested +ve) and actual cases
  - Decreases when number of asymptomatic patients increase, pandemic reaches inaccessible regions, and testing reduces
  - Increases when testing rate goes up significantly

Key Parameters: Reach ρ

- Measures fraction of population over which the pandemic is active
  - It is very small initially and typically increases with time
  - Increases rapidly when there is a lot of movement across regions, many people come out of isolation
  - Captures loss of immunity and vaccination-induced immunity

Projections for Mumbai, Delhi and India

Loss of Immunity

- It is the most critical factor in rise of Omicron cases
- Vaccine immunity is almost completely bypassed
- Estimates for natural immunity bypass vary between 50% to 100%
- Not possible to estimate this loss precisely from data as yet
  - Should be possible in a few days for Delhi and Mumbai
  - Will take more time for India
- Even a 5% change in estimation causes major change in peak value!
  - Hence, predicting peak value is error-prone
- Timing of peak does not depend much on immunity loss and so can be predicted with better precision

Mumbai

- Between 70% to 100% people have lost immunity
- Cases to peak during January 15-20
- Peak value of cases (7-day average) between 30,000 to 60,000 per day
  - Estimate not precise due to error in estimating immunity loss
- It is assumed that ~3.5% of reported cases require hospitalization for 5-8 days

Hospital bed requirement estimated to be 10,000 at its peak

Delhi

- Between 70% to 100% people have lost immunity
- Cases to peak during January 15-20
- Peak value of cases (7-day average) between 35,000 to 70,000 per day
  - Estimate not precise due to error in estimating immunity loss
- It is assumed that ~3.5% of reported cases require hospitalization for 5-8 days

Hospital bed requirement estimated to be 12,000 at its peak

India

- Between 70% to 100% people have lost immunity
- Cases to peak during last week of January/first week of February
- Peak value of cases (7-day average) between 4,00,000 to 8,00,000 per day
  - Estimate not precise due to error in estimating immunity loss
- It is assumed that ~3.5% of reported cases require hospitalization for 5-8 days

Hospital bed requirement estimated to be 150,000 at its peak