



Modeling effectiveness of interventions for COVID-19 in Addis Ababa

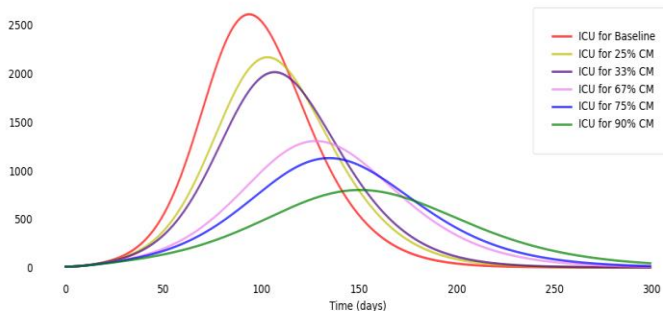
- Social distancing and facemask are non-pharmacological interventions proven to reduce COVID-19 transmission and for the containment of the outbreak.
- For these interventions to be effective high level of compliance or coverage is critical.
- Using an advanced compartmental SEIR mathematical model, this brief present's scenario based estimation and forecasting of the effectiveness of interventions in reducing admission to ICU and death due to COVID-19.
- The SEIR model assume community transmission and hence Addis Ababa has taken as a case as to demonstrate the effectiveness of the different interventions.

Key findings

Face mask (FM)

Use of facemask can reduce the number of ICU admission and deaths but depends on

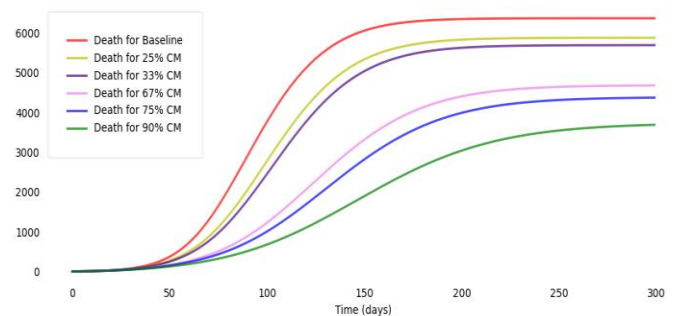
- A) Effectiveness of Mask (EF): cloth mask can reduce transmission by 33%
- B) Coverage Mask (CM): high compliance among users is required to reduces transmission. AAU data suggest 67-80% compliance



FM coverage	25%	33%	67%	75%	90%
% reduction in ICU	17	23	51	57	70

- A 75% compliance to cloth facemask could avert 57% of ICU admission that could happen at the peak (See fig 1).
- FM use helps to flatten the curve

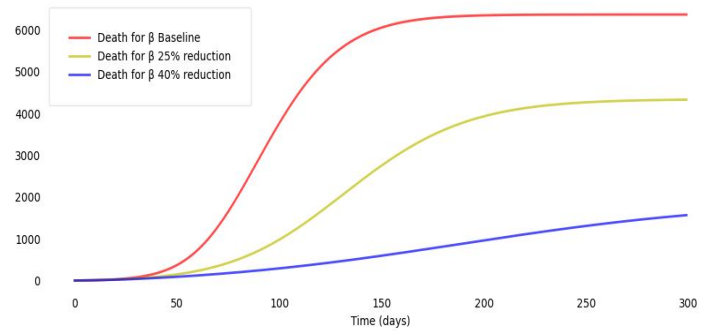
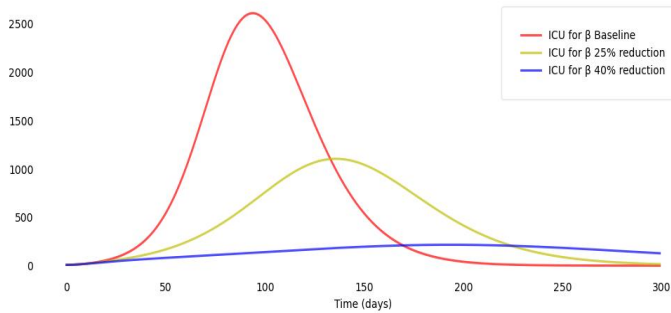
- A 75% compliance to cloth facemask could avert 31% of the deaths that could occur at the peak (fig 2,)
- FM use helps to flatten the curve



FM coverage	25%	33%	67%	75%	90%
% reduction in death	8	11	26	31	42

Social distancing (SD)

- Social distancing significantly reduces effective contact rate (β) & transmission.
- Mobility data has been used as a proxy to measure social distancing compliance
- Cutting transmission through social distancing reduces ICU admissions and deaths.



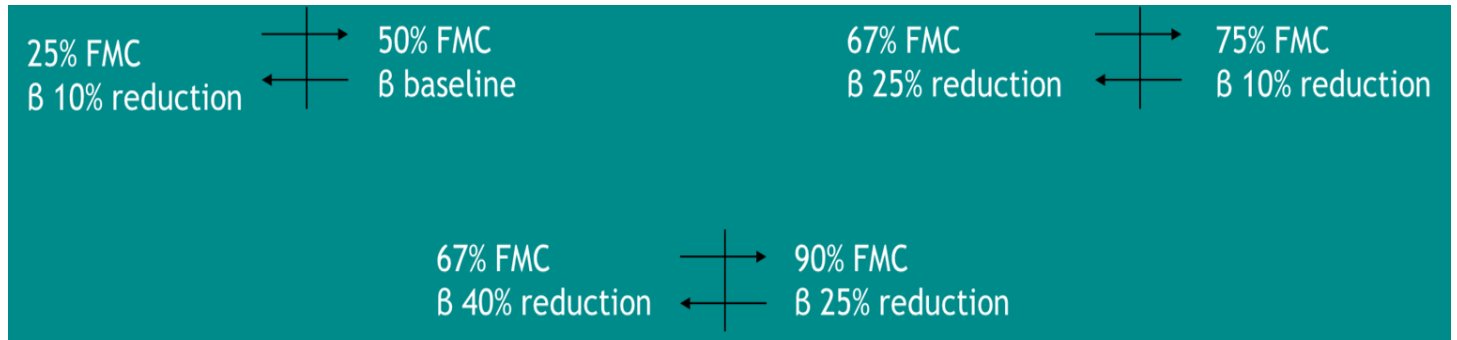
Reducing social mobility (β)	25%	40%
% reduction in ICU cases	58	92

Combined intervention (MC+SD)

- 40% reduction in social mobility can avert 92% of ICU admissions that could happen at the peak (Fig 3)
- 40% reduction in social mobility can avert 73% of deaths that could happen at the peak (Fig 4)
- SD helps to flatten the curve

- By combining FM and SD, a significant reduction in transmission, health care demand and deaths could be achieved.
- By setting facemask compliance at 67% and its effectiveness at 33%, a 25% reduction in mobility could avert 89% ICU admission and 74% Deaths that could occur at the peak.

Trade offs



Conclusion:

- Facemask and social distancing have significant effect to reduce new infections, to slow down epidemic growth and to flatten the curve, which ultimately reduces mortality and the demand on the health system and a toll on the society.
- The models have tested the status of current interventions and what should be done to attain significant effects with trade-offs.

- The findings give reassurance to the government that it is doing the right thing but require enforcement, community engagement and awareness for its sustainability
- Combining social distancing with facemask has higher effect than individual interventions.
- High compliance to these interventions should be attained all the time for good result.

Acknowledgment

The National Data Management Center for health at EPHI works in collaboration with the ABRen,