Covid-19 in Maharashtra

Wave I, Wave II and the Future

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The Fear

Overwhelming of hospitals.

Sudden jump in death rate.

Great Misery.

And hence: Lockdowns, improvement in preparedness, in planning.

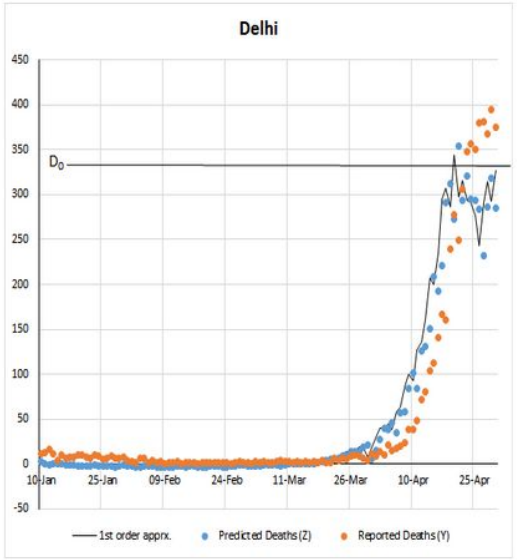


Fig. 1 Time Series, Deaths and D_0

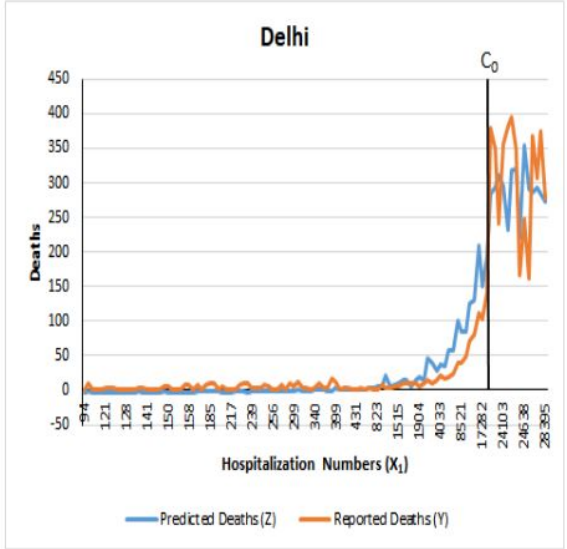


Fig.2 Hospitalizations, Deaths and C_0

Data upto 29th April 2021 from covid19india.org

The Downside

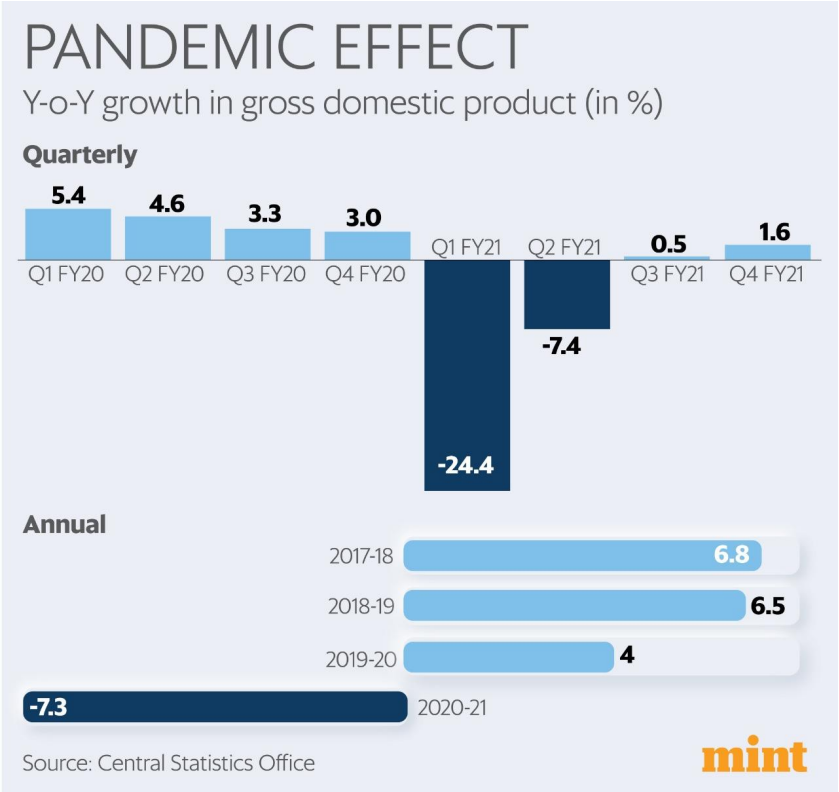
Huge disruption.

Great hardships.

Job losses.

Potentially permanent changes at individual, community enterprise and economic structural level!

How to balance the two?



Questions

1. **How are we placed today? What are the results of the 45 day lockdown?**
2. **What is likely to happen in the future? What are the chances of a third wave?**
3. **How should we prepare for it?**
4. **What is the medium term perspective?**
5. **How has GoM responded as on 29th May, 2021?**

What to measure

Quantity	How	Pros	Cons
Daily New Cases	Test Results	Formal Cases	Testing regime, gaming
Positivity	Test Results	Closer to R-factor	May be gamed
Active Cases	State Departments	Current Workload	Administrative
Daily Deaths	Clinical	**Most significant to society**	Lagging, under-reporting
Hospital Death Rates	Clinical	**Closest to supply side**	Needs data gathering

Positivity, Active: Not as much of concern as deaths! Cases can only be postponed. They cannot be saved. We are trying to save deaths not cases.

Govt. of Maharashtra, 29th May, 2021

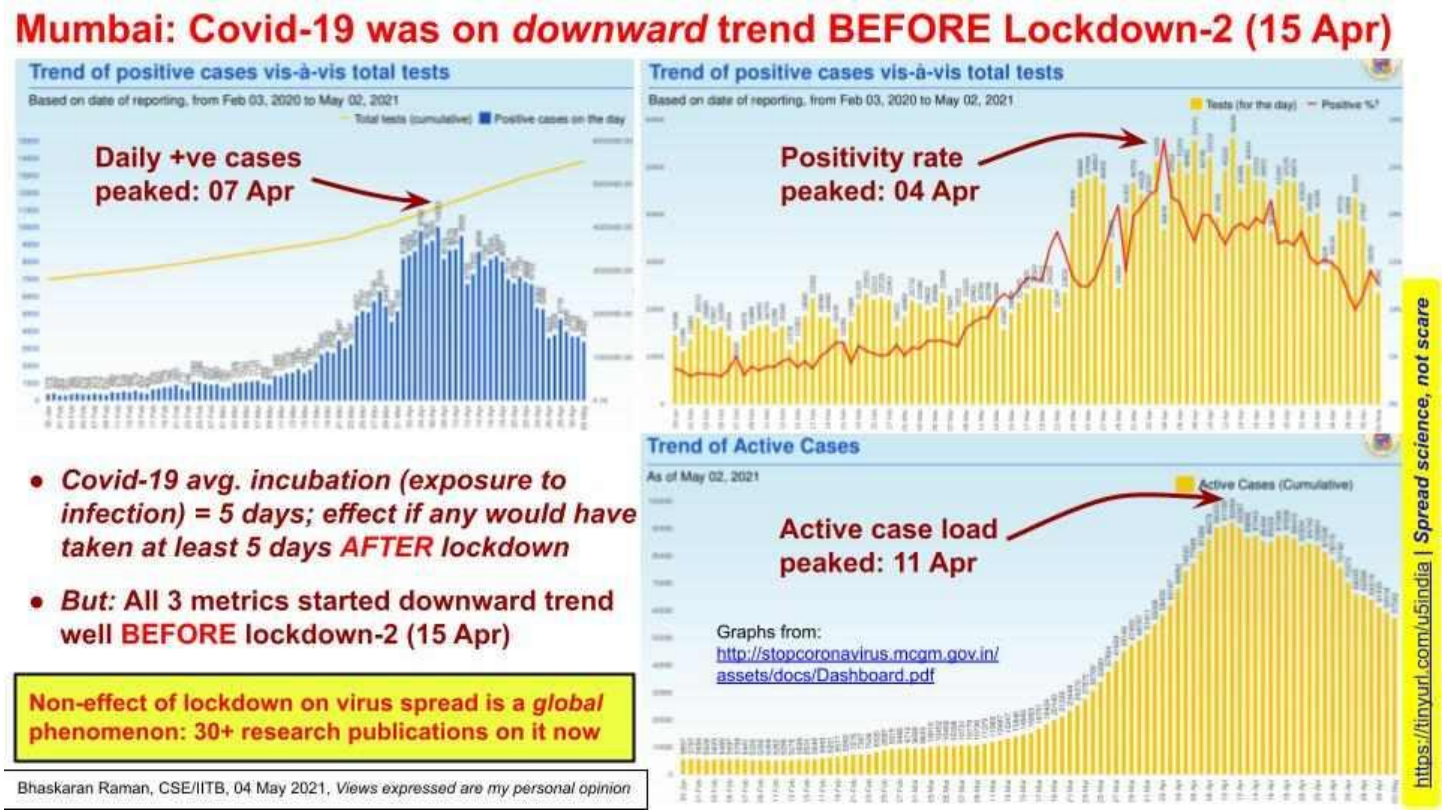
Background

Overwhelming has largely not happened in Wave II. Questions of access and quality. Great transparency. Better communication. Better community cooperation.

New Rules

Cat.	Criteria	Restrictions
A	Positivity <20% AND O2 bed occupancy <40%	Non-essential shops open between 7-2. Movement restrictions continue.
C	Positivity > 20% OR O2 bed occupancy > 75%	District sealed.
B	Between the two	Lockdown continues.

Mumbai - Fall before Lockdown



Pune Dynamics

Both Rural and Urban

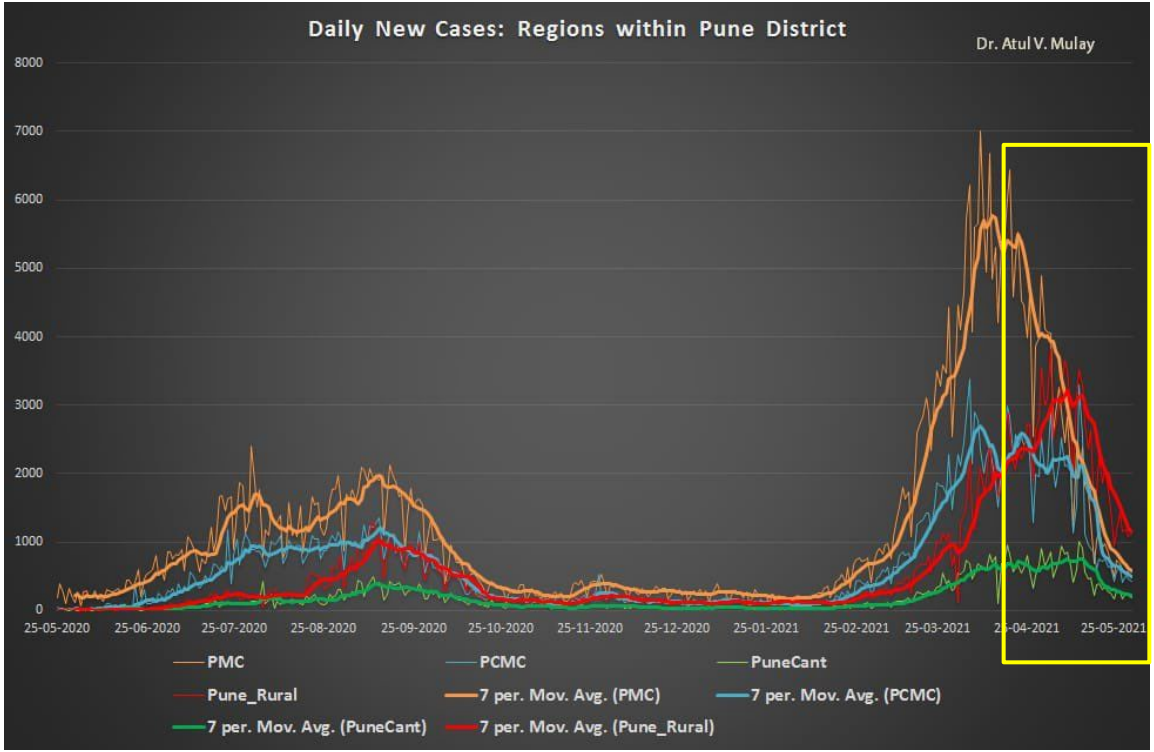
Urban dropped before lockdown.

Rural rose after lockdown!

More things at work…

Prevalence - within geography, community and social contact network

Turn-around at 1000-1200 DPM! - Thane, Pune, Nagpur, Mumbai and also peri-urban districts like Satara, Sangli.

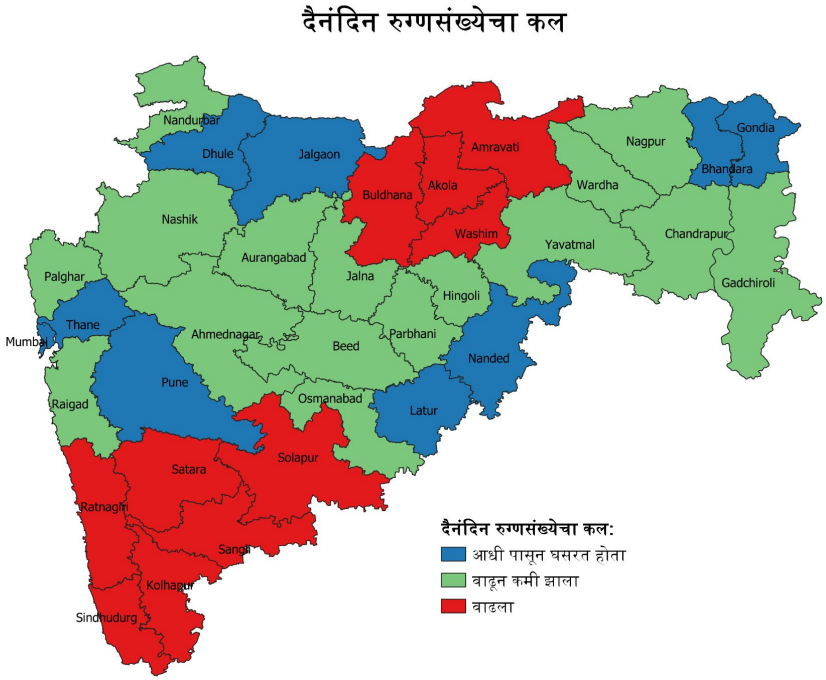


Did the lock-downs work?

- Partly, Thane, Mumbai, Pune already in decline.
- Nashik, Amravati - possibly.
- Kolhapur and 8 other districts, not at all.

Reasons:

- **Extreme lockdowns work. Too infective to be stopped by mild lockdowns.**
- **Prevalence works.**
- **Rural mechanics are different.**



Weekly deaths on April 14th, 29th and May 13th,

How are we doing?

Clinically: 700 DPM. One of the largest in India. But factual reporting is a great virtue. Brings trust and partnership. Comparable to international reporting.

Less sharp rise than other states. At least 2500 cases throughout - Smoother spike. Better provisioning including Oxygen.

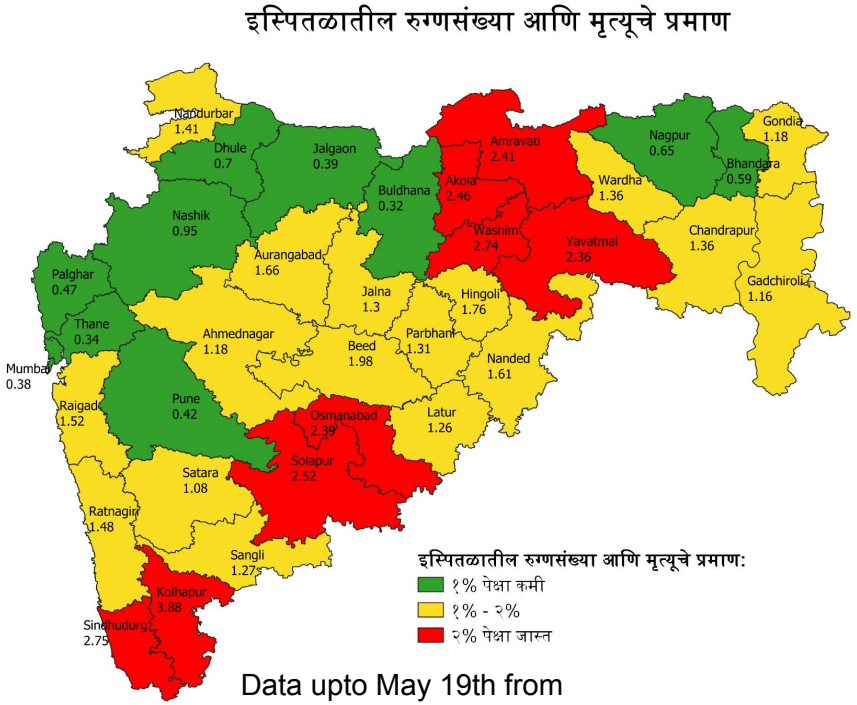
Economic and social costs rising. Education and basic governance.

MH: LPR, UER & GUER(%) Monthly Estimates by Region Type

	Total			Urban			Rural		
	LPR	UER	GUER	LPR	UER	GUER	LPR	UER	GUER
January 2021	42.68	3.79	4.26	36.95	4.60	5.65	47.84	3.23	3.28
February 2021	43.04	3.75	4.27	35.95	4.65	5.68	49.44	3.17	3.34
March 2021	44.16	3.55	3.72	36.64	4.73	5.06	50.97	2.78	2.84
April 2021	40.64	5.47	6.29	35.78	5.38	6.15	45.02	5.53	6.39

Hospital/Case Regression Death Rates

- Great variation in death rates.
- 0.5% for key cities
- 2-2.5% in rural areas
- 1-2% in intermediate cities
- **Causes - capacity, quality, access.**
- Rural Transmission following a different script
- Rural Spread - a key concern



Data upto May 19th from covid19india.org

Comparing Mortalities

District	CFR 1 (upto Jan. 1)	CFR 2 (After Jan. 1)	Hosp. Mort. (after. Jan. 1)
Mumbai	3.8	2.1	0.38
Pune	2.1	1.2	0.42
Nagpur	2.5	1.3	0.65
Osmanabad	3.2	2.3	2.39
Amravati	1.9	1.6	2.10
Nandurbar	2.0	2.1	1.41
Maharashtra	**2.6**	**1.7**	**1.03**

Longer hospital stays, Better Care -> Lower mortality

What about the future?

1. Existing prevalence - Communities, wards and villages visited earlier have been affected much less.
2. 57 Lakh confirmed: Roughly 25%-40% prevalence. Needs to be checked by clinical surveys.
3. Key metric is DPM: deaths per million. Mumbai, Pune, Nagpur at 1200 DPM. More at risk are rural areas and districts/towns with <500 DPM.
4. No indication that there will be a “youth” or “children” wave. No record elsewhere in the world.

We need to be prepared: Norms on hospitalization fatality rate < 1%, 1-per-thousand O2 beds, DPM alerts, O2 and other requirement.

Wave I vs. Wave II - The Dharavi effect.

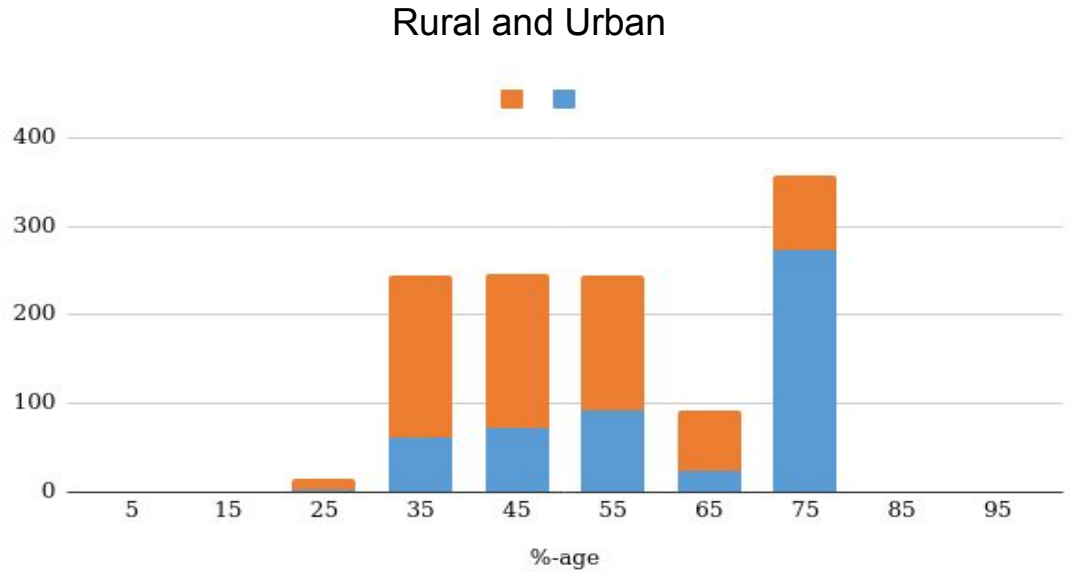
Y axis: population in lakhs

X axis: districts grouped by %-age deaths in Wave I.

Bi-modality seen even at the district level!

Wave I : largely urban and poor and middle

Wave II urban middle and upper class and beginning of rural spread.



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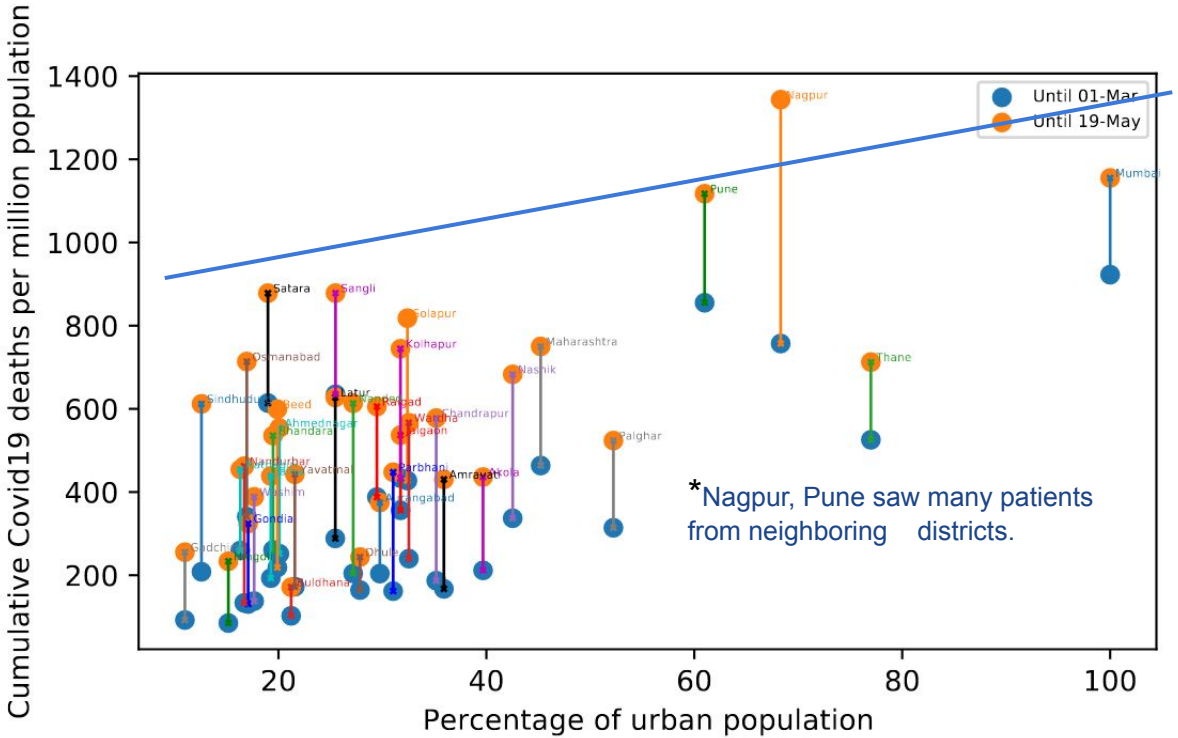
Wave I and Wave II - DPM Thresholds

(given reporting standards of Maharashtra).



Prevalence

1000-1200 DPM for urban.

700-1000 for rural/peri-urban

Indicates prevalence and the transition point for current infectivity.

Likely turning point for waves

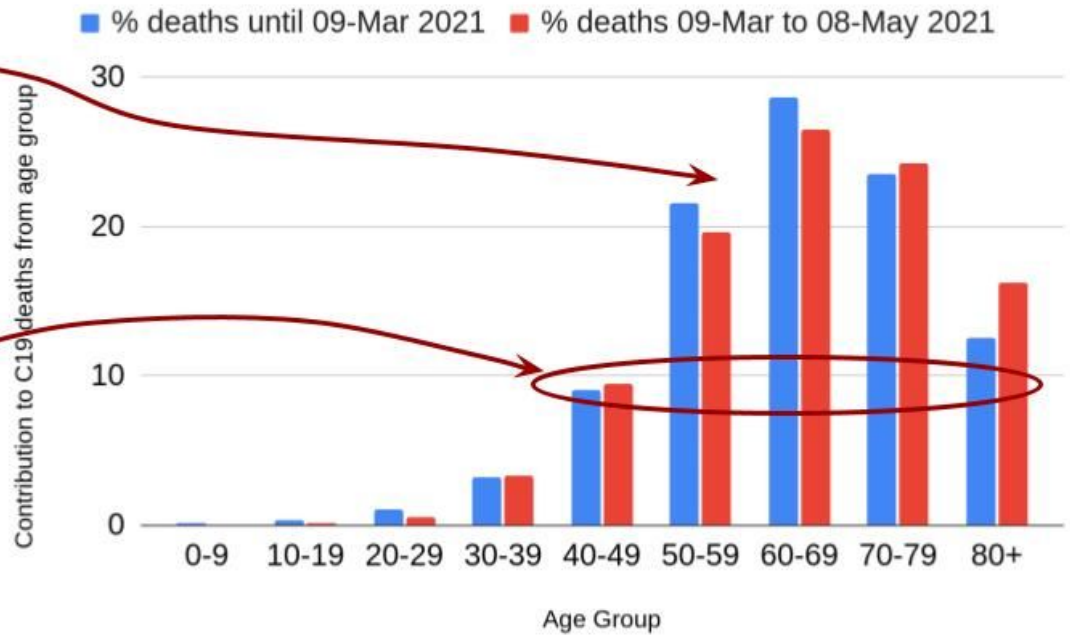
Data upto May 19th from covid19india.org

Mumbai : No change in age-profile.

Mumbai C19 Deaths: Age-Group Wise Breakup

(1) Over 86% of deaths in >50 category ⇒ lockdown is NOT the answer, focused protection of elderly is a better option for hospital management; https://gbdeclaration.org/

(2) As per this data, second wave is similar to first wave in terms of age-differential risk



Data source: http://stopcoronavirus.mcgm.gov.in/assets/docs/Dashboard.pdf

https://tinyurl.com/u5india | ***Spread facts, not fear***

Bhaskaran Raman, CSE/IITB, 09 May 2021, *Views expressed are my personal opinion*

What to do? - Disease Management

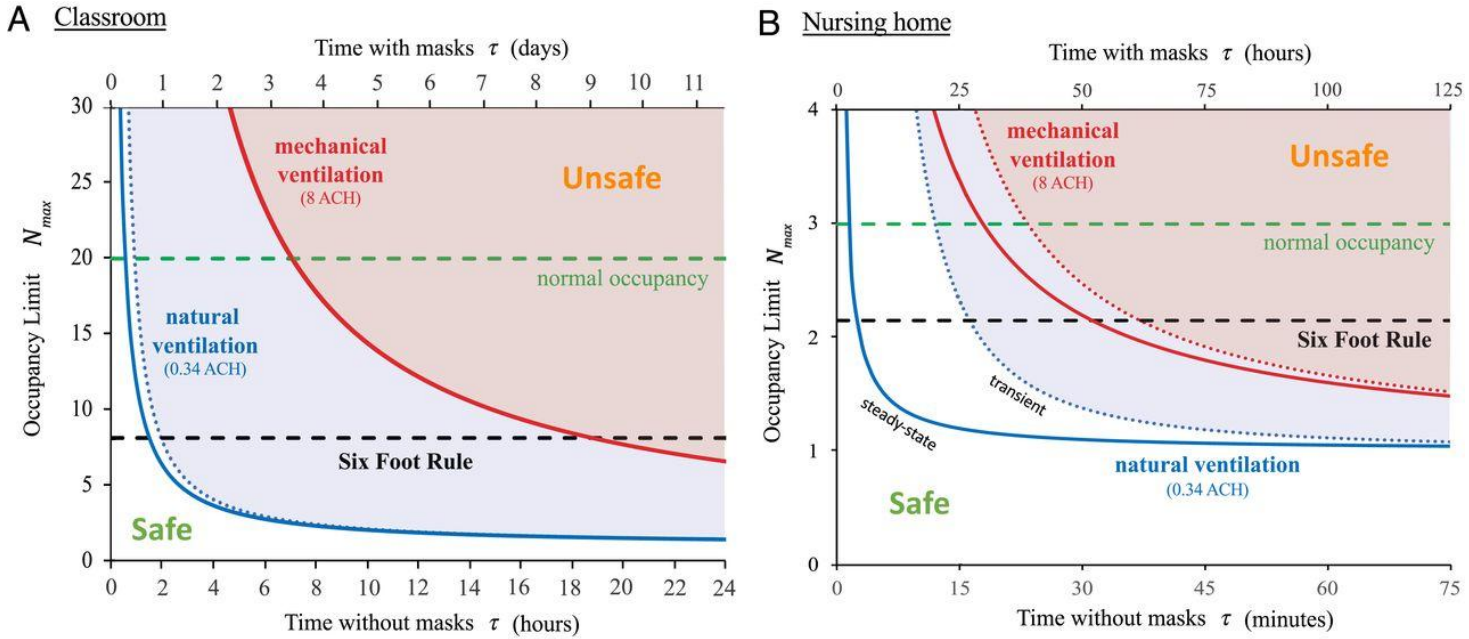
1. Measure and bring down hospital death rate < 1% per day.
2. Readiness for 1-O2-bed-1000 population.

Norm	**Action**	**Nasik City (pop. 20L, 2020)**	**Nanded Dist. (pop. 33L, 2011)**
2 DPM-per-day	New Normal	4 deaths	7 deaths
4 DMP-per-day	Alert	8 deaths	14 deaths
6 DPM-per-day	Restrictions	12 deaths	21 deaths
O2 Beds		2000	3300

What to do - Socio-Economic

1. Research on ventilation to start schools, colleges and offices.
2. Corona-proofing education, small industries.
3. Focus on small and medium enterprises - improve market share, quality, robustness.
4. Increase participation of civil society in resilience management, data and analysis.
5. Revamp District and City planning offices. Dashboard, governance, local problems, coordination.
6. Special role for universities in evaluation, support and local R&D.

Bazant and Bush, PNAS, April 2021.



Importance of ventilation, amplified by masks.

Govt. of Maharashtra: The good and the bad

Good

1. Hospital Occupancy - first supply side criteria. Opening for scientific discussion.
2. Recognition that rural is following a different trajectory.
3. Broad coalition of experts and industry.
4. Mentions long-term resilience to Covid-19. Corona-proofing sectors.

Not so good.

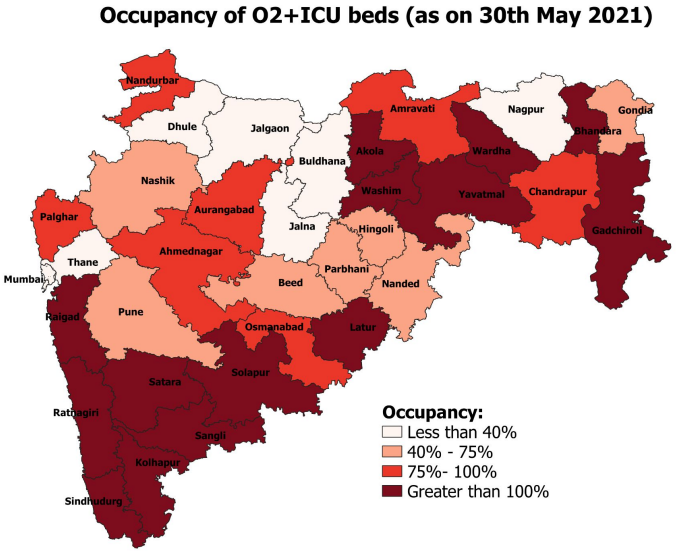
1. Misses death rates as an important quality indicator.
2. 3rd wave fears, esp. In children.
3. Ignores Prevalence as an important player.
4. No thoughts on re-starting the economy, or education.
5. Corona - “mukti” and “winning the war” myths
6. Little concrete data.

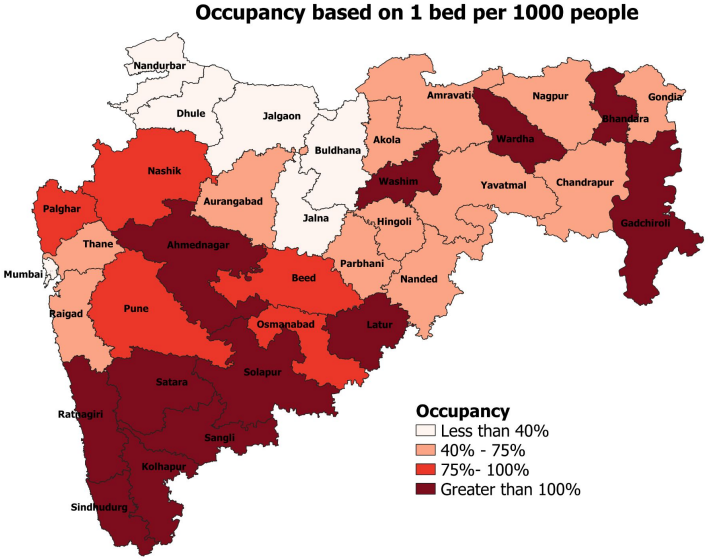
GoI-GoM comparison:

GoI largely clueless.

- Provided no frameworks for hospital management.
- No scientific guidance on risks and opening.
- No scientific research on risk mitigation, e.g., ventilation.

Coming back...what do the O2 beds show?





Under-served: Nandurbar, Raigad, most Vidarbha districts other than Nagpur

Better-served: Thane, Pune, Nashik, Ahmednagar, Beed, Nanded

Conclusions

Need to re-start - with great care.

1. Extreme lockdowns work. Usual lockdowns diminish trends but do not change them.
2. **Prevalence - and future vaccinations,** key factors in future waves of diminishing impact.
3. **Mass communication and comprehension** - as in Pune/Mumbai - best bet. Rural communication needs to be worked out.
4. **Medical care - key area where improvements are needed** - and they work. Concrete performance criteria. Again, rural supply chain of medical care needs to be worked out.
5. **Concrete threshold-based restrictions** - strongly recommended. Leads to better understanding of material, personnel constraints, to incorporate scientific facts, and to marshal public appeal.
6. **Scientific and Statistical ways of Covid-proofing key activities.**