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Webinar on COVID-19 Pandemic Report

May 26, 2020
1030 to 1200 IST



Palash Shah



Abhijit Pal



Megha Garg



Swati Gupta



Manish Sen

Programme

May 26, 2020, Tuesday, 1030 to 1200 IST

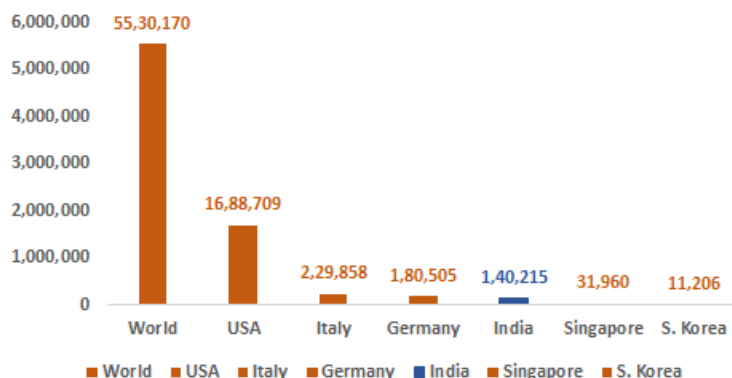
No	Time	Sessions	Speaker
1	1030 to 1040	Introduction	Mr. Sunil Sharma/ Mr. Heerak Basu/ Mr. Kailash Mittal
2	1040 to 1100	Learnings from Overseas	Mr. Tanay Chandra/ Ms. Archana Anoor
3	1100 to 1130	Models & Projections	Mr. Palash Shah/ Mr. Abhijit Pal/Mr. Kailash Mittal/ Ms. Megha Garg
4	1130 to 1145	Products: Global Trends and coverage	Ms. Swati Gupta/ Mr. Manish Sen
5	1145 to 1150	Summary	Mr. Heerak Basu
6	1150 to 1200	Q&A	

Learnings from Overseas

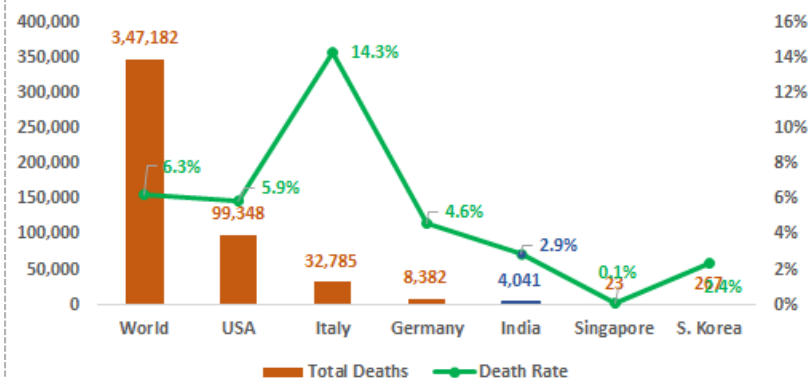


Country Experience – World

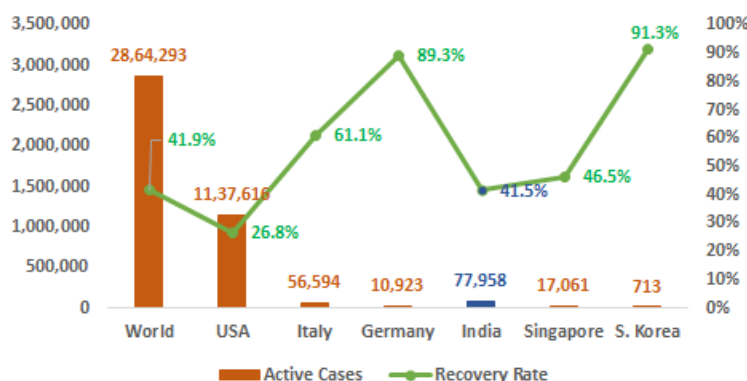
Total Cases



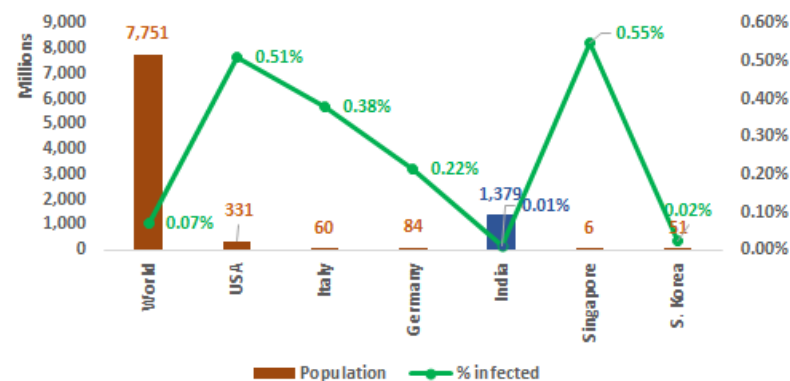
Death and Death Rate



Active cases and Recovery Rate



% of Population Infected (Confirmed cases)

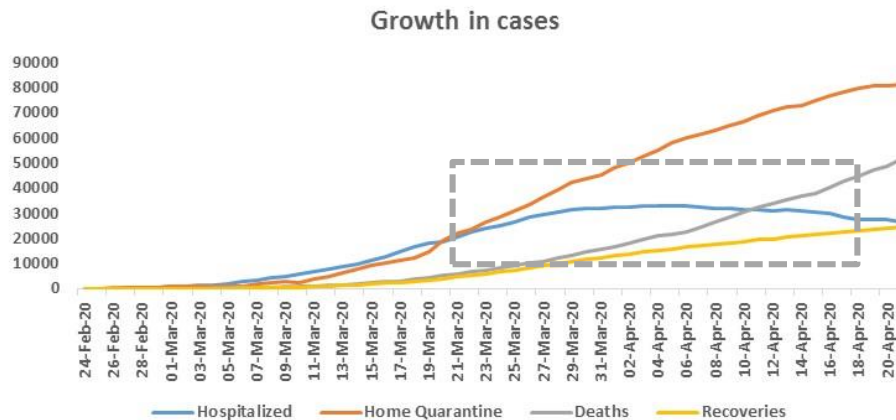


World has come to a halt

- 200+ countries impacted
- 5.5 Million people affected and 347K deaths
- Severe economic and behavioural impact

Country Experience – Italy

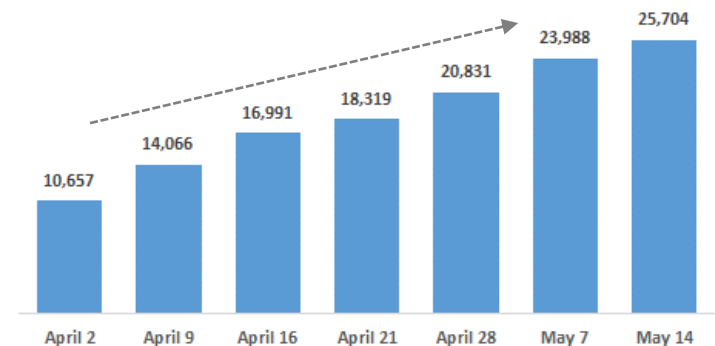
Confirmed: 2,29,658 | Active: 56,594 (25%) | Deaths: 32,785 (14%) | Recovered: 1,40,479 (61%) *



- COVID-19 coincided with Influenza season
- Hospitals could have unknowingly become hotspots
- Large gathering for matches and trade fair also linked to spread
- Health care system put under stress, 25K medical staff affected by virus

- 50+ age account for ~ 70% of total cases and ~ 98% of total deaths
- Male Case Fatality Rate (CFR) ~15% is ~ double of Female fatality rate
- Mumbai, population density is ~ 1.75 times that of worst affected cities like Milan

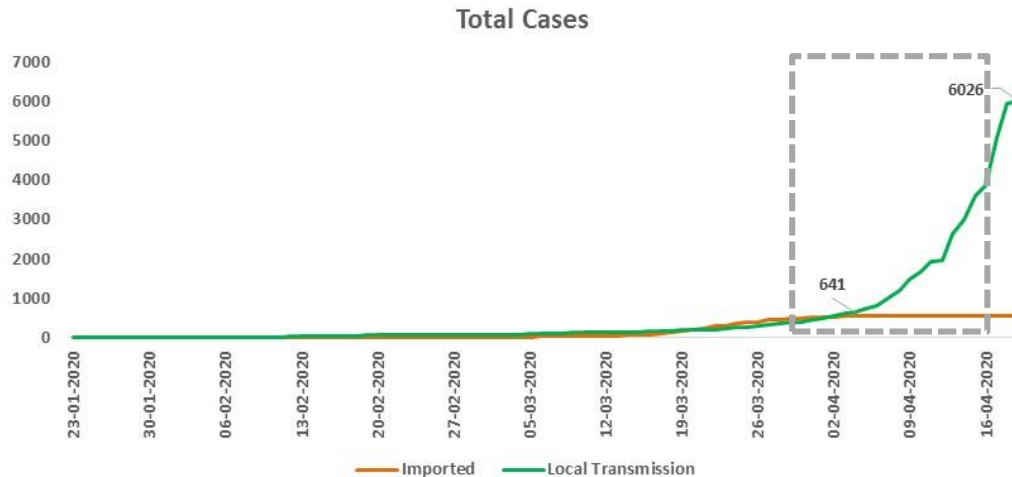
Health Care personnel infected by COVID



India cannot afford to stress its Healthcare system | Population has to follow protocols

Country Experience – Singapore

Confirmed: 31,960 | **Active: 17,061 (53%)** | **Deaths: 23 (0.1%)** | **Recovered: 14,876 (47%)** *

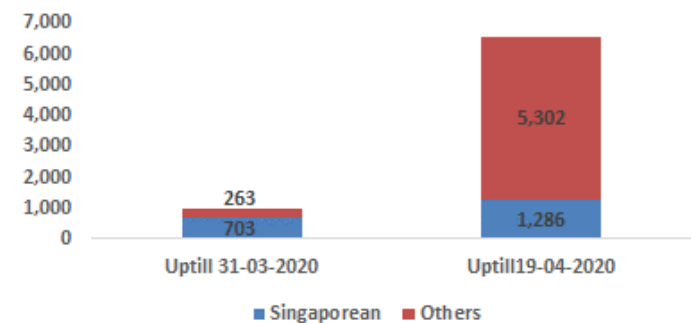


- Aggressive contact tracing ensured contained spread (especially imported). Mar end ~ 1000 cases.
- Steep rise due to cluster spread in dormitories. 400% increase in cases in first 2 weeks of April.

(Local transmission is community spread from people with no travel history)

- Spread mainly in migrant workers from India, Bangladesh living in 43 mega-dormitories with ~ 20 people in a room and common facilities.
- S11 Dormitory in Punggol has 2,302 confirmed cases, ~ 12% of total cases.

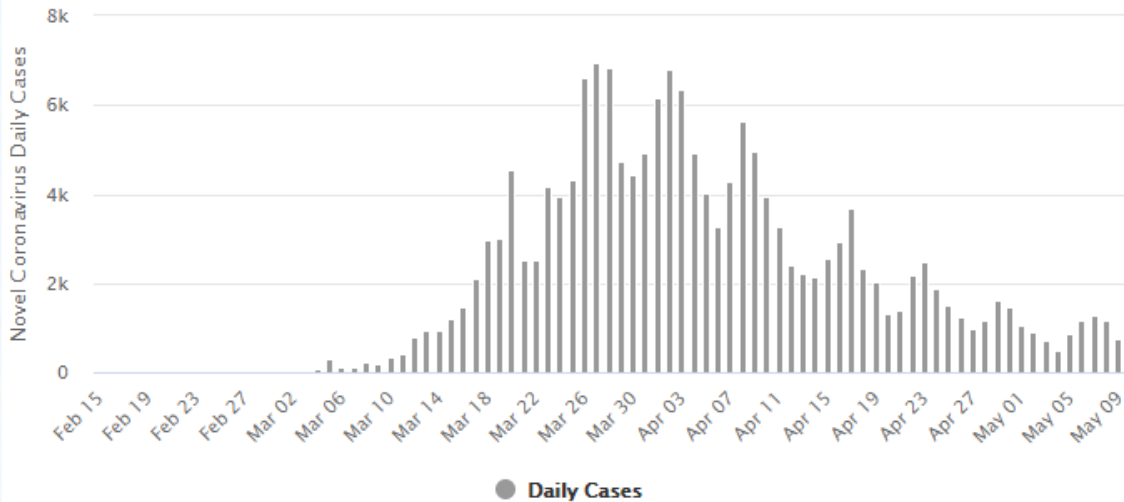
Total Cases by Nationality



Cluster spread risk is significant and how it is managed will define the impact of pandemic

Country Experience – Germany

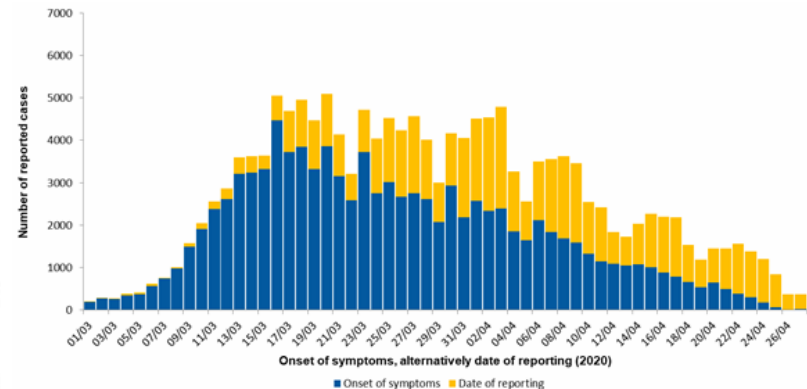
Confirmed: 1,80,505 | **Active: 10,923 (6.1%)** | **Deaths: 8,382 (4.6%)** | **Recovered: 1,61,200 (89.3%)** *



4 key aspects:

- Protection of vulnerable segments of the population
- Diagnostics (3.6M tests done)
- Development of drugs and vaccines, and
- Information and education.

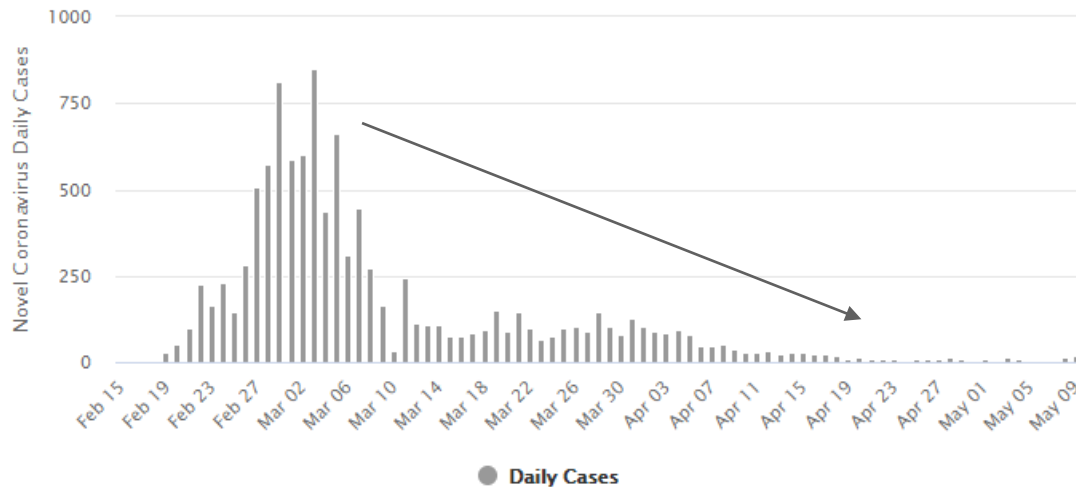
- Quick to respond to the pandemic
- Reliable tests were rolled out by mid-Feb
- Private testing labs roped in at early stage
- Able to identify asymptomatic cases and reduce the transmission rate
- High ratio of hospital (8) and ICU beds (6) per 1000 people leads to high recoveries
- Deaths are among the lowest in developed countries



Testing included government and private labs collaboration and high ICU bed ratio are key

Country Experience – South Korea

Confirmed: 11,206 | **Active: 713 (6.4%)** | **Deaths: 267 (2.4%)** | **Recovered: 10,226 (91.3%)** *



Flattened the curve:

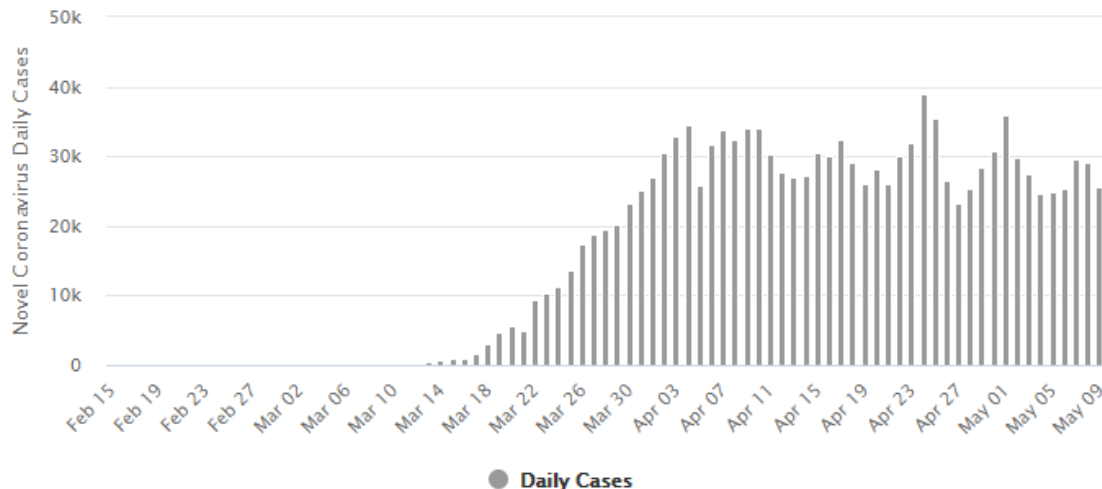
- Average daily new cases ~ 20 over last 1 month
- One of the countries with the highest recovery rate

- Their mantra: test, trace and treat.
- Aggressive Contact tracing
- Case no 31, Super spreader: A single patient known as the super spreader is believed to have infected ~ 45% of the total confirmed cases as of today
- Pioneered various ways of testing like drive-through testing facilities in a short period of time
- Discipline showed by the population in quarantine

Accessibility of testing, usage of data and technology to trace and monitor quarantine is key

Country Experience – USA

Confirmed: 16,88,709 | **Active: 11,37,616 (67%)** | **Deaths: 99,348 (6%)** | **Recovered: 4,51,745 (27%)** *



- Accounts for 31% of World's cases
- Average daily cases ~22,000
- Has accounted for highest number of deaths

- At 14 Million, testing is among the highest in the world
- Transmission Rate is slowing but away from flattening
- 17% of the USA population is 65 or older, more than 32% of cases have been recorded for this age bracket.

- ~80% of deaths are from older age
- New York accounts for 22% of total cases but ~30% of total deaths
- High population density and lack of adherence to social distancing protocol at initial stage is suspected to be cause of spread

Lockdown, Social Distancing protocol, Rapid testing and increasing capacity in hospitals are key

Country Experience – Others

Sweden: ~34K confirmed cases (0.36% of population), CFR high at ~12% against world's average of 6.3%

- No formal lockdown, tested with herd immunity
- Government guidelines on social distancing, hand washing, avoiding non-essential travel, elderly asked to avoid contact with others
- Gatherings of more than 50 people were banned
- Schools that cater to children under 16 remained open
- Bars, restaurants, and gyms also stayed open with social distancing

UK: ~259K confirmed cases (0.38% of population), very high CFR in Europe at ~14.2%

- Tried with the idea of Herd-Immunity initially
- Reverted to lockdown approach based the forecast by epidemiologists at Imperial College London

China: ~83K confirmed cases (0.01% of population), and CFR of 5.6%

- Concerns over resurgence of the virus (in Shulan) which is showing slightly different characteristics (with longer incubation period) is observed
- In Wuhan, the country is aiming to mass test its 11 Million population to stem the second wave

Poll 1



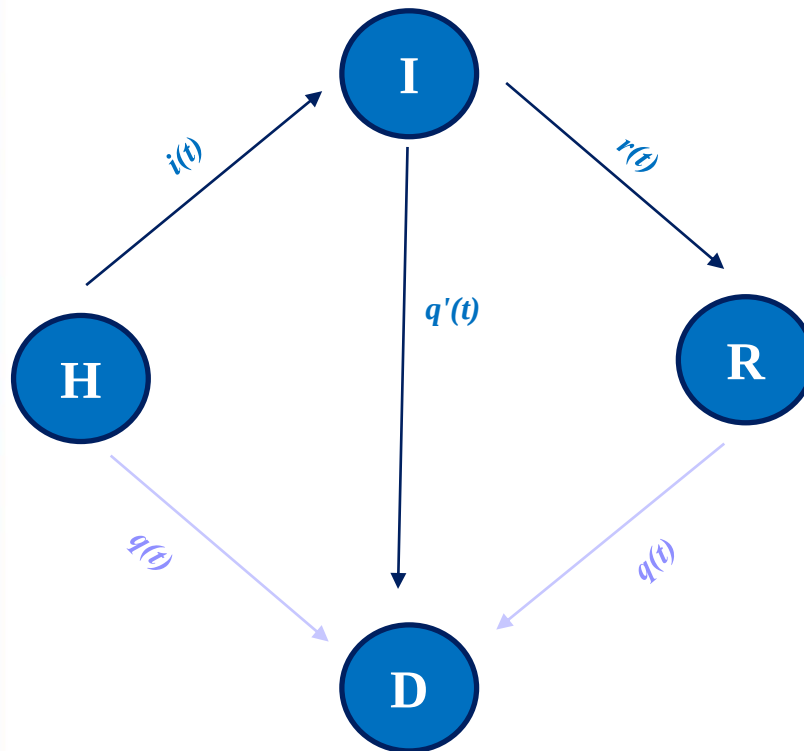
Models & Projections



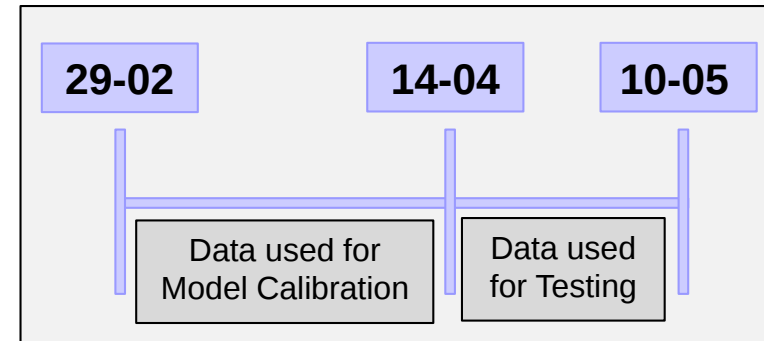
Models & Projections: HIRD model



HIRD Model – Model Construct



$i(t)$ -> Probability of getting infected
 $r(t)$ -> Probability of getting cured
 $q(t)$ -> Population Mortality (Not Modelled)
 $q'(t)$ -> Case Fatality Rate (Death due to COVID-19)



H -> Healthy

State contains "Able to Infect" Lives (Lives seem healthy but carrying the virus).

I -> Infected

State contains "Symptomatic" Lives.

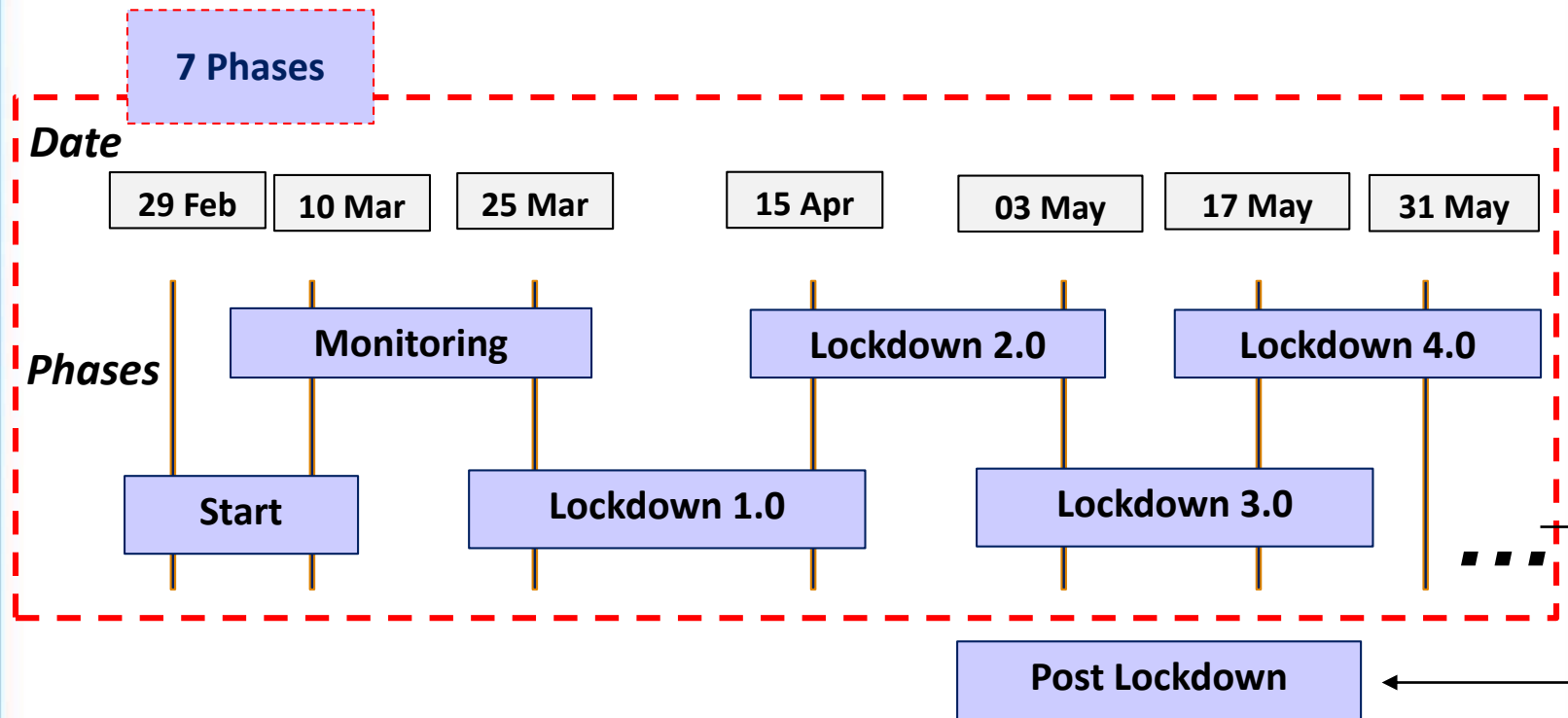
R -> Recovered

State contains Lives Recovered from COVID-19

D -> Dead

State contains Deaths due to COVID-19

HIRD Model – Parameter Estimation



Impact of changes in testing strategy

The impact of changes in testing strategy has been excluded from our model construct.

HIRD Model – Parameter Estimation



→ Day 0 → 29th February → No. of Infected = 1

→ No. of Infected @ $t+1$ = No. of Infected @ 't' * $(1 + \text{Transmission Rate @ time 't'})$

→ *What happens between two States ???*

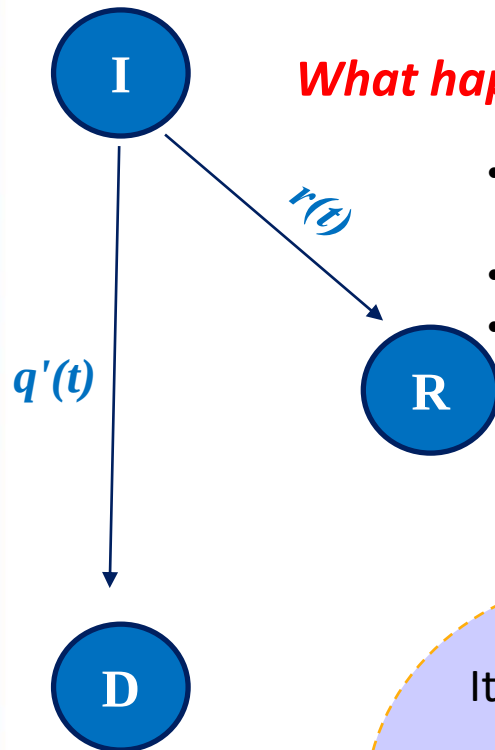
1. Application of Transmission Rate (Phase wise)
2. Application of Ratio of Symptomatic Cases (30%)
3. Recoveries of Asymptomatic Cases ~ Poisson(10)
4. Incubation Period for Symptomatic Cases ~ Poisson(5.5)

→ *Why Poisson ???* 1. Negatively Skewed 2. Lower Mean 3. Easier to Fit

Derivation: Due to non-availability of any prior assumption for transmission rates, these have been derived by minimizing the chi-squared total

HIRD Model – Parameter Estimation

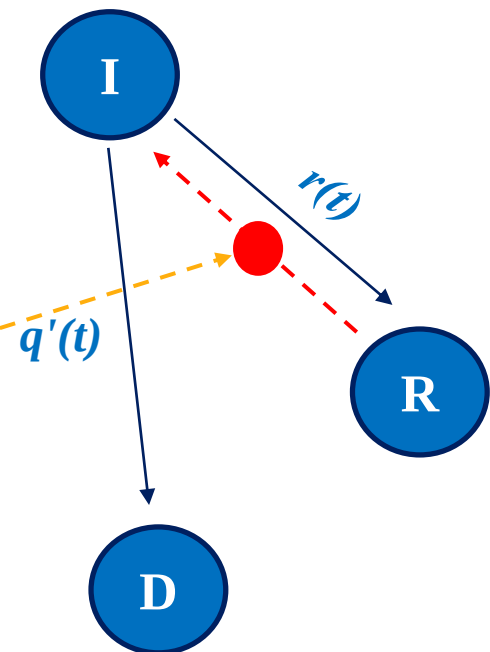
Deaths and Recoveries



What happens after a case is found to be Symptomatic ?

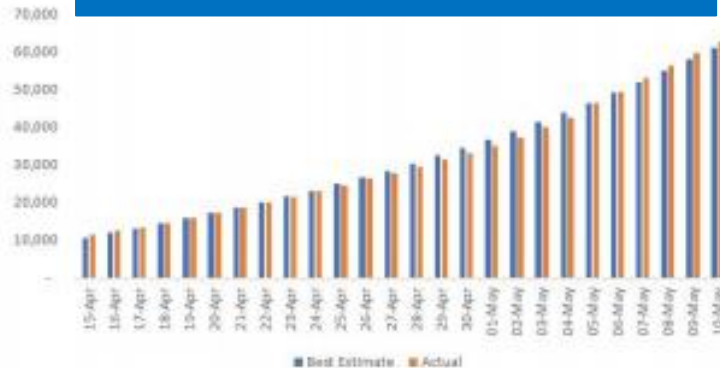
- Application of Mortality Rate @ 5% and Recovery Rate @ 95% ($1 - \text{Mortality Rate}$)
- Time-Lag applied to Deaths $\sim$ Poisson (7)
- Application of Recovery Lag (Symptomatic) $\sim$ Poisson (18.25)

It was assumed that the recovered cases are not getting infected again

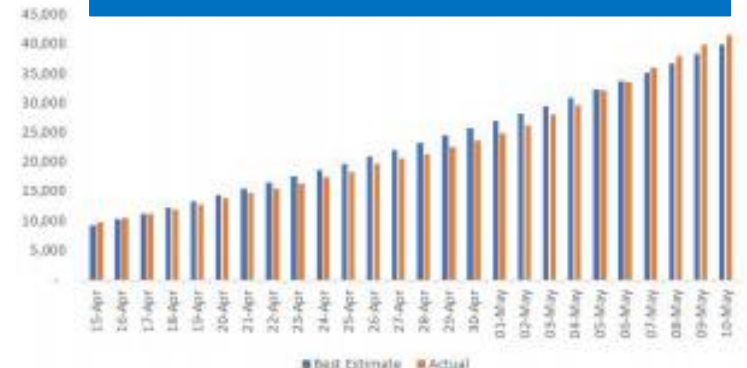


HIRD Model – Testing *(15th April till 10th May)*

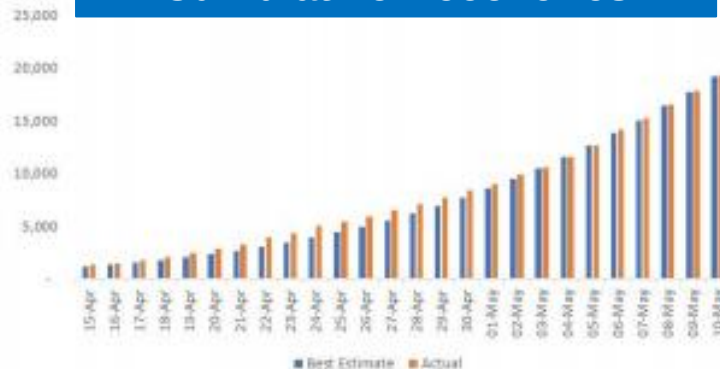
Cumulative Confirmed Cases



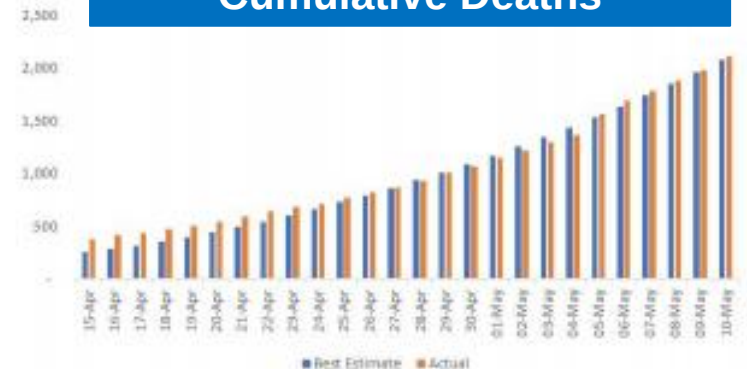
Cumulative Active Cases



Cumulative Recoveries



Cumulative Deaths

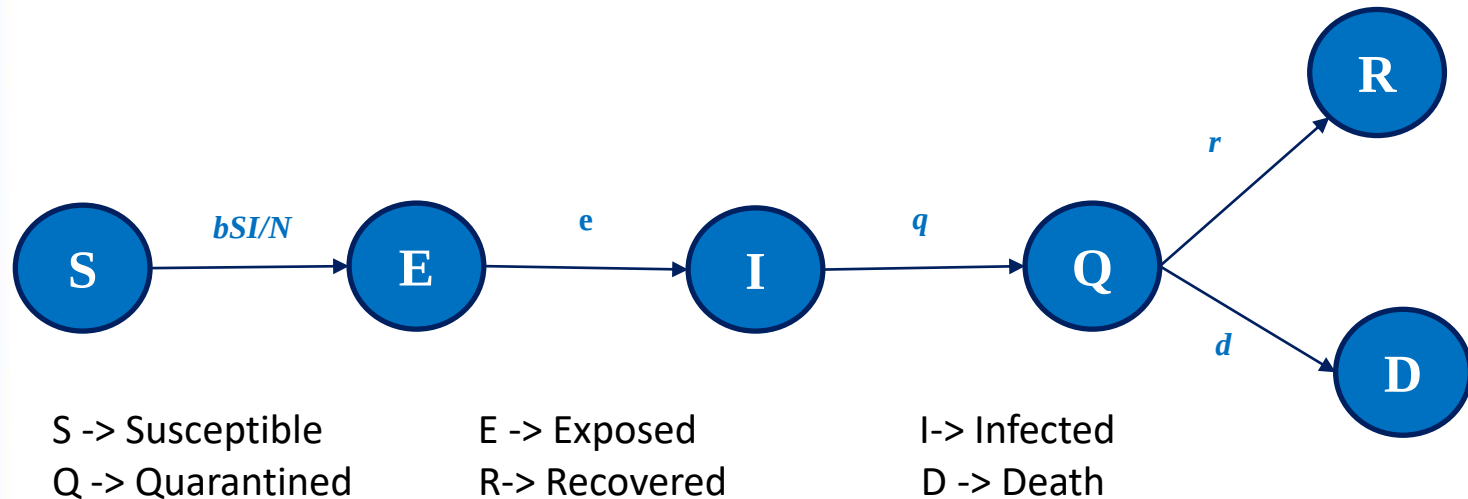


Back-testing was mainly done for above numbers with an acceptable error limit of +/- 5%

Models & Projections: SEIR model



SEIR Model – Model Construct



- b : expected number of people an infected person infects per day (R_0 per day). Hence, $b = \text{number of contacts per infected person per day} \times \text{probability of transmission}$
- e : Proportion of exposed being infectious per day, $e = (1/\text{incubation period})$,
- q : Proportion of infected quarantined per day. $q = (1/\text{number of days between a person getting infected and diagnosed})$.
- r : Proportion of quarantined recovered per day. $r = (1/\text{time to being recovered})$.
- d : Proportion of quarantined died per day. $d = (1/\text{time to die})$
- N : total population in which the disease can spread

SEIR Model – Assumptions

- A person is in exposed state for the duration of incubation period.
- All demographic changes in the population (i.e., births, deaths, and ageing) are ignored.
- This is a closed system with a constant population size.
- As a person enters the “Recovered” stage, he/she cannot be under “Susceptible” again.
- Exposed, Infected and Quarantined migrate at a constant rate.

SEIR Model – Parameters Estimation



- Reliable data was consistently and readily available only for cumulative Active, Recovery and Death cases for the country.
- The granularity of the data required to estimate the transition probabilities between the various states was not available.
- Hence, lives in the Exposed and Infected state were estimated based on the active cases at a given start date.
- It has been observed that:
 - There is a gap of almost a month between the first three and subsequent cases.
 - Post 22nd March, no international flight landed in India. Hence, people who had got the infection by travelling to other countries came to India till that date.
 - Lockdown was enforced from 25th March. The lockdown was enforced relatively early (compared to other developed countries) and the total number of cases were very low.
 - The base date for the model was set as 24th March.

The timeframe was divided into three phases namely Pre-Lockdown, Lockdown and Post Lockdown phase

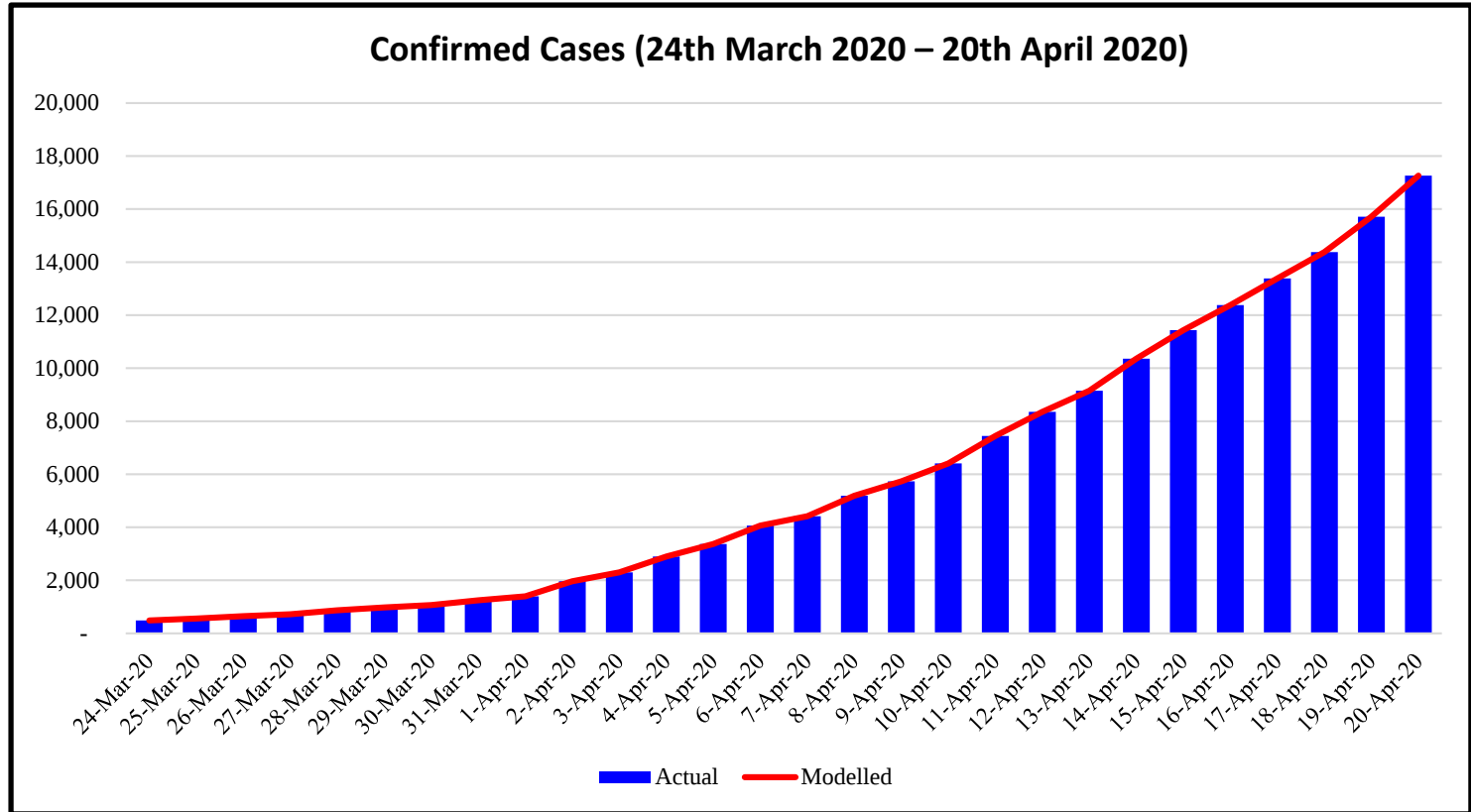
SEIR Model – Parameters Estimation

Phase	Pre-Lockdown	Lockdown	Post Lockdown
Dates	30 th January – 23 rd March	24 th March – 17 th May	18 th May Onwards (assumed)
Transmission rate per day	0.9	0.72	0.8
Average incubation period (days)	5	5	5
Average lag between infectious & Testing (days)	3	2	1.1
Daily recovery rate	1.43%	3.03%	3.33%
Daily death rate	0.50%	0.36%	0.29%

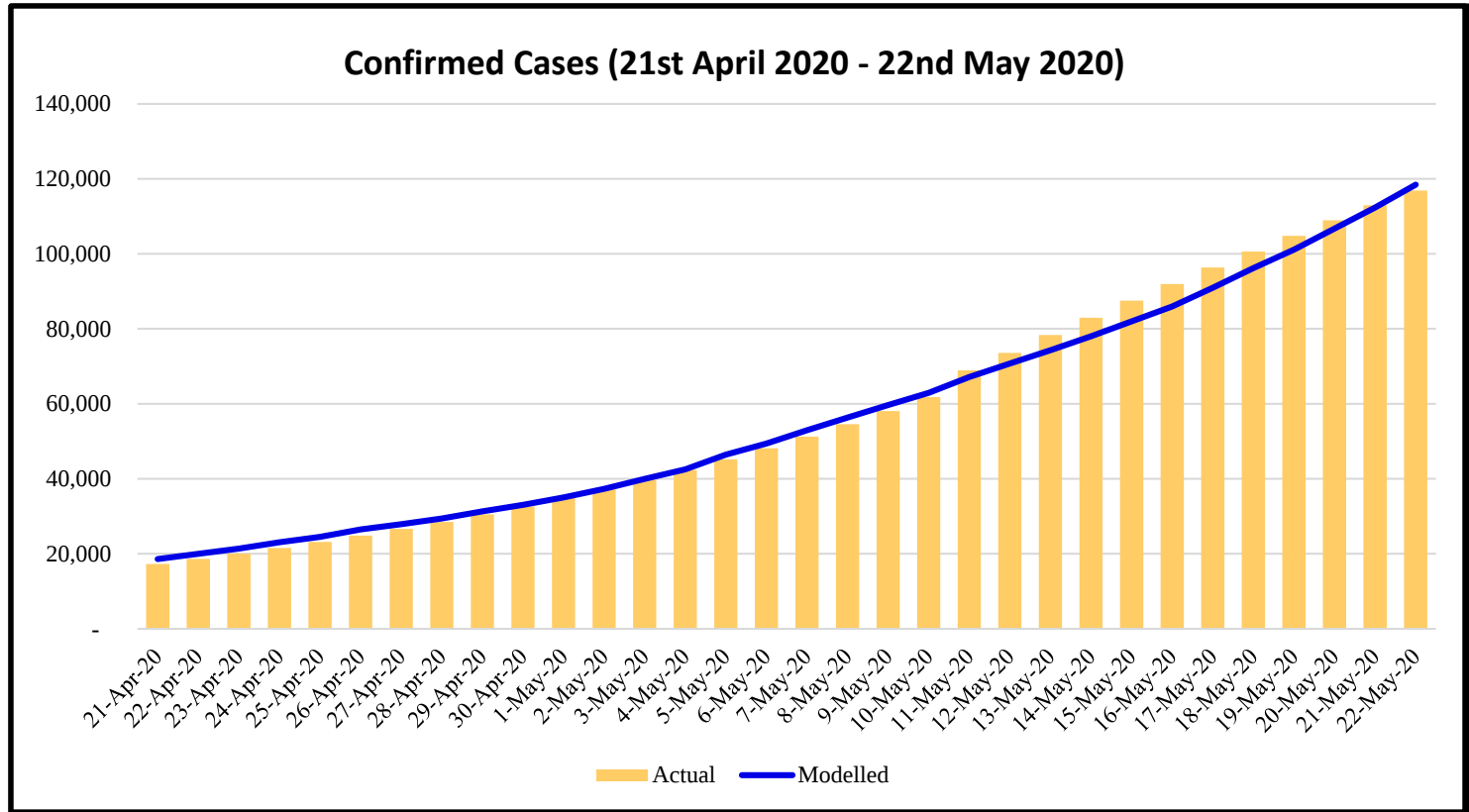
- There are no published studies based on Indian data that have empirically established the above parameters.
- Hence, the parameters have been estimated based on anecdotal evidences, actuarial judgement as well as observing patterns in the actual data.
- Any error in the reporting of the data is also part of the parameters' estimation

Parameters have been estimated using the actual case data till 20th April 2020.

SEIR Model – Model fit



SEIR Model – Model test



Models & Projections: Projections



Projections- Background

Model Used: HIRD | Sense Check: SEIR model | Data: Up to 14th April

Projection results are highly susceptible to:

- Whether the lockdown continues
- Adherence to social distancing norms by the citizens
- Contact tracing / testing capacity
- Availability of quarantine facilities and Intensive care facilities

Poll 2

Expected impacts in future, as lockdown relaxes:

- Public transport becomes operational
- Social distancing norms become harder to adhere to
- Another spike in the coming week
- Lag in the impact

Projections – Scenarios

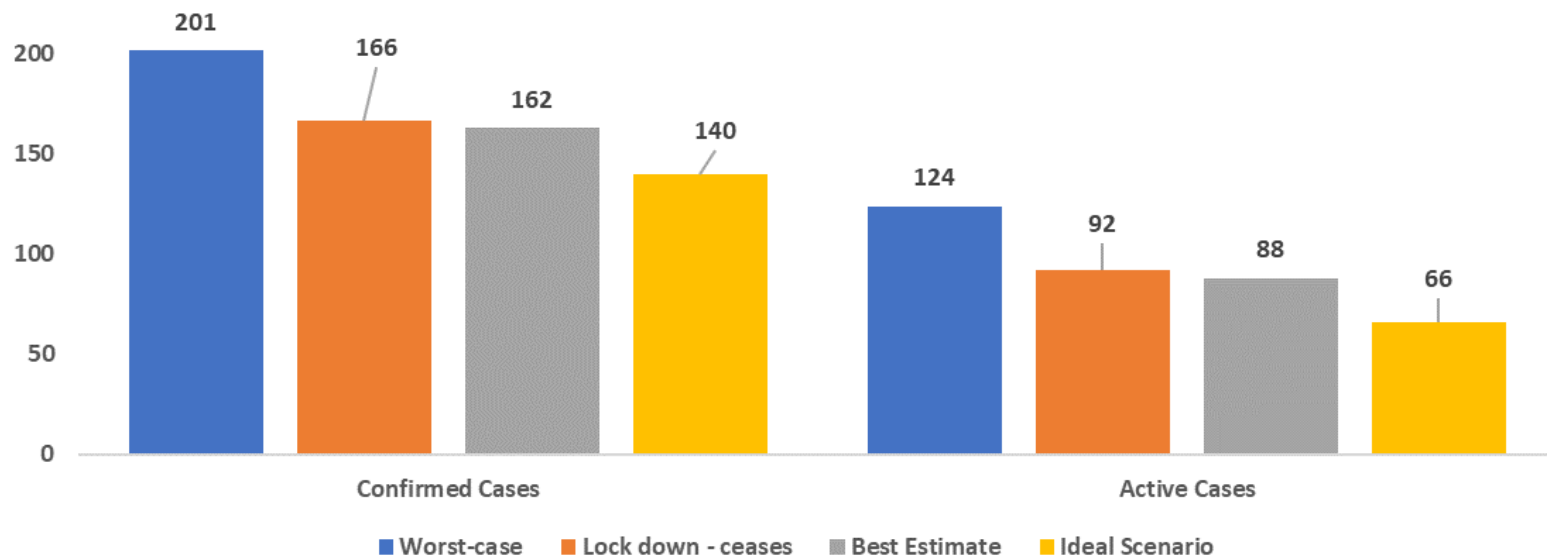
Till when does the lockdown continue | Adherence to social distancing norms

	<u>Phase</u>	<u>May 4 to May 17</u>	<u>May18 to end-May</u>	<u>June 2020</u>
Worst-case	Lockdown status	Lockdown - with relaxation	No lockdown	
	Social distancing norms	Not followed uniformly	Not followed	
	Transmission Rate for Jun'20			1.143 (7:1)
Lockdown- ceases	Lockdown status	Lockdown - with relaxation	No lockdown	No lockdown
	Social distancing norms	Followed		Followed partly
	Transmission Rate for Jun'20			1.125 (8:1)
Best- estimate	Lockdown status	Lockdown – with relaxation		
	Social distancing norms	Followed		
	Transmission Rate for Jun'20			1.100 (10:1)
Ideal Scenario	Lockdown status	Lockdown – limited relaxation		Lockdown – with relaxation
	Social distancing norms	Strictly followed		
	Transmission Rate for Jun'20			1.067 (15:1)

Poll 3



Projections – Expected May 31



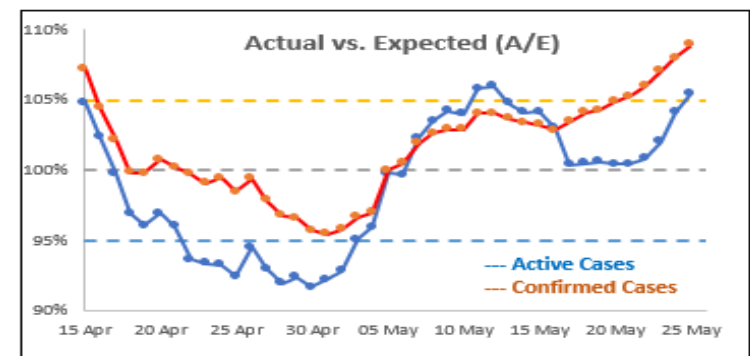
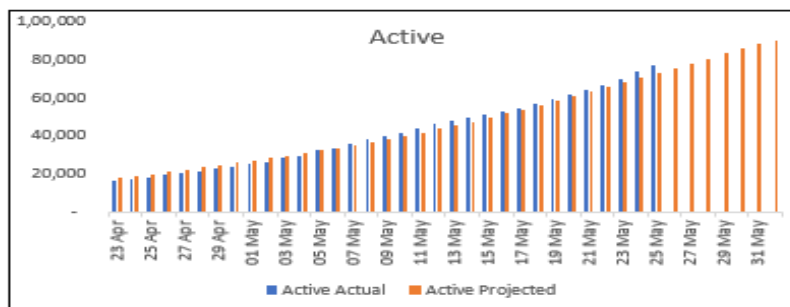
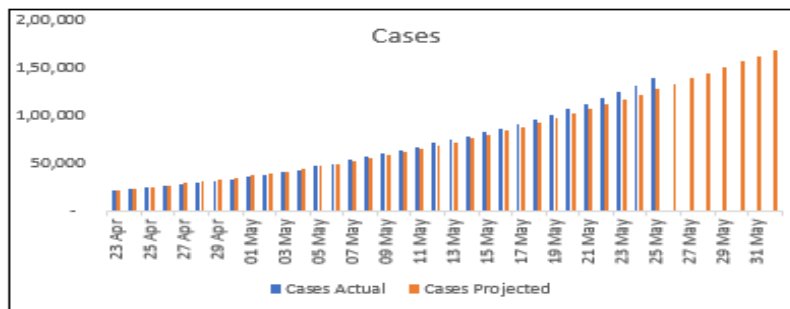
(All above figures are in '000)

Projections – Latest update



Date	2020-05-20		2020-05-21		2020-05-22		2020-05-23		2020-05-24	
	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected
Cases Confirmed	1,06,750	1,01,814	1,12,359	1,06,728	1,18,447	1,11,747	1,25,101	1,16,869	1,31,868	1,22,103
Deaths	3,303	3,610	3,435	3,801	3,583	4,000	3,720	4,207	3,867	4,423
Recoveries	42,297	37,321	45,299	39,593	48,533	41,964	51,783	44,438	54,440	47,019
Active	61,150	60,883	63,625	63,334	66,331	65,783	69,598	68,224	73,561	70,660

Future Predictions ->	Date	2020-05-25			2020-05-26	2020-05-27	2020-05-28	2020-05-29	2020-05-30
		Actual	Projected	A/E					
	Cases Confirmed	1,38,845	1,27,459	1.09	1,32,950	1,38,584	1,44,365	1,50,294	1,56,350
	Deaths	4,021	4,646	0.87	4,876	5,113	5,357	5,608	5,864
	Recoveries	57,720	49,713	1.16	52,524	55,457	58,517	61,708	65,034
	Active	77,104	73,100	1.05	75,550	78,013	80,491	82,978	85,452



Projections – Update

- Number of cases seems to be between our “lockdown ends” scenario and “Worst case scenario”
 - Could be lack of [adherence to social distancing norms](#)
 - Implication could be significant [delay in the peak](#) emerging
 - Could be impact of [migrant workers](#) movement
- Number of [deaths are lower](#) than we had anticipated

Projections – Limitations

- Assumes general populous follows [social distancing norms](#)
- Does not consider [reinfection](#)
- Works on country as an [aggregate](#), and not regional level
- It does not “predict”, but details a [funnel of possible outcomes](#)
- Assumes [no “super spreaders” / “clusters”](#)

Products: Global Trends and coverage



Global Trends

USA

- Waiver of all types of cost sharing
- Encouragement of contactless transactions

Italy

- Standalone product for COVID-19
- Coverage to all company employees

China

- Pre-compensation program for existing policies
- Provided 10 Million free policies
- 'Emergency Response Plans' to ensure fast claim settlement for policyholders
- Additional coverage to healthcare workers and reporters working in the worst-affected areas

Other countries

- Extension to coverage period without any additional cost for certain categories like travel and marine.
- Discounts, refunds and complimentary extensions for motor insurance

Products offered - Life products

- **Product Design:**
 - **Ideas:**
 - Coverage of co-morbid conditions, mental and/or behavioral disorder
 - All-in-one cover
 - Exclusive COVID-19 group product.
 - Sum Insured enhancement
 - **Challenges:**
 - Lack of claims experience with respect to mental disorder
 - Level of social distancing
 - Anti-selection and moral hazard

Time for more flexibility in product design, based on calculated risk.

Products offered - Life products

- **Product Options:**

- **Ideas:**

- Change the premium paying pattern
 - Addition of health riders
 - Alternative options to surrender policies

- **Challenges:**

- System setup, policy issuance and claim handling
 - Adverse impact of alternative to surrenders
 - Anti-selection and moral hazard

Need based product options along with agile business processes.

- **Pricing and Reinsurance**

- **Ideas:**

- COVID-19 specific parameterization in premium tables
 - Digital underwriting and usage of Arogya Setu app
 - Alignment of RI treaty

- **Challenges:**

- Lack of credible data
 - Testing efficacy of new age underwriting
 - Adaptability of Arogya Setu app
 - Capacity of reinsurer

New parameters for pricing basis new data sources.

Poll 4



Average Claim Cost

	No of Claims	Claim Amount	Average
Reported Claims	4,593	645,490,716	140,538
Settled Claims	2,217	248,260,914	111,981

Status as on May 23, 2020 at 5:00pm

Source: *Data collated by GI Council from General Insurance Companies: COVID-19 cases*

Poll 5



Products offered- Non-life products



- **Product options:**

- **Ideas:**

- COVID-19 Indemnity covers on lines of disease specific covers
 - Special use to Seniors/High Risk Group who cannot afford/have access to traditional indemnity plans
 - Specific plans/riders to meet COVID-19 related non-payables
 - Customized short-term income protection plans

- **Challenges:**

- Product restrictions might make a COVID-19 specific plan unattractive
 - Uncertainty with respect to level of spread

- **Underwriting process:**

- **Ideas:**

- Revisit Underwriting – explore Tele verifications & Tele medical UW
 - Offer special SI enhancements drives to address under insurance
 - Offer refunds/discounts in lieu of reduced exposure due to lockdown

- **Challenges:**

- Frauds and Anti Selection
 - Customer's unwillingness to spend more
 - Expected increase in future claim outgo

Steps taken by IRDAI



Relaxation of timelines:

- **Provision of Grace period** up to 31st May 2020 for life insurance policies where premium is due in months of March and April.
 - For term loans issued, **moratorium period** of 3 months for instalment due from March to May
 - Health insurance - condone delay in renewal up to 30 days without deeming such condonation as a break in policy
-

Guidance on claims settlement:

- **Exclusion of clause “Force Majeure”** for COVID-19 death claims.
 - Inclusion of **admissible expenses**, including treatment in quarantine period for all policies.
 - **Thorough assessment of claims** reported under COVID-19 before repudiating the claims.
 - For ULIP maturing by 31 May 2020, where fund value is to be paid in lump sum, **permission to offer settlement options** has been granted, regardless of whether such option exists in policy contract or not.
-

Others:

- **Fast-track approval for products** covering costs and providing protection from risks arising out of COVID-19
- Enabling Paperless KYC process through Aadhaar Authentication Services of UIDAI

Policies launched by Indian Insurers



List of a few COVID-19 related covers offered by Indian Insurers (Not Exhaustive)

- **Digit Insurance** is the first insurer to roll out a coronavirus insurance plan called Digit Health Care Plus filed under IRDAI's Sandbox Regulations
Sum Insured ranging from 25K to 200K
- **ICICI Lombard** Lumpsum payout on hospitalization, 14 days of waiting period; Sum Insured 25K
- **Religare** has launched group-based indemnity insurance plans
- **Future Generali** Group Cover - Lumpsum payout (100% of COVID-19 Diagnosis and 50% on quarantine) 10% towards incidental
- **Star Health Insurance** Lumpsum payout on hospitalization, 15 days of Waiting Period; Sum Insured 21K & 42K
- **Edelweiss General Insurance** are among others which have also come up with exclusive insurance policies for COVID-19
- **Bajaj Allianz General Insurance** in partnership with PhonePe & **Bharti AXA General Insurance** has tied up with Airtel Payments Bank to offer COVID-19 related covers

CPD questions



Summary



Q & A

