COVID-19 Best Practices Manual for Parliamentarians

Long List of Case Studies and Top Ten Best Practices

PART A: TOP TEN BEST PRACTICES

Methodology

In order to choose the top ten best practices, the following methodology has been undertaken -

1. Repository of all case studies: A repository of 50 case studies has been created using secondary research of online English newspapers and magazines to find out any covered COVID-19 responses -
    a. at the state or district level
    b. involving governments or civil society organisations or private businesses
    c. within the time period of March 25th (the date of imposition of the lockdown) to present.

2. Categorisation of case studies: From the repository, all the case studies have been categorised as per the theme and the broad objective
    a. Health Care - telemedicine, contact tracing, COVID-19 infrastructure, response network
    b. Livelihood Generation - Self Help Groups
    c. Economy - stimulating businesses, long term development solutions
    d. Awareness Generation and Information Dissemination

3. Final list of ten case studies: The final list will include case studies which span all the different themes (employment, health care etc). Within each theme, the **featured case study** is one that fulfills most of the following criteria -
    a. Larger number of beneficiaries / impact numbers
    b. Larger geographical scale of intervention
    c. Participation of fewer stakeholders as it would allow easier facilitation and fewer bottlenecks
    d. Replicability of intervention model
    e. Sustainability of intervention through impact such as infrastructure development or awareness creation

    Within each theme, the other relevant case studies will also be mentioned so as to ensure a document with several diverse, wide ranging ideas.

CASE STUDY 1:

Intervention: Self Help Groups (SHGs) **Areas of Operation: Ramagundam, Telangana**

Theme

Livelihood Generation and Health Care through supply of Personal Protective Equipment (PPE)

Beneficiary

Women in SHGs and Healthcare workers

Nature of intervention:

Deepti Mahila Samithi, which is a club within the National Thermal Power Corporation, Ramagundam, distributed cotton masks to their employees and contract workers. These masks were stitched by volunteer members of the club themselves as well as women from nearby villages, who received tailoring training.

Implementing authorities:

Community Participation through women Self Help Groups and associations

Impact:

5,000 cotton masks distributed

Also See:

About 5 SHGs comprising 17 members are producing masks in the Tarapur Gram Panchayat of Silchar Block in Cachar District, Assam[1]

[1] https://indiaeducationdiary.in/local-administrations-in-all-parts-of-the-country-continue-taking-initiatives-to-help-the-public-during-the-situation-arising-from-covid-19/

CASE STUDY 2:

Intervention: Telemedicine **Areas of operation: Rajasthan, Haryana and Madhya Pradesh**

Theme
Health care

Nature of intervention:
Karma Healthcare is a healthcare start-up which has been running the software "e-Doctor" since 2014. 'e-Doctor' operates nurse-assisted clinics in the rural areas of Rajasthan, Haryana and Madhya Pradesh offering primary care services.
The software provides "patient to doctor" consultation through a weblink over any digital device. For patients without access to a device or internet, there is also an option for consultation over a call with assistance provided by the nursing staff.
A 24-hour helpline and counseling service, equipped with dedicated community healthcare workers, and counselors, enables doctors to provide consultation to rural patients in their vernacular language.

Implementing agency:
Civil Society Organisation - Karma Healthcare

Impact:
'E-Doctor' operates 25 nurse-assisted clinics and has successfully treated over 120,000 patients. Further, their partners have deployed the e-Doctor software in other remote locations, for the management of over 5 lakhs patient records.

Also See:
Apollo TeleHealth has trained its primary healthcare workforce pan India including doctors, nurses, midwives and lab technicians in dealing with the COVID-19 pandemic and is running a network of telehealth enabled primary health centers in Andhra Pradesh, Uttar Pradesh and Jharkhand and tele emergency centers in Himachal Pradesh.

QuikDr Healthcare Private Limited is providing a telemedicine app for free to the Directorate of Health Services, Government of Kerala, through which patients can have virtual consultations with top doctors in the state.

The Telemedicine Society of India has also prepared training modules to be conducted through live webinars which can simultaneously engage several hundreds of participants in a remote classroom setting.

CASE STUDY 3:

Intervention: Mass Awareness **Areas of Operation: Kerala**

Theme
Awareness

Nature of intervention:
Kerala has been effectively disseminating health-related information through news channels, traditional and new media, print and digital platforms, as well as direct announcements. These communications have been in different languages (such as Bengali and Hindi) in migrant dominated areas to reach a large number of people. More importantly, it has been using the technique of "transmedia storytelling", which involves creating content that engages with the masses by permeating their daily lives. For example, Kerala Police's Media Centre produced a video of a group of policemen dancing to a popular song while demonstrating the correct way to wash hands.
Kerala has also launched a mass hand washing campaign named "Break the Chain" which aims to educate people about the importance of public and personal hygiene. The government has installed water taps and hand wash bottles at public spots such as at the gates of the railway stations, and sanitisers have also been made available in all offices.

Implementing authorities:
Media centres within state government and police departments

Impact:
The government's communication efforts over the years have made Kerala Police's Facebook page as one of the most followed police department pages across the world – with 1.4 million followers - which plays a huge role in information dissemination to a large number of people.

Also See:
In Himachal Pradesh, a portal has been designed to combat fake news, where citizens can post the relevant web link to check for the veracity of the content, while protecting the data of the citizens and thus addressing any privacy concerns.

CASE STUDY 4:

Intervention: Information Dissemination Apps **Areas of Operation: Pan India**

Theme
Awareness

Nature of intervention:
Haqdarshak's COVID-19 platform helps citizens discover schemes that they are eligible for, along with information about the procedures and documentation required. The scheme content is available for 20 states in 11 regional languages, and can be accessed offline as well. There is also a helpline to address queries as well as multilingual infographics and videos on COVID-19 relief measures.

Implementing authorities:
Civil Society Organisation (CSOs) - Haqdarshak

Impact:
Through the special helpline Haqdarshak has supported 5400 individuals access ration, medicines, sanitizers and information on COVID-19 relief measures, most of whom are daily wage workers.

Also See:
CovidFYI is channelising all COVID related essential information from official sources to a single platform, to increase awareness and access; promote contact-less healthcare and social distancing; and prevent misinformation. Users can find information provided by the government for their city or state for various categories such as mental health, women, senior-citizen, medicine delivery, labs, hospitals, fever clinics, e-pass and others. Within each segment, (eg. senior citizen services) focused help is provided.

The COVID-19 pandemic has resulted in several millions of children missing their regular vaccination shots. Charity Science Health has prepared a district level dashboard to try and measure the impact of this, and shows the areas where most vaccinations have been missed. They also send SMS reminders to mothers to help them remember when it is time to get their child vaccinated. Officials and Parliamentarians can make use of this dashboard to prioritise health and vaccination in their districts / constituencies to prevent the outbreak of another communicable disease like polio, measles etc.

CASE STUDY 5:

Intervention: COVID-19 Infrastructure **Areas of Operation: Kerala**

Theme
Health care

Beneficiary
Persons with symptoms of / tested positive for COVID-19

Nature of intervention:
Asimov Robotics has built cost effective robots for isolation wards, minimising the number of visits of healthcare staff inside the quarantine zone. A robot named 'KARMI-Bot' will be used at the medical college's COVID-19 isolation ward. The robots deliver food and medicine, collect the trash from the patients, disinfect used items and allow patients to communicate with physicians and relatives outside.

Implementing authorities:
Civil Society Organisation 'Asimov Robotics' in partnership with the Department of Health, Government of Kerala

Also See:
The Telangana State Pollution Control Board (TSPCB) has requested the public, urban local bodies, health care establishments and bio-medical waste management facilities to follow specific procedures for handling and disposal of bio-medical waste generated from Covid-19 patients - such as segregation of waste and use of double layered bags for collection of waste from Covid-19 isolation wards to prevent any leaks.

Personnel from Naval Dockyard Visakhapatnam have designed a 'Portable Multi-feed Oxygen Manifold (MOM)' using a six-way header fitted to a single cylinder, to enable one oxygen cylinder to supply six patients concurrently. A typical oxygen cylinder feeds only one patient through a Ventimask. In this pandemic ventilator support is required for about 5-8 per cent of patients with symptoms and a large number require oxygen support, for which the existing facilities are not adequate. Therefore this design can provide oxygen through masks to a number of patients using a single-cylinder during emergencies.

COVID-19 Warhead aims to develop predictive models for contagious disease such as COVID-19 by determining disease transmission based on various characteristics such as population density, health care infrastructure and policy measures. The proposed outputs would be applicable to all existing and emerging

novel infectious diseases and would help in better preparedness of health care systems, appropriateness of mitigation measures, and support science-based policy making for such contagious illnesses in India.

CASE STUDY 6:

Intervention: Response Network **Areas of Operation: Uttar Pradesh**

Theme
Awareness

Nature of intervention:
Productivise aims to build a local network of health-workers to help in infection prevention and control. An A.I. based infrastructure helps the district/state control room by bringing all available resources (ASHA workers, NGOs, medical students, volunteers, experts) together on one secure channel for official communication. It creates location-based clusters for localized support to ensure rapid mobilization. It also enables field data collection and round the clock monitoring.

Implementing authorities:
Civil Society Organisation Productivise in partnership with State Government

Also See:
An inventory management app in Himachal Pradesh organises inventory management information related to healthcare services such as the availability of hospital beds, quarantine facilities, ventilators, masks, COVID hospitals - on covidportal.hp.gov.in

The Niramaya app in Madhya Pradesh helps persons tested positive for COVID-19 manage their case lifecycle – from doing the testing to getting the reports. The same app can be used for getting food supplies delivered. By not allowing the user to apply for a food kit on the app for a specific number of days after one request, the app helps avoid duplication of food kit supply, ensuring that the food goes to the needy and prevents wastage.

As an alternative to the helpline numbers, which are often overwhelmed manual processes, World Help Group offers the '111 App' to connect volunteers, NGOs, and local governments to streamline, automate and maximise relief impact. The platform can be used to register for 'help', as a 'volunteer' with a specified area of operation, or as a local authority with a separate dashboard. The app has real time geo tagging and supports 9 regional languages. It has already connected with over 1500 volunteers and over 200 civil servants.

CASE STUDY 7:

Intervention: Equipping health care workers **Areas of Operation: Pan India**

Theme
Health care

Nature of intervention:
Tata Consultancy Services iON, has announced CoronaWarriors, a free online self-certification course which Aims to prepare frontline health workers, specifically paramedical and professional healthcare workers, with prevention and control measures. It also offers - profession-specific measures for nurses, pharmacists, receptionists, laundry, radiology, technicians and biomedical waste management workers; and covers topics such as virtual support practice, infection control policies, mental health education, resident awareness, travel mode sanitization, visitor movement management, social distancing protocols and laboratory testing guidelines by WHO. The course has been designed by medical experts of TCS Life Sciences unit, along with inputs from subject matter experts.

Implementing authorities:
Tata Consultancy Services

Also See:
Project ECHO aims to extent specialty care to a wider population base and reduce health disparities for underserved people. It is based hub-and-spoke knowledge sharing networks, led by expert teams who use multi-point video conferencing to conduct virtual clinics and empower primary care doctors, nurses & clinicians to provide specialty care to patients in their own community. Project ECHO is currently followed in 21 countries with 112 hubs to treat over 55 diseases. Their COVID Response has involved conducting over 600 COVID training sessions with over 2.5 lakh health workers.

CASE STUDY 8:

Intervention: Contact Tracing

Theme
Health care

Nature of intervention:
The Infinite Analytics platform processes user IDs to identify which of them have come in close proximity to an infected ID to track down people at risk of infection and to categorize the severity of the risk, based on the distance from the infected person, the time spent in the vicinity of the infected person, as well as the mode of transport. The IDs are based on 'non personally identifiable information' such as that used in advertising, to analyze user behavior, while addressing privacy concerns.

Implementing authorities:
Civil Society Organisation Infinite Analytics

Also See:
The Bhilwara Model of containment included intense contact tracing of all COVID positive patients, an app to monitor the conditions of those under home quarantine along with a geographical information system (GIS) and a complete lockdown, with the police ensuring that even essential supplies were being delivered to the public on their doorstep.

Droneman.in is using drone surveillance for public health governance. It uses drone surveillance for thermal imaging, through which multiple people can be checked at one time instead of individual temperature checks, increasing the rate of inspection. It can help in public announcements and alert for detection of cases. It can also help in delivery of essentials, especially in remote areas and difficult to reach terrains. 44 cities across India currently have registered drone pilots.

CASE STUDY 9:

Intervention: Stimulating Businesses **Areas of Operation: Pan India**

Theme
Economy

Nature of intervention:
Invest India's Business Immunity Platform keeps a regular track on developments in the control of the virus, provides the latest information on various central and state government initiatives relevant for businesses, and brings together key Government stakeholders, industry champions and logistic providers to identify and fill any demand-supply mismatches to combat COVID-19.

Implementing authorities:
Invest India in partnership with Central and State Governments

Also See:
Many businesses have repurposed their manufacturing plants to contribute to the supply chain of critical medical products - the way LVMH has adapted to for sanitizers and Zara has for face masks. Reliance Industries has built a 100-bed hospital dedicated to supporting COVID-19 cases.

Zetwerk is helping apparel suppliers repurpose their units to manufacture personal protective equipment (PPE) by providing them with the technical know-how and certifications, and creating the demand-supply link. They currently have 155 suppliers across India, and have delivered 20,000 kits in two weeks, with another 80,000 in the pipeline. Similarly they are also producing N95 masks.

Watson Envirotech Pvt. Ltd. has built electricity-free water purifiers which are ideal for COVID relief camps and places deprived of potable water for a price of Rs. 1800-2800/filter. These filters provide arsenic and fluoride remediation while retaining good minerals in the water. To date, they have provided 3 lakh stand alone filters to the Chennai and Kerala flood relief operations, NGOs, and direct buyers. They have also fulfilled 17 larger capacity filter orders and exported many orders outside India as well.

CASE STUDY 10:

Intervention: Long Term Development Solutions **Areas of Operation: Kerala**

Theme
Agriculture

Nature of intervention:
The Kerala government is adapting modern farming techniques and practices to maximise produce and be self-sufficient for availability of agricultural supply in the long term. All possible ways, including kitchen gardens, rooftop cultivation and community projects,are being explored by the state. Local governments can initiate farming on vacant land, if owners are not able to start farming on their own.

Implementing authorities:
Agriculture Department, Government of Kerala in partnership with local government bodies

Impact:
Kerala aims to increase rice cultivation to over 25,000 hectares in the next two years; and vegetables to 20 lakh metric tonnes every year as compared to this year's 14.72 lakh metric tonnes.

Also See:
Since Odisha suffers nearly 25% of India's natural disasters, crisis precautions were already in place in the state - including cyclone shelters, which are now being used to house migrant workers. This proactive preparedness (Odisha was the first Indian state to impose a full lockdown and to announce exclusive COVID-19 hospitals) has helped Odisha significantly restrict the spread of the virus.

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PART B: LIST OF ALL CASE STUDIES

State Governments

1. **Helpline Numbers: Andhra Pradesh**

Andhra Pradesh government has set up a control room. Andhra domiciles who are stranded in other states can call 0866-2424680 and other states' domiciles stranded in Andhra can call 1902 and give their details, to get help to go back to their respective locations.[2]

2. **Waste Management: Telangana**

Telangana State Pollution Control Board (TSPCB) has requested the general public, urban local bodies, health care establishments (HCFs) and common bio-medical waste management facilities to follow specific procedure/ guidelines for handling, collection, transportation, treatment and disposal of bio-medical waste generated from Covid-19 patients/suspected persons. They have been told to keep separate colour coded bins/ bags/ containers in wards and maintain proper segregation of waste as per BMWM Rules, 2016 and CPCB guidelines. As a precaution, double layered bags (2 bags) should be used for collection of waste from Covid-19 isolation wards to ensure adequate strength and no leaks.[3]

3. **Agricultural Supply: Kerala**

With the Covid-19 pandemic threatening the availability of agricultural supply in the long term, the Kerala government is pushing for modern farming techniques and practices to maximise produce. The plan is to start farming on vacant land parcels available across the state. The state currently has 568,556 tonnes of rice, 136,631 tonnes of flour, 2,636 tonnes of onion, 3,071,000 litres of sunflower oil, 2,155,000 litres of coconut oil and 12,652 tonnes of sugar in stock. The Local Self Government (LSG) can initiate farming on vacant land, if owners are not able to start farming on their own. The agriculture department, in association with LSG bodies, is planning big projects to improve the state's self-reliance. All possible ways, including kitchen gardens, rooftop cultivation and community projects,are being explored by the state. The state needs to adopt modern farming techniques and practices to have maximum produce from the minimum area.[4]

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[2] https://indiaeducationdiary.in/local-administrations-in-all-parts-of-the-country-continue-taking-initiatives-to-help-the-public-during-the-situation-arising-from-covid-19/

[3] https://indiaeducationdiary.in/local-administrations-in-all-parts-of-the-country-continue-taking-initiatives-to-help-the-public-during-the-situation-arising-from-covid-19/

[4] https://www.business-standard.com/article/economy-policy/covid-19-kerala-to-boost-agriculture-amid-fears-of-prolonged-impact-120042201474_1.html

4. **Break the Chain Campaign: Kerala**

The Kerala government has launched a mass hand washing campaign named "Break the Chain". The campaign aims to educate people about the importance of public and personal hygiene. The government has installed water taps at public spots such as at the entry and exit gates of the railway stations with hand wash bottles and sanitisers have also been made available in all offices.[5]

5. **Awareness and Use of Media: Kerala**[6]

Kerala's success in effectively disseminating health-related information can be attributed to its comprehensive use of both traditional and new media and transmedia storytelling, which involves creating content that has the potential to engage with the masses using techniques to permeate their daily lives. For example, Kerala Police's Media Centre produced a short video which shows a group of policemen dancing to the tone of a recent Malayalam blockbuster while demonstrating the correct way to wash hands. Such efforts over the years have made Kerala Police's Facebook page as one of the most followed police department pages across the world – with 1.4 million followers.

Kerala is making use of multiple platforms – print and digital media – and news channels and direct announcements – including in different languages (such as Bengali and Hindi) in migrant dominated areas.

6. **Disaster Management Response System: Odisha**

Odisha suffers nearly 25% of India's natural disasters, which means that crisis precautions were already in place. These included cyclone shelters, now being used to house migrant workers from other states during the coronavirus outbreak. Proactive preparedness is Odisha's hallmark, with it becoming the first Indian state to impose full lockdown (before India imposed it as a whole). The state classified COVID-19 as a natural disaster, like the super-cyclone of 1999. It was the first to announce exclusive COVID-19 hospitals.[7]

District Administration

1. **Volunteer Workers: Kerala**

40 NSS volunteers are taking turns to work at the District Medical Office on the Collectorate premises, tracing primary and secondary contacts of all the people who came to the district from other countries and states since the COVID-19 outbreak. The Control Cell monitors those in quarantine, the lorry drivers who have been transporting goods from other states and those who crossed the borders with a special pass. Apart from

[5] https://www.ndtv.com/kerala-news/kerala-launches-break-the-chain-campaign-to-combat-coronavirus-2196103

[6] https://thediplomat.com/2020/04/how-a-tiny-south-indian-state-is-using-transmedia-storytelling-to-fight-covid-19/

[7] https://theprint.in/india/rajasthan-and-kerala-can-teach-the-world-how-to-fight-coronavirus/408114/

tracing their travel routes and contact persons, these volunteers double up as helpline service staff, mitigating doubts, confusion and panic of the callers. The volunteers wear masks and use sanitizers while practising safety measures at the cell. All of them sanitise themselves and their phones before entering their homes. After the day's work, they attend classes online to continue their academics.[8]

2. **"Bhilwara Model"[9]**

Within three days of the first positive case in Bhilwara, Rajasthan the Health Department and district administration constituted nearly 850 teams and conducted house-to-house surveys at 56,025 houses and of 2,80,937 people. Intense contact tracing was also carried out of those patients who tested positive, with detailed charts of all the people whom they had met since being infected. An app was used to monitor the conditions of those under home quarantine along with a geographical information system (GIS). The Bhilwara Model of containment included a complete lockdown, with the police ensuring that even essential supplies were delivered to the public on their doorstep.

Community / CSOs

1. **SHGs: Assam**

About 5 SHGs comprising 17 members are producing masks in the Tarapur Gram Panchayat of Silchar Block in Cachar District.[10]

2. **SHGs: Telangana**

Deepti Mahila Samithi, ladies club of National Thermal Power Corporation, Ramagundam, distributed 5,000 cotton masks to employees and contract workers. Significantly, the masks were stitched by the volunteer members of the ladies club as well as women of nearby villages, who received tailoring training.[11]

3. **Telemedicine**

With the entire country in a lockdown to enforce social distancing to prevent the spread of COVID-19, many patients are unable to visit doctors and hospitals for their consultations and follow-ups. This may affect the continuity of treatment especially in cases of non-communicable diseases (NCDs) like diabetes, high blood pressure, and heart disease and telemedicine permitting virtual consultations will be of immense benefit in

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[8] https://indiaeducationdiary.in/local-administrations-in-all-parts-of-the-country-continue-taking-initiatives-to-help-the-public-during-the-situation-arising-from-covid-19/

[9] https://indianexpress.com/article/explained/explained-bhilwara-model-ruthless-containment-stop-coronavirus-6350395/

[10] https://indiaeducationdiary.in/local-administrations-in-all-parts-of-the-country-continue-taking-initiatives-to-help-the-public-during-the-situation-arising-from-covid-19/

[11] https://indiaeducationdiary.in/local-administrations-in-all-parts-of-the-country-continue-taking-initiatives-to-help-the-public-during-the-situation-arising-from-covid-19/

these cases.. Telemedicine Society of India has prepared training modules to be conducted through live webinars which can simultaneously engage several hundreds of participants in a remote classroom setting. Apollo TeleHealth has trained its primary healthcare workforce pan India including doctors, nurses, midwives, lab technicians in dealing with the COVID-19 pandemic and runs a network of telehealth enabled primary health centers in Andhra Pradesh, Uttar Pradesh and Jharkhand and tele emergency centers in Himachal Pradesh.[12]

4. **Telemedicine**

Karma Healthcare is an award-winning healthcare start-up with proprietary tele-consultation software "e-Doctor" that operates 25 nurse-assisted clinics in rural areas of Rajasthan, Haryana and Madhya Pradesh offering primary care services. Since 2014, they have deployed an "e-Doctor" software to successfully treat over 120,000 patients. Further, their partners have deployed e-Doctor software solutions at remote locations, for the management of over 5 lakhs patient records. They offer contactless "patient to doctor" consultation with a weblink over a smartphone or laptop. For patients without access to a smartphone or internet, they also provide consultation over a call with assistance provided by our nursing staff. Their 24-hour helpline and counseling service, equipped with dedicated community healthcare workers, and counselors, enables doctors to provide consultation to rural patients in their vernacular language.

5. **Telemedicine**

NimbusClinic is a digital platform designed to provide health care to patients via the website and mobile app. It provides an integrated solution through telemedicine, e-prescriptions, e-pharmacy, e-labs, and point of care devices. It has over 3000 doctors across 200+ cities in India.

6. **Immunisation of Children**

Charity Science Health sends SMS reminders to mothers in India to help them remember when it is time to get their child vaccinated. Mobile vaccination reminders increase vaccination rates by 7 percentage points on average. They have reached over 250,000 families across India with these life-saving reminders. The COVID-19 pandemic has resulted in several millions of children missing their regular vaccination shots. Charity Science Health has prepared a district level dashboard to try and measure the impact of this, and shows the areas where most vaccinations have been missed. Officials and Parliamentarians can make use of this dashboard to prioritise health and vaccination in their districts / constituencies to prevent the outbreak of another communicable disease like polio, measles etc.

7. **Citizen Awareness**

[12] https://www.expresscomputer.in/news/covid-19/apollo-hospitals-group-supports-mcis-online-telehealth-during-covid-19/53228/

Haqdarshak has a COVID-19 specific platform which will help citizens discover schemes they are eligible for, along with information about how to access the benefits and the documentation required. Any new relief schemes announced by the government is available here. The app can also be used in an offline mode. The scheme content is available for 20 states in 11 regional languages. To reach out to the citizens during the lockdown, Haqdarshak has introduced a special helpline to address queries related to COVID-19 relief measures, through which they have supported 5400 individual citizens to access ration, medicines, sanitizers and information on COVID-19 relief measures. Most of the citizens supported via the helpline are daily wage workers. To ease the process of information access in these critical times, Haqdarshak created multilingual infographics and videos on COVID-19 relief measures.

8. Citizen Awareness

CovidFYI is channelising all COVID related essential information to a single user-friendly platform, that delivers verified information from official sources (through website, chatbot, SMS, call) - with the aim of increasing awareness and access; to promote telemedicine, contact-less healthcare, social distancing; and prevention of misinformation. Users can find various categories of information provided by the govt., for their city or state ranging from mental health, women related, migrant labour, senior-citizen, medicine delivery, labs, hospitals, fever clinics, ambulance, telemedicine, dial a doctor, control room, e-pass, volunteer and much more, all at one place. Within each segment, (eg. senior citizen services) focused help is provided. This service would also be provided through SMS, Call, Chat (Whatsapp, Telegram, Facebook)

9. Contact Tracing

The Infinite Analytics platform processes a "non – Personally Identifiable Information" (PII) based ID, that is used in advertising, to analyze user behavior. This platform can identify which IDs have come in close proximity to an infected ID to track down those people at a risk of infection and categorize the severity of the risk, based on the distance from the infected person, the time spent in the vicinity of the infected person, as well as the mode of transport.

10. Prediction Model

The project goal of COVID-19 Warhead is to develop predictive models for contagious disease such as COVID-19 by determining susceptibility of populations and disease transmission based on various characteristics such as population density, health care infrastructure and policy measures. The proposed outputs for predicting trajectory of disease transmission would be relevant not only for COVID -19, but also applicable to other existing and emerging novel infectious diseases. It would help in better preparedness of health care systems, faster determining of effectiveness and appropriateness of mitigation measures, and support science-based policy making for such contagious illnesses in India.

11. Health care network

Productivise's solution helps build a strong local network of health-workers to help in infection prevention and control. It is an A.I. based infrastructure that helps the District/State control room by bringing all available resources (ASHA, ANM, Health NGOs, Medical students, Volunteers, Experts & Control room) together on one secure channel for official communication. It creates location-based clusters for localized support, by mapping health workers to medical professionals and ensures rapid mobilization & training of health-workers. It also enables field data collection & 24x7 reports to monitoring teams.

12. Fundraising Concert

Facebook collaborated with several artists to conduct a home-to-home digital concert "I for India", to raise funds for the frontliners working round-the-clock to contain the pandemic. The concert managed to raise an amount of over Rs 52 crore donations for relief.[13]

13. Mental Health Counselling

COVID Response is a crisis counselling platform which aims to serve individuals under quarantine, frontline workers, children, elderly citizens and people at the margins. They offer psychological intervention and an integrated support system. They use a 'training of trainers' approach to prepare counsellors who have been trained in 'peace-time' counselling to also undertake crisis counselling. They have received over 23000 calls, and have a capacity to handle 2000 calls per day. They are expanding their volunteer base by partnering with postgraduate students and educational institutions.

14. Drone Surveillance

Droneman.in is using drone surveillance for public health governance. It uses drone surveillance for thermal imaging, through which multiple people can be checked at one time instead of individual temperature checks, increasing the rate of inspection. It can help in public announcements and alert for detection of cases. It can also help in delivery of essentials, especially in remote areas and difficult to reach terrains. 44 cities across India currently have registered drone pilots.

15. Emergency Relief

As an alternative to the helpline numbers, which are often overwhelmed manual processes, World Help Group offers the '111 App' to connect volunteers, NGOs, and local governments to streamline, automate and maximise relief impact. The platform can be used to register for 'help', as a 'volunteer' with a specified area of operation, or as a local authority with a separate dashboard. The app has real time geo tagging and supports 9 regional languages. It has already connected with over 1500 volunteers and over 200 civil servants.

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[13] https://indianexpress.com/article/entertainment/bollywood/star-studded-digital-concert-i-for-india-raises-over-rs-52-crore-for-covid-19-relief-6393718/

Private Sector

1. Invest India

Invest India's Business Immunity Platform keeps a regular track on developments in the control of the virus, provides the latest information on various central and state government initiatives relevant for businesses, and brings together key Government stakeholders, industry champions and logistic providers to identify and fill the demand-supply shortages in the supplies required to combat COVID-19.

2. Repurposing manufacturing units

Businesses that have relevant manufacturing capabilities can repurpose their manufacturing plants to contribute to the supply chain of critical medical products the way French multinational and conglomerate LVMH has for sanitizers and Zara has for face masks. Here in India, Reliance Industries has built a 100-bed hospital in just two weeks dedicated to supporting COVID-19 cases and many business leaders including Anand Mahindra have pledged support in multiple ways.[14]

3. Repurposing manufacturing units

Zetwerk is helping apparel suppliers repurpose their units to manufacture personal protective equipment (PPE) by providing them with the technical know-how and certifications, and creating the demand-supply link. They currently have 155 suppliers across India, and have delivered 20,000 kits in two weeks, with another 80,000 in the pipeline. Similarly they are also producing N95 masks.

4. Equipping health care workers

Tata Consultancy Services iON, has announced CoronaWarriors, a free online self-certification course which Aims to prepare frontline health workers, specifically paramedical and professional healthcare workers, with prevention and control measures. It also offers - profession-specific measures for nurses, pharmacists, receptionists, laundry, radiology, technicians and biomedical waste management workers; and covers topics such as virtual support practice, infection control policies, mental health education, resident awareness, travel mode sanitization, visitor movement management, social distancing protocols and laboratory testing guidelines by WHO. The course has been designed by medical experts of TCS Life Sciences unit, along with inputs from subject matter experts.[15]

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[14] https://www.weforum.org/agenda/2020/03/how-india-can-show-leadership-in-addressing-covid-19/

[15] https://timesofindia.indiatimes.com/gadgets-news/coronavirus-tcs-offers-free-online-course-for-healthcare-workers/articleshow/75404025.cms

5. **Water Purifiers**

Watson Envirotech Pvt. Ltd. has built electricity-free water purifiers which are ideal for COVID relief camps and places deprived of potable water for a price of Rs. 1800-2800/filter. These filters provide arsenic and fluoride remediation while retaining good minerals in the water. To date, they have provided 3 lakh stand alone filters to the Chennai and Kerala flood relief operations, NGOs, and direct buyers. They have also fulfilled 17 larger capacity filter orders and exported many orders outside India as well.

6. **Online Education**

Ascent Edutech's Everydemy portal offers a secure and user friendly virtual learning environment to the faculty and students. The app allows for video creation through a mobile application, allowing teachers to also share their documents, presentation or their own images and videos, which can then be easily edited and trimmed if required. The teacher can also take live sessions and interact with students, where attendance can be taken. A Teacher Panel allows teachers to upload videos, share assignments, and other study material, which can be arranged subject wise and unit wise. It is also possible to track the number of hours a student is watching the lectures. An admin panel ensures that only a single student can login to his ID with his unique authorized code and a complete report of student performance and teacher activity is generated.

7. **Disinfectants**

SilveryNanos Innovations has applied their proprietary nano-tech solution to disinfect surfaces like steel, plastic, wood, etc to stop the community spread of COVID-19. The innovative formula contains antibacterial properties. As COVID19 is a non-living virus with a lipid coating, the formula works in a way to not allow lipids to attach or transmit to any bacteria or living cell to multiply, this staying on the surfaces.

8. **Equipping health care workers**

Project ECHO aims to extent specialty care to a wider population base and reduce health disparities for underserved people. It is based hub-and-spoke knowledge sharing networks, led by expert teams who use multi-point video conferencing to conduct virtual clinics and empower primary care doctors, nurses & clinicians to provide specialty care to patients in their own community. Project ECHO is currently followed in 21 countries with 112 hubs to treat over 55 diseases. Their COVID Response has involved conducting over 600 COVID training sessions with over 2.5 lakh health workers.

9. **Oxygen support**

Personnel from Naval Dockyard in Andhra Pradesh's Visakhapatnam have designed an innovative 'Portable Multi-feed Oxygen Manifold (MOM)' using a six-way radial header fitted to a single cylinder, to enable one oxygen cylinder to supply six patients concurrently. A typical oxygen cylinder feeds only one patient through a Ventimask. In this pandemic ventilator support is required for about 5-8 per cent of patients with symptoms and a large number require oxygen support, for which the existing facilities are not adequate. Therefore this

design can provide oxygen through masks to a number of patients using a single-cylinder during emergencies.[16]

PPPs (State Government - Start Up Partnerships)[17]

1. **Delivering Real Time Information: Kerala**

Qkopy has developed an app called 'GoK Direct' for the Government of Kerala. It provides real-time information and alerts on COVID-19 as released by the Department of Information & Public Relations. It sends Covid-19 updates and travel information via phone notifications, and via SMS to older phones for the population without smartphones. These messages are delivered both in English and in Malayalam, the local language.

2. **Telemedicine: Kerala**

QuikDr Healthcare Private Limited is providing a comprehensive telemedicine solution for free to the state government. Through this app, patients will be able to have virtual consultations with top doctors in Kerala. Currently, this app is being used by the Directorate of Health Services, Government of Kerala.

3. **Delivery of Essentials: Kerala**

iBoson, a KSUM incubated startup has developed a software to manage essential services of the state government. With this app, authorities can manage the designated staff's access to the workplace. This will ensure ease of continuity of essential services and is currently being used by Kerala State IT Mission.

4. **Automation: Kerala**

Asimov Robotics has built cost effective robots for autonomous delivery of food, medicine, and other consumables inside isolation wards for the Department of Health, Government of Kerala. The robots also disinfect the used items and allow patients to communicate with physicians and relatives outside. Through this the number of visits of healthcare staff inside the quarantine zone are minimized. The startup also launched a robot named 'KARMI-Bot' which will be used to assist patients at the medical college's COVID-19 isolation ward. Dispensing food, medicine, collecting the trash used by the patients, performing disinfection, enabling video calls between the doctor and the patient etc are the main responsibilities of the robot.

5. **COVID case lifecycle management: Madhya Pradesh**

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[16] https://www.indiatoday.in/india/story/covid-19-naval-dockyard-manufactures-innovative-portable-multi-feed-oxygen-manifold-1661553-2020-03-31

[17] https://www.expresscomputer.in/indiaincfightscovid19/how-states-have-partnered-with-startups-to-fight-covid-19/54737/

The Niramaya app is targeted at persons tested positive for COVID-19 to manage their testing lifecycle – end to end from doing the testing to getting the reports. The same app can be used for food supplies. The users can download the app and it will be delivered to them. The app based process avoids providing food kits to the same citizens more than once in under a specific time period, which results in food going to the needy and also prevents wastage. The user will not be able to apply for the food kit on the app for a specific number of days after he has already requested for it once.

6. **Waste Management: Madhya Pradesh**

The Kabadiwala, which was originally into GPS based waste management collection, is now delivering food supplies based on all the requests posted. There are 200 vehicles who are delivering supplies, which can be tracked by the phone GPS.

7. **Combating Fake News: Himachal Pradesh**

An app was designed to bust the fake news menace, for which a unit was set up. The citizens can post the relevant web link on the fake news portal, to check for the veracity of the content. The privacy of the applicant is also protected. The mobile number and email of the applicant is entered but it's not reflected to the fake news monitoring unit. The result is sent to the user as an SMS.

8. **Development Logistics: Himachal Pradesh**

An inventory management app organised the information related to the healthcare services related inventory management such as the availability of hospital beds, quarantine facilities, ventilators, masks, COVID hospitals. These six applications were all hosted on covidportal.hp.gov.in

Crowdsourcing ideas[18]

1. The national government launched the Covid-19 solution challenge on March 16 that invites innovators to offer ideas and solutions for tackling the pandemic.
2. Industry associations such as the Federation of Indian Chambers of Commerce and Industry collaborated in an online hackathon to develop non-medical solutions for Covid-19.
3. Crowdsourced platforms from start-up incubators such as BreakCorona received 1,300 ideas and 180 product solutions within two days of launch.
4. Volunteers have set up an online crowdsourced portal called Coronasafe-Network, a real-time open-source public platform containing details on Covid-19 precautions, tools and responses which serves as a useful starter-kit for innovators.

[18] https://scroll.in/article/960783/indian-startups-are-fighting-covid-19-with-innovation

5. The state of Jharkhand organised a hackathon on COVID-19 related solutions in collaboration with Skillenza and Startup India. The hackathon hosted 20 teams across India. Overall, more than 50 entries were filed with final developed solutions.

International Best Practices

1. Vietnam[19]

The health care infrastructure and swift response to COVID-19 has helped keep the pandemic in check in Vietnam, and consequently allowed industries and supply chains to restart functioning much sooner than in other countries. This has forced global chains to look towards Vietnam to diversify and set up their manufacturing units.

2. New Zealand

Early national lockdown efforts, good public adherence to the rules, and widespread testing capabilities are likely to have prevented New Zealand from being overwhelmed with a wave of infections. New Zealand imposed restrictions on travel weeks before recording even a single coronavirus case within its borders. Upon crossing 100 cases, the country's alert level was raised to Level 3 restrictions, which meant that the country was under "heightened risk that disease is not contained." Schools were closed and mass gatherings were cancelled. Finally, the country entered into Level 4 restrictions, which instructed all individuals to stay at home. Compulsory quarantine for New Zealanders returning home was put in place.[20]

3. Germany

Germany's response has been structured around 4 categories - protection of particularly vulnerable and systemically relevant population groups; diagnostics; development of drugs and vaccines; and information and education.[21] In mid-January, long before the virus hit Germany, Charité hospital in Berlin had already developed a test and posted the formula online so by the time Germany recorded its first case of Covid-19 in February, laboratories across the country had built up a stock of test kits.[22]Their key to ensuring broad based testing is not having any patient pay for it. Since medical staff is at particular risk of contracting and spreading the virus, they are regularly tested. To streamline the procedure, some hospitals have started doing block

[19] https://www.vietnam-briefing.com/news/how-vietnam-sucessfully-contained-covid-19.html/; https://www.telegraphindia.com/world/coronavirus-what-can-we-learn-from-vietnam-which-has-reported-zero-covid-19-deaths/cid/1769351

[20] https://www.businessinsider.in/science/news/australia-and-new-zealand-have-been-able-to-keep-their-number-of-coronavirus-cases-low-thanks-to-early-lockdown-efforts-experts-say-its-probably-too-late-for-other-countries-to-learn-from-them-/articleshow/75194722.cms

[21] https://www.contagionlive.com/news/considering-germanys-response-to-covid19

[22] https://www.nytimes.com/2020/04/04/world/europe/germany-coronavirus-death-rate.html

tests, using the swabs of 10 employees, and following up with individual tests only if there is a positive result. Health authorities are also planning to roll out a large-scale antibody study, testing random samples of 100,000 people across Germany every week to gauge where immunity is building up.

Germany has asked several of its car manufacturers to produce ventilators and other medical equipment to deal with rising cases of the infection.

Their district level response and community engagement has been extensive. The district of Heinsberg in North Rhine-Westphalia relied on transparency for complete cooperation from the public. Upon detection of the first case, the district crisis committee convened and decided to close day-care centres and schools and asked the population to stay home. The district administrator has been communicating regularly on social media with video messages to explain the current measures and the background behind the decision-making process, which has helped them achieve a high degree of trust and popular support. After this the focus was shifted to expanding medical capacities.[23] Heidelberg's corona taxis are medics outfitted in protective gear, driving around the empty streets to check on patients who are at home, five or six days into being sick with the coronavirus.

4. Singapore

Efforts to contain the spread of COVID-19, such as quarantining infected people and their family members, closing schools plus quarantine and adopting workplace distancing plus quarantine, 'in that order', have facilitated the reduction in the number of cases.[24] In all locations, all direct costs for treating patients are covered by the governments, appropriate training and adherence to infection prevention and control measures are practiced in hospitals. Since the first imported case was identified in Singapore, official updates and advisories have been disseminated through traditional channels, in addition to newer social media platforms like WhatsApp, Telegram, Twitter and Facebook. Recognizing the importance of engaging beyond the screen, town hall meetings have also taken place with various professional and civic society groups.[25]

5. South Korea[26]

The South Korean model of 'trace, test and treat strategy' has received global recognition. Unlike the majority of the countries dealing with the pandemic, South Korea has not resorted to any lockdown and allowed business and economic activities to go on as usual. They have adopted the approach of widespread testing and significant use of digital tracking of suspected cases to contain the pandemic.

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[23] https://www.euractiv.com/section/coronavirus/news/how-germanys-black-sheep-became-a-model-for-its-covid-19-response/

[24] https://healthmanagement.org/c/hospital/news/where-are-the-most-effective-anti-covid-19-strategies

[25] https://www.asianscientist.com/2020/02/topnews/singapore-covid19-pandemic-preparedness-playbook/

[26] https://www.thehindu.com/news/national/india-looks-at-china-south-korea-germany-for-best-practices-technology-to-contain-coronavirus/article31228013.ece

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