

Review Article

Covid 19 & Dentistry

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ABSTRACT:

The outbreak of coronavirus disease 2019 (COVID-19) rapidly escalated into a worldwide pandemic, creating a global health and economic crisis. It is a novel virus which is distinct from SARS-CoV and MERS-CoV, with Chinese horseshoe bats being the most probable origin. Transmission occurs primarily through droplet spread or contact routes. Due to the characteristics of dental settings, the risk of cross infection between dental health care personnel (DHCP) and patients can be very high. In the present review, we aim to summarize some of the important aspects of dentistry in relation to COVID 19.

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INTRODUCTION

As the year 2019 approached its end months, there was an arrival of a new viral infection, COVID-19 in Wuhan, China. Nobody had thought that New Year 2020 would rather become a black year in the entire history bringing the Earth to a halt. On 30th January, 2020 COVID-19 was declared as public health emergency and on 11th March, 2020 it was declared as global pandemic. Almost entire world came to a standstill and as for us Indians from 25th March, 2020 the entire nation underwent lockdown. Millions of people were infected from this viral disease leading to death of lakhs. Earlier in 2002, severe acute respiratory syndrome (SARS) became the first pandemic of the 21st century. Like COVID-19, SARS was due to a coronavirus, known as SARS-CoV. It also originated in China. Scientists believe that SARS-CoV-2, the virus that causes COVID-19, originated in bats, moved into pangolins, then entered humans. SARS-CoV too had begun in bats, but it moved into civets before humans. Both SARS-CoV and the virus that causes COVID-19 can transmit via droplets from coughs and sneezes.¹⁻³

Pandemics aren't necessarily defined by their growth rate but rather by the spread of the disease. However,

understanding the growth rate of a pandemic can still help health officials prepare for an outbreak. Many disease outbreaks follow a growth or spread pattern described as exponential growth. This means they spread at a rapid rate over a specific period of time — days, weeks, or months. 'Think of driving a car and pressing on the gas pedal. The farther you travel, the faster you go — that's "exponential growth"'. Many initial disease outbreaks, like the 1918 influenza pandemic, seem to follow this growth pattern.⁴⁻⁶

Once in the human body, this coronavirus is abundantly present in nasopharyngeal and salivary secretions of affected patients, and its spread is predominantly thought to be respiratory droplet/contact in nature. Dental professionals may encounter patients with suspected or confirmed SARS-CoV-2 infection and will have to act diligently not only to provide care but at the same time prevent nosocomial spread of infection. During this COVID-19 pandemic, dentistry is sidelined as medical professionals are taking care of the heavy burden of patients all around the globe but as famous English prose says "Face is the index of mind" likewise oral cavity is the main entrance of any systemic diseases. Dental surgeons who come in contact with human

saliva, aerosols during procedures are at the highest risk for the spread of this COVID-19 infection and they have to be more careful while dealing with patients. A lot efforts has been put to curb the effects starting from lockdown restrictions to adapting COVID-19 suitable habits like wearing mask, maintaining physical distancing, sanitizing the hands frequently, it has changed the life of people of not only INDIA but all over the world. The role of Dentists at work to prevent the spread of this disease and to manage patients' during this crucial time of pandemic is the main concern.¹⁻⁶

RESUMING DENTISTRY⁷⁻¹⁰

Dental practice came to a standstill as it deals with the oral cavity and the transmission of SARS-CoV2 is via oral cavity mainly. Moreover, dental practices majorly include aerosol generating procedures so it was decided by the Government to shut down all the dental practices till some working protocol is made.

Decision to resume practice should be made based on which of the 3 Zones your practice is located in which zone:

Red Zone: Areas or the hotspots classified as those with the highest case load.

Orange Zone: Areas which have reported a limited number of cases in the past and no surge in positive cases recently.

Green Zone: Areas with zero confirmed cases till date or no confirmed case in the last 21 days.

One should follow the most updated advisory from local governing authorities and monitor trends in local case counts and deaths, especially for populations at higher risk for severe illness.

A dentist's life will never be the same post COVID-19. The serious implications on cross infection ensure that the use of the indispensable air turbine drills and ultrasonic devices that induce aerosol would be restricted. A large number of operative procedures entail the use of conventional high-speed drills and 'we would be lost without them'. We cannot imagine a work life without the air turbine handpiece and ultra-sonic scalers, and getting back to our practices seems scary and confusing.

Air turbine drills were introduced into dentistry for the sole purpose of improving efficiency and reducing chairside time. Drilling through a tooth with an air turbine drill takes a fraction of the time taken by slow speed drills.

In order to tide us through the period of transition post lockdown, and until it is safe to go back to full-fledged air turbine tooth preparation, a few sets of recommendations are suggested by IDA.

1. Telephonic Prescreening should be done prior to giving appointment to patients
2. Ask patient to wear mask and preferably come alone without any attendant
3. Recommended Clinic Design Modifications
4. Take the History and Consent of patients arriving at the facility

5. Recommended guidelines for Dental professionals
6. Recommended treatment protocols

GUIDELINES FOR PREPARATION OF DENTAL OPERATORY¹¹⁻¹⁵

The Chinese model of dentistry is worth mentioning in this situation. It includes:

1. Precheck triages established in clinics and hospitals.
2. Pre-operative antimicrobial mouth rinse provided to every patient.
3. Use of rubber dam and high-volume suction during dental emergency procedures.
4. Separate entry gates for patients and the dentist along with the use of PPE.

Yellow: triage and waiting area.

Orange: dental clinic. Red: isolation clinic. Green: resting area for staff only

The triage staff in yellow area wears work clothes, disposable surgical mask and caps.

In orange area, PPE is provided including N95 masks, gloves, gowns, caps, shoe covers, goggles and face shield. The area is disinfected regularly.

The red isolation area is designed for suspected COVID-19 patients, or recovering (<1 month after discharge from hospital) or a close contact person who needs emergency dental treatment. Separate entry and exit gates for such patients should be made. The staff also enters from a separate gate in the isolation area and this area is disinfected as soon as the patient leaves.

Green is the resting room for staff and it is recommended to use it by turn. The staff should wear surgical mask and gloves at all times in the dental set up.

Every general population has started to develop a dilemma to visit dental clinics as they fear of acquiring infection. There are certain measures which we can apply in our clinical setup to provide better care to the patients and take good care of ourselves to.

1. Reduced number of staff at all times. Rotation posting roster can be made.
2. No intra-oral radiographs to be taken. Panoramic radiography is preferred if at all.
3. Minimum use of cell phones during working hours. Use plastic sheets to cover them as, cell phones are the most common device to harbor fomites and contaminants.
4. All surfaces of dental chair need to be disinfected with appropriate disinfectant (70% alcohol based, 0.5% hydrogen peroxide based, 0.1% sodium hypochlorite based or glutaraldehyde based)
5. Use of high-volume suction near the OPD chair for suctioning of saliva directly from patient's mouth to avoid the spitting in the spittoon of dental chair.
6. Operator & patient's face distance should be at least an arm distance¹⁵⁻²⁰

Dental operatory is also surgical operatory and utmost infection control has always been necessary for a safe

and successful dental practice. COVID-19 is highly contagious disease so in this time we need to take uncompromising steps beyond our universal protocol.

As dental operatory has high saliva contamination so a very target-oriented disinfection and sterilization protocol is required to protect ourselves.¹⁵⁻²⁰

Area	Specifications
Reception and patient waiting area (Housekeeping surfaces)	<ul style="list-style-type: none"> • Avoid sweeping with broom • Use wet moping with warm water and detergent or hospital disinfectant (eg. 1:50 dilution of 5.25-6.15% Sodium hypochlorite) • High touch surfaces (eg. door knobs, handles, elevator buttons) must be cleaned more frequently with hospital grade detergent/disinfectant. • Toilets, wash basins, sinks must be cleaned with detergent and disinfected with 1% sodium hypochlorite
Treatment area/patient care area	
Standard recommendation	<ul style="list-style-type: none"> • Floor - Use Wet Moping- Multi Bucket Technique – Water/Detergent/Low Level Disinfectant like 3% hydrogen peroxide, 1% sodium hypochlorite or EPA approved agents • High touch/clinical surfaces within 3 feet diameter of the dental chair that are difficult to clean must be covered using a physical barrier for every patient or disinfected between patients using a wipe (Eg. 0.5% to 0.1% sodium hypochlorite or 70% alcohol for sensitive surfaces) • Wet dust all non- critical/ non touch surfaces horizontal surfaces with freshly prepared disinfectant solution once a day unless visibly soiled (Eg. 0.5-1% Sodium hypochlorite or 3% hydrogen peroxide) • Walls, window blinds, frames cleaned and disinfected when visibly soiled or end of the day • Mop heads and cleaning cloths must be discarded in biomedical waste bins appropriate or decontaminated regularly by laundering (heat disinfection) with detergent, 1:1000 dilution of sodium hypochlorite and drying at 80 °c. Must be changed frequently • The house keeping staff must adorn recommended PPE

OPERATORY DESIGN²⁰⁻²⁵

1. Waiting area-
 - i. It needs to be spacious and arrangements of chairs to be made following physical distancing norms.
 - ii. Fomite bearing articles like magazine to be removed from waiting area.
 - iii. Only patient should be allowed in the waiting areas and should be advised to visit alone.
 - iv. Commonly touched surfaces like door handles, reception tables, chair handles need to be sprayed regularly by the auxiliary staff with sodium hypochlorite. Wherever possible doors should be made automated with sensors.
 - v. An arrangement of hand hygiene practice (Sensor based Sanitizer dispenser, Foot controlled Sanitizer dispenser or hand washing area) to be kept at entry of waiting area.

AUTOMATIC HAND SANITIZERS

As of now, manually operated hand sanitizers are dispensed in the clinics. In this, the risk of

contaminated surfaces that are frequently contacted in healthcare settings is a potential source of SARS CoV-2 transmission. So, electrically operated automatic hand sanitizer machines with sensor are more advantageous in reducing the transmission.

NON-CONTACT INFRARED THERMOMETER

Patient reporting to dental clinics may or may not exhibit the classic symptoms of COVID-19, in both the conditions the use of non-contact infrared thermometer helps to record the body temperature while maintaining a distance specified by the manufacturer from the patient.

PAYMENT GUIDELINES

- a. Digital maximum
- b. Non-contact method
- c. Keep currency handling to bare minimum

PROTOCOL

- i. Appointment based practice should be followed.

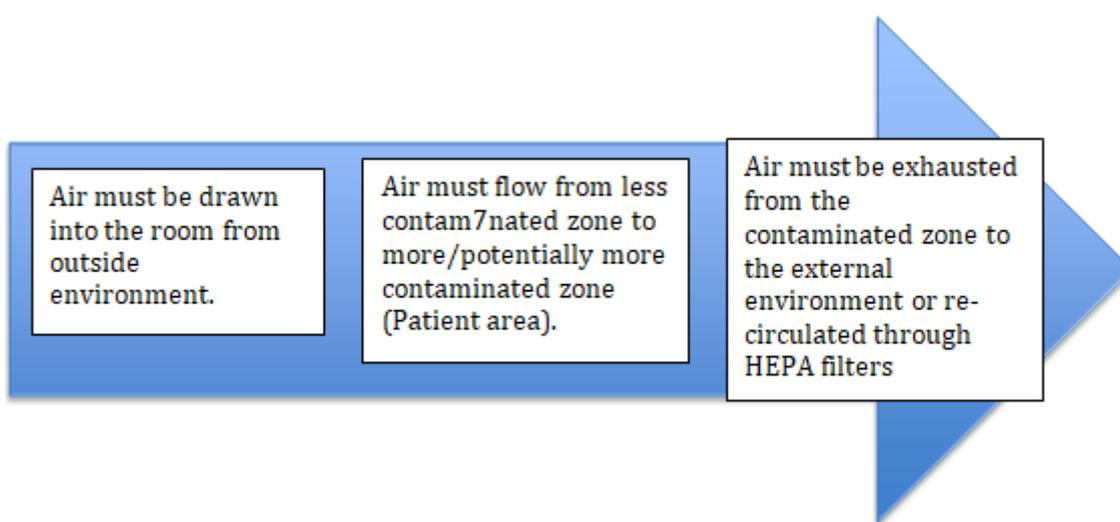
- ii. Patient history should be taken via telecommunication and then the required appointment be given.
- iii. In between two appointments min 20 mins time is required for preparation of next patient's treatment.
- iv. Ask patients to wait in their cars if waiting area is full before they report to dental operator

OPERATING AREA^{22- 26}

- i. It should be spacious with windows/vents for air circulation.
- ii. Only equipment/material which are required for treatment need to be kept outside, rest all extra equipment's must not be taken out from the storage area.
- iii. Cover all the fomite bearing surfaces like the

x-ray machine, viewer, computers, micromotors, scalers, chair handles, overhead light handles with disposable plastic sheets which need to be replaced after every day and after major procedures.

- iv. All the stationary items must be removed from the operator.
- v. All the bins with respective biomedical color-coding need to be filled with dilute sodium hypochlorite.
- vi. Only maximum of 3 persons (Inc. Patient) should be present in the operator (4-handed dentistry) needs to be implement.
- vii. Consider the use of upper-room ultraviolet germicidal irradiation (UVGI) as an adjunct to higher ventilation and air cleaning rates



ADDITIONAL RECOMMENDED ARMAMENTARIUM TO REDUCE THE AEROSOL TRANSMISSION IN AN OPERATORY

- HEPA filters
- PLASMA AIR STERILIZER
- FOGGER MACHINE

BEFORE STARTING THE DENTAL PROCEDURE^{22- 26}

The dental practitioner and the staff should have AAROGYA SETU APP (an initiative by govt. of India) and should encourage the patients to download and take self-assessment test on it before coming to dental operator.

Ensure that you have the appropriate amount of personal protective equipment (PPE) and supplies to support your patient volume. If PPE and supplies are limited, prioritize dental care for the highest need, most vulnerable patients should be treated first.

SELECTION OF PATIENT

- i. DHCP (Dental Healthcare Personnel) must ask about the presence of fever or other symptoms consistent with COVID-19 and actively take the

patient's temperature. If the patient is afebrile (temperature < 100.4°F) and otherwise without symptoms consistent with COVID-19, then dental care may be provided.

- ii. If patients do not exhibit symptoms consistent with COVID-19, provide dental treatment only after you have assessed the patient and considered both, the risk to the patient of deferring care and the risk to DHCP of healthcare-associated disease transmission. If your community is experiencing no transmission or minimal community transmission, dental care can be provided to patients without suspected or confirmed COVID-19 using strict adherence to Standard Precautions.

PREPARING THE OPERATORY FOR EACH PATIENT

1. Flush all water lines for 30 seconds before attaching handpieces to the lines.
2. If an ultrasonic scaler is to be used, flush the scaler line for 30 seconds before attaching the tip.
3. Cover the following items with PLASTIC BAGS of appropriate size (large, small) if they will be touched at any time during treatment.

4. Cover the following items with PLASTIC WRAP (cover all strips) if they will be touched at any time during treatment.
5. No bags or cover all strips, are needed on the arms of the dental unit or the hoses.
6. Set up all items to be used in the planned procedure. Instruments and items that may or will contact the patient's mucous membranes must be disposable or sterilized prior to use. Inspect the integrity of each package containing sterile instruments/equipment. Open each package aseptically.
7. Whenever possible and appropriate, individual portions of material should be dispensed ahead of time.
8. Equipment that is carried to the operatory from the dispensary must be bagged and placed in the correct area.

PATIENT DISCIPLINE

Patient needs to follow certain guidelines to procure utmost care with complete safety. Following are some guidelines which every patient reporting to the dental facility follow.

- i. All patients should visit the dental clinic only after telecommunication with the dentist.
- ii. Only the patient must visit the clinic unless age or any physical morbidity demands so.
- iii. Every patient and if accompanied by someone must wear a mask and "NO MASK NO ENTRY" rule should be followed.
- iv. Every patient needs to perform hand hygiene measures before entering and after leaving the clinic.
- v. Patient must follow all the special post-operative instructions strictly, if in doubt can contact the concerned via telecommunication
- vi. Recall and follow up should be done only through telecommunication.
- vii. Strict execution of physical distancing norms must be followed.

PERSONAL PROTECTIVE EQUIPMENT (PPE)²⁶⁻³⁰

Personal Protective Equipment's (PPEs) are protective gears designed to safeguard the health of workers by minimizing the exposure to a biological agent.

COMPONENTS OF PPE

Components of PPE are goggles, face-shield, mask, gloves, coverall/gowns (with or without aprons), head cover and shoe cover.

1- Face shield and goggles

Contamination of mucous membranes of the eyes, nose and mouth is likely in a scenario of droplets generated by cough, sneeze of an infected person or during aerosol generating procedures carried out in a clinical setting. Inadvertently touching the eyes/nose/mouth with a contaminated hand is another

likely scenario. Hence protection of the mucous membranes of the eyes/nose/mouth by using face shields/ goggles is an integral part of standard and contact precautions. The flexible frame of goggles should provide good seal with the skin of the face, covering the eyes and the surrounding areas and even accommodating for prescription glasses.

2- Masks

Respiratory viruses that include Coronaviruses target mainly the upper and lower respiratory tracts. Hence protecting the airway from the particulate matter generated by droplets / aerosols prevents human infection. Hence the droplet precautions/airborne precautions using masks are crucial while dealing with a suspect or confirmed case of COVID-19/performing aerosol generating procedures. An N-95 respirator mask is a respiratory protective device with high filtration efficiency to airborne particles. To provide the requisite air seal to the wearer, such masks are designed to achieve a very close facial fit

3- Gloves

When a person touches an object/surface contaminated by COVID-19 infected person, and then touches his own eyes, nose, or mouth, he may get exposed to the virus. Although this is not thought to be a predominant mode of transmission, care should be exercised while handling objects/surface potentially contaminated by suspect/confirmed cases of COVID-19. Nitrile gloves are preferred over latex gloves because they resist chemicals, including certain disinfectants such as chlorine. There is a high rate of allergies to latex and contact allergic dermatitis among health workers. However, if nitrile gloves are not available, latex gloves can be used. Nonpowdered gloves are preferred to powdered gloves.

4- Coverall/Gowns

Coverall/gowns are designed to protect torso of healthcare providers from exposure to virus. Although coveralls typically provide 360-degree protection because they are designed to cover the whole body, including back and lower legs and sometimes head and feet as well, the design of medical/isolation gowns do not provide continuous whole-body protection.

By using appropriate protective clothing, it is possible to create a barrier to eliminate or reduce contact and droplet exposure, both known to transmit COVID-19, thus protecting healthcare workers working in close proximity (within 1 meter) of suspect/confirmed COVID-19 cases or their secretions.

5- Shoe covers

Shoe covers should be made up of impermeable fabric to be used over shoes to facilitate personal protection and decontamination.

6- Head covers

Coverall usually cover the head. Those using gowns, should use a head cover that covers the head and neck while providing clinical care for patients. Hair and hair extensions should fit inside the head cover.

Table 1: Recommended PPE in Hospital Setting Out Patient Department (Respiratory Clinic / Separate screening area)²⁶⁻³⁰

S. No	Setting	Activity	Risk	Recommended PPE	Remarks
1	Triage area	Triaging patients Provide triple layer mask to patient.	Moderate risk	N 95 mask Gloves	Patients get masked.
2	Screening area help desk/ Registration counter	Provide information to patients	Moderate risk	N-95 mask Gloves	
3	Temperature recording station	Record temperature with hand held thermal recorder	Moderate risk	N 95 mask Gloves	
4	Holding area/ waiting area	Nurses / paramedic interacting with patients	Moderate risk	N 95 mask Gloves	Minimum distance of one-meter needs to be maintained.
5	Doctors chamber	Clinical management (doctors, nurses)	Moderate risk	N 95 mask Gloves	No aerosol generating procedures should be allowed.
6	Sanitary staff	Cleaning frequently touched surfaces/ Floor/ cleaning linen	Moderate risk	N-95 mask Gloves	
7	Visitors accompanying young children and elderly	Support in navigating various service areas	Low risk	Triple layer medical mask	No other visitors should be allowed to accompany patients in OPD settings. The visitors thus allowed should practice hand hygiene

DRUGS FOR THE MANAGEMENT OF DENTAL PROBLEMS DURING COVID-19 PANDEMIC³⁰⁻³⁵

- Due to self-isolation and shielding policies, patients might have attempted to self-manage symptoms. It is important to establish the patient's self-management to date to check for possible overdose, particularly paracetamol.
 - Be aware that prescribing for some patient groups might differ. Examples include the elderly, patients who are immunocompromised or with hepatic or renal problems, patients who are pregnant and nursing mothers.
 - During the COVID-19 pandemic, it is advisable to liaise with local pharmacy colleagues to ensure that the drugs you are prescribing are available.
 - Advise patients to recontact you if symptoms persist or worsen.
 - If patients are referred for urgent dental care, ensure that details of all drugs already taken to manage the condition (prescribed and over-the-counter) are provided.
- Ibuprofen and COVID-19

There has been concern raised about the use of NSAIDs, e.g., ibuprofen, in patients with COVID-19. There is currently no strong evidence indicating that ibuprofen can make COVID-19 infection worse. However, the MHRA (Medicines and Healthcare products Regulatory Agency) have recommended that patients who have confirmed COVID-19, or those who have symptoms of COVID-19, should take paracetamol in preference to ibuprofen/NSAIDs. Ibuprofen is still appropriate for management of dental pain in patients who do not have symptoms of COVID-19 infection.

ANALGESICS

Most odontogenic pain can be relieved effectively using paracetamol and/or ibuprofen. It is important to first establish the patient's self-management to date to check for possible overdose of analgesics. The following analgesics can be recommended for patients with no contraindications. During the COVID-19 pandemic, patients may have to take analgesics for longer than normal and particular caution is required for patients with underlying health

conditions. The analgesic drug regimens presented here can be advised for patients to control their symptoms using over-the-counter drugs or provided by prescription. Instruct patients to take the drugs at regular intervals that are as spaced out as possible.

Recommended analgesic doses for adults

• For dental pain in adults, an appropriate 5-day regimen is either:

Paracetamol, 2 x 500 mg tablets up to four times daily (i.e., every 4–6 hours)

Or

Ibuprofen, 2 x 200 mg tablets up to four times daily (i.e., every 4–6 hours), preferably after food.

• For severe dental pain in adults, an appropriate 5-day regimen is either:

Increase the dose of ibuprofen to 3 x 200 mg tablets up to four times daily, preferably after food

Or

Ibuprofen and paracetamol together, preferably after food, without exceeding the daily dose or frequency for either drug, as above

Or

Diclofenac (1 x 50 mg tablet three times daily) and paracetamol together, preferably after food, without exceeding the recommended daily dose or frequency for either drug.

AFTER PATIENT TREATMENT³⁰⁻³⁵

Following patient treatment, use the following protocol, in the order given, for cleaning-up:

1. Complete all entries in the computer.
2. Remove gloves.
3. Wash your hands immediately.
4. Dismiss the patient.
5. Put on heavy-duty, nitrile rubber gloves.
6. Discard needles and any disposable sharp instruments (e.g. scalpel blades, suture needles, broken instruments, endodontic instruments, used burs, orthodontic wires, and any item that could puncture skin) into the rigid biohazard (sharps) container at your unit. Use forceps to pick up these items.
7. Hold the high-speed handpiece over the high-speed evacuator and activate the handpiece water line and air line (bur in) for 30 seconds before removing the handpiece.
8. Place handpieces into the transportation cassette and place them to the side.
9. Place all the dental instruments back into their cassettes in the correct order, removing all composite, amalgam, other non-biologic waste and biologic waste.
10. Disinfect all portable equipment and supplies with Cavicide disinfectant as follows: Spray with Cavicide disinfectant and Wipe clean the visible debris using paper towel. Then Spray again with Cavicide and Keep Moist for at least 5 minutes.
11. Return the dental instruments, handpieces and bur cassettes to sterilization.

12. Remove all barriers, one at a time, from the unit and any portable equipment and discard into the plastic waste bag. When all barriers are removed, place the waste bag in a rigid waste receptacle. Avoid touching the contaminated side (outside) of the barriers against any clean surfaces.

13. Any surface which is visibly contaminated with blood and all surfaces within 3 feet radius of the patient's mouth that were not covered during patient treatment, must be Sprayed with Cavicide disinfectant, wiped clean of visible debris, and then Sprayed with Cavicide and kept moist for at least 5 minutes.

14. Paper towels and napkins must be discarded.

15. Flush all vacuum lines with tap water to prevent drying of blood and debris in the lines.

CONCLUSION

The basic things that we need to know are that this is not the last pandemic. In future antigenic drift and shifts may occur amongst various micro-organisms and may cause more deadly diseases. The big lesson that we have to learn from this pandemic is that Prevention is always better than Cure.

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