



COVID-19 and Dental Practice in Ireland

Background and Timeline of Events:

- COVID-19, a respiratory disease, emerged in December 2019 from Wuhan, China.
- On January 8, 2020, a novel β -Coronavirus, a zoonotic virus, was officially announced as the causative pathogen of COVID-19 by the Chinese Centre for Disease Control and Prevention. COVID-19 is caused by the coronavirus known as SARS-CoV-2.
- COVID-19 was confirmed to have spread to Ireland on 29 February 2020. This was announced by Dr Tony Holohan, the Chief Medical Officer of the Department of Health. Information on the progression and management of the disease has been coordinated between the Department of Health, the Health Protection Surveillance Centre (HPSC) and the Health Services Executive (HSE).
- Management of the disease has been divided into three phases: Containment, Delay and Mitigation. These phases reflect the case frequency of the disease in the population and the ensuing burden on our medical services.
- COVID-19 was declared a pandemic on 11th March 2020 by the WHO Director General, Dr Tedros Adhanom Ghebreyesus.
- Ireland moved to the Delay phase on 12th March 2020.
- Ireland's Chief Dental Officer, Dr Dympna Kavanagh, first issued advice on 13th March 2020.

Morbidity:

Age (60+ years of age) and comorbidities (diabetes mellitus, respiratory disease, cardiovascular disease including hypertension, immune depression including cancer, and failing organ function) are good predictors of poor clinical outcome.

The fatality rate (cumulative deaths divided by cumulative cases) of COVID-19 is 0.39% to 4.05% compared to that of seasonal influenza (0.01% to 0.17%) according to data for 2010 to 2017 from the US Centers for Disease Control and Prevention [1].

Dental Services in Ireland:

Irish dentists, in independent (private) practice, in the absence of specific dental advice from the

Department of Health or HSPC, have relied on the advice of the HSE National Oral Health Office to HSE Dental and Orthodontic Services. Its Guiding Principle in the Delay phase is:

“The guiding principles in organising and delivering services during delay phase are to reduce footfall, improve social distancing and effective and efficient use of supplies of PPE. In addition in the delay phase, there is a clear emphasis on the deferral of non-urgent treatments and the minimisation of aerosol generating procedures” [2].

It gives further advice on redeployment of at-risk staff, the deferral of non-urgent appointments and minimising the generation of aerosol.

In contrast, the advice from the CDO, is: “the HPSC has advised that dental practices can remain open and there is currently no need for change in practice” [3]. At the most superficial level, this advice appears to fly in the face of national efforts to reduce social contact as dental practices are mainly in urban centres and patients regularly use public transport to get to their dentist.

The HSE Dental Services and the Cork University Dental School and Hospital and Dublin Dental University Hospital are providing emergency-only dental services since 13th March 2020.

By the 16th March 2020, many dental practices had altered their practice to emergency-only or had closed their practice on assessment of their personal circumstances and their assessment of the risk to their staff, to their patients and community and to themselves. Many were knowledgeable and mindful of international advice and practice in combating the disease.

International Dental Responses:

China

In January 2020, the National Health Commission of China added COVID-19 to the category of group B infectious diseases, which includes SARS and highly pathogenic avian influenza. However, it also suggested that all health care workers use protection measures similar to those indicated for group A infections—a category reserved for extremely infectious pathogens, such as cholera and plague.

In most cities of the mainland of China, only dental emergency cases have been treated when strict implementation of infection prevention and control measures are recommended. Routine dental practices have been suspended until further notification according to the situation of epidemics.

Additionally, dentistry-related quality control centres and professional societies in many provinces and cities have put forward their recommendations for dental services during the COVID-19 outbreak, which, as supplementary measures, should be helpful in ensuring the quality of infection control [4].

Italy

“It is important to note that as by Sunday 8th of March 2020 there is no directive to suspend dental services at a national level, the Italian Dental Association advised dentists. Carefully select which patients to treat (treatments that pose the lowest risk of infection), with the general advice to postpone non urgent treatment, avoiding if possible, to treat patients at risk, because of underlying health conditions or old age. Scrupulously apply the recommended rules to maintain the highest possible degree of safety for our patients and collaborators” [5].

Scotland (UK)

“Scottish Government is clear the NHS is on an ‘emergency footing’ during the current COVID-19 outbreak and that providing routine dentistry ‘as normal’ is no longer sustainable. “We need to stop undertaking aerosol generating procedures (AGPs) are a frequent daily occurrence in routine daily care... Clinical care: Effective from 18th March 2020” [6].

Wales (UK)

“It is becoming clear that providing routine dentistry ‘as normal’ is no longer sustainable. Not least because aerosol generating procedures (AGPs) are frequent daily occurrences in routine daily care and should be avoided in this delay phase...”

The following advice is included in the Welsh CDO letter:

“Guidance for Health Care Workers: Healthcare workers should wear the appropriate protective equipment (aprons, gloves and a fluid repellent mask while assessing and treating patients; gowns, gloves and FFP3 masks and eye protection while performing aerosol generating procedures)” [7].

USA

The American Dental Association, which has been guided by the Centers for Disease Control and Prevention has advised its members: “In order for dentistry to do its part to mitigate the spread of COVID-19, the ADA recommends dentists nationwide postpone elective procedures for the next three weeks. Concentrating on emergency dental care will allow us to care for our emergency patients and alleviate the burden that dental emergencies would place on hospital emergency departments “ [8].

The American Dental Hygienists Association has advised its members “to mitigate the spread of COVID-19 ...strongly recommends that all dental practices nationwide postpone elective procedures and continue to be available for patients with dental needs” [9].

This shared recommendation has been supported at by many State dental associations and societies, including California, Illinois, New York, Ohio, Oregon and Vermont. The Vermont Health Department has applauded the move.

Quebec (Canada)

“In order to reduce the crowds in dental offices and to halt the progression of COVID-19, dental clinics in Quebec will have to take all reasonable measures so that, as of Monday, March 16, for the next 14 days, all appointments for elective dental treatment and preventive, i.e. non-urgent, oral care are postponed. This directive will be reassessed periodically, in the light of developments “ [10].

“Yesterday, you received an important message in which the Order urged professionals working in dental offices to take reasonable measures in a timely manner to postpone elective dental treatments and preventive oral care – in other words non-urgent appointments – for a period of 14 days starting today. As of tomorrow, **you should no longer be giving your patients appointments for elective care**” [11].

This immediate suspension of non-essential dental services is being repeated across Canada: The College of Dental Surgeons of British Columbia, the Provincial Dental Board of Newfoundland and Labrador, the Provincial Dental Board of Nova Scotia, the Royal College of Dental Surgeons of Ontario have all told their members to cease non-essential dental treatment forthwith.

Hong Kong and Singapore

The Universities of Hong Kong and Singapore closed in January for four months, including their Dental Schools and Hospitals other than for emergency care. Singapore postponed all non-essential dental treatment during the SARS Co-V outbreak.

Management of COVID-19:

This novel β -Coronavirus is a new strain of coronavirus not encountered before. We cannot solely refer to previous coronavirus diseases to provide the answers in managing this new disease. SARS Co-V infection killed a number of medical healthcare workers but did not kill dentist because, unlike COVID-19, it was only infectious when the patients showed symptoms and were too ill to visit the dentist. This is not the case with COVID-19 where asymptomatic, contagious patients can still present in dental clinics.

The initial assessments of the rapid and catastrophic epidemic in Italy is too early to call but there is early agreement that the absence of a pandemic plan slowed the Italian response, despite being aware of the situation in China, allowed unfettered spread of the disease. China responded early with an authoritarian social distancing policy.

South Korea seems to be experiencing success. Behind its success, so far, has been the most expansive and well-organized testing programme in the world; this approach is based on the belief that asymptomatic individuals are infectious. The testing programme is combined with extensive efforts to isolate infected people and trace and quarantine their contacts. Despite the present success in case reduction, it is bracing itself for a resurgence in cases.

The U.K. appear to have hung the iconic 'Keep Calm and Carry On' poster in the Cabinet Room in Downing Street. It is attributed to advice from Sir Arthur Newsholme, Principal Medical Officer (1908-1918), who recommended that no action be taken against the 1918-19 Spanish flu (H1N1) pandemic as the war effort took precedence over the health of the nation. Whatever, the motivation by the present British Government, there is growing public fear that its present approach will result in the needless deaths of many citizens. The British Prime Minister's response, on 16th March, included advice to avoid unnecessary social contact advising that the public should consider postponing scheduled healthcare.

'Flatten the bump' has entered our lexicon. This will only be achieved by sustained effort and adhering to national guidelines. [Leo Varadkar, Taoiseach, National Address, 17th March 2020] The advice by the CDO regarding dental practice is counter-intuitive to many of those guidelines as it promotes footfall, increases cross-infection risk to patients and the dental team with the potential outcome of additional burden on the health services, their frontline staff and the community at large.

In addition, management of non-essential dental treatment has been established previously as a means of lessening the spread of disease and the risks to patients and the dental team [12]–[15].

One would expect the public will come to understand that international practice is to limit dental treatment to emergencies only and will be very aggrieved if it believes it had been exposed unnecessarily to risk while undergoing non-essential dental treatment. Litigation is certain to follow.

Transmission in Dental Practice:

The person-to-person transmission routes of COVID-19 include direct transmission, such as cough, sneeze, droplet inhalation transmission, and contact transmission, such as the contact with oral, nasal, and eye mucous membranes. COVID-19 can also be transmitted through the saliva, and the faecal-oral routes may also be a potential person-to-person transmission route. The participants in dental practice are exposed to tremendous risk of COVID-19 infection due to the face-to-face communication and the exposure to saliva, blood, and other body fluids, and the handling of sharp instruments [16].

A paper in press with the journal *Emerging Infectious Diseases* reports on the collaborated work of scientists from the University of Texas at Austin, Dalian Minzu University and Beijing Normal University in China, the University of Hong Kong, and the Institute Pasteur to identify how quickly COVID-19 can spread from person to person. They found that time between cases in a chain of transmission is less than a week. They found that the serial interval (how long it takes the cases to spread) is shorter than the incubation time indicating that pre-symptomatic transmission is likely to have occurred. Although the conclusions are based on early data, the findings indicate the presence of pre-symptomatic transmission in more than 10% of cases. This supports South Korea's approach to management of the disease.

A case has been reported in Germany of a healthy German developing COVID-19 on 24th January 2020 following contact with an asymptomatic Chinese colleague 3-4 days earlier. The German recovered enough within two days to return to work only to infect at least two other work colleagues and possibly a third, who might have been infected by contact with the Chinese person also [17]. This case study highlights how insidiously transmission may occur when social distancing is not observed. Social distancing is impossible for the dental team carrying out treatment for any patient.

In addition, dental care services provide a challenging environment for infection prevention and control as routine dental procedures generate aerosols. Due to the nature of dental healthcare, the risk of cross infection is high between patients and dental healthcare professionals at all times. The risk increases in direct proportion to morbidity rates and the numbers carrying the disease, which could rise by 30% per day for the coming 14 days [18].

The dental team are particularly at risk because of the nature and environment of their work due to respiratory droplet transmission of this disease. Their families and communities are also exposed to the danger even when they are adhering to the national guidelines.

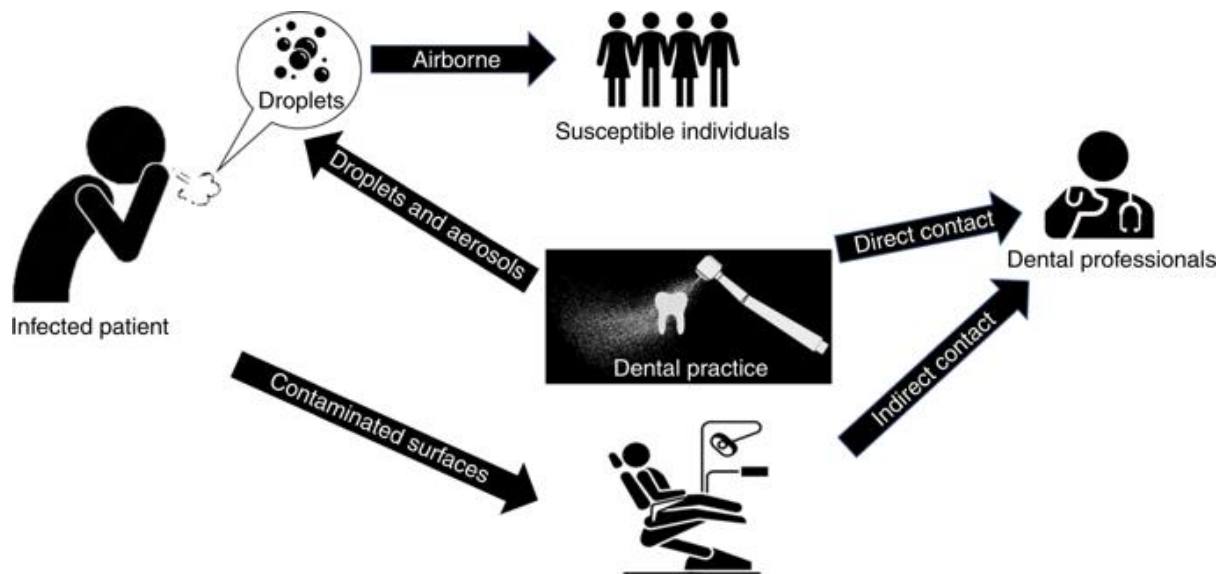


Illustration of transmission routes of 2019-nCoV in dental clinics
 Transmission Routes of 2019-nCoV and Controls in Dental Practice Int J Oral Sci 12 (1), 9 2020

Aerosol Generating Procedures (AGP):

SARS-CoV-2 has been found in the saliva of infected persons. [In press] Epithelial cells of salivary gland ducts were early targets for SARS-CoV infection, and SARS-CoV-2 is likely to be the same situation, although no research has been reported so far [16].

There has been reports of significant environmental contamination by COVID-19 patients through exhaled respiratory droplets. [In press] SARS-CoV-2 can persist on surfaces for a few hours or up to several days, depending on the type of surface, the temperature, or the humidity of the environment [19].

Correspondence to The New England Journal of Medicine reports aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1 in five experimental conditions (aerosols, plastic, stainless steel, copper and cardboard). It reports that SARS-CoV-2 remained viable in aerosols throughout the duration of the experiment (3 hours). SARS-CoV-2 was more stable on plastic and stainless steel than on copper and cardboard, and viable virus was detected up to 72 hours after application to these surfaces. On copper, no viable SARS-CoV-2 was measured after 4 hours and no viable SARS-CoV-2 was measured after 24 hours on cardboard.

“We found that the stability of SARS-CoV-2 was similar to that of SARS-CoV-1 under the experimental circumstances tested. This indicates that differences in the epidemiologic characteristics of these viruses probably arise from other factors, including high viral loads in the upper respiratory tract and the potential for persons infected with SARS-CoV-2 to shed and transmit the virus while asymptomatic.3,4 Our results indicate that aerosol and fomite transmission of SARS-CoV-2 is plausible, since the virus can remain viable and infectious in aerosols for hours and on surfaces up to days (depending on the inoculum shed)” [20].

The use of a high-speed handpiece or ultrasonic instruments aerosolise patient's respiratory secretions, saliva, or blood dispersing SARS-CoV-2 to the surroundings. These contaminants can remain airborne for an extended period before settling on surfaces or enter the respiratory tract. It has been shown that endemic human coronaviruses, including MERS-CoV and SARS-CoV, can exist on metal, glass and plastic and remain infectious, at room temperature, from two hours to nine days [16].

The use of personal protective equipment (PPE) is central to Standard Precautions and generally used by dentists and the dental team. The advent of COVID-19 has brought focus to the type of PPE and their efficacy. While the need to avoid AGPs is paramount, it is very difficult to carry out much in dentistry without creating this as the most basic of equipment, the 3-in-1 syringe, creates aerosol. At best, dentists can try to minimise AGPs by limiting treatment both in range and number.

The choice of mask in the dental setting seems somewhat arbitrary. The HSE agrees with some Chinese authors as to the use of FFP2 Respirator masks (equivalent to N-95 masks) in treating infected or suspected cases of COVID-19. However, the Welsh CDO requires the use of FFP3 masks in an aerosol generating procedure irrespective of the health status of the patient. The use of a routine surgical face mask/dental mask is not enough. The choice of mask requires further consideration if there is any potential that an asymptomatic patient may be vectors for the disease at the time of treatment. This consideration increases in importance as the number of cases rises from 292 (17th March) to an expected 15,000 by the end March [18].

Emergency Treatment:

The National Oral Health Office, in planning for the Mitigation phase of the pandemic list emergency treatments as:

1. Trauma
2. Haemorrhage
3. Acute infection
4. Severe pain
5. Suspicious oral lesions and diseases (oral cancer) [2].

This seems a reasonable list and is a useful guide for independent (private) practice in the Delay and Mitigation phases of the pandemic.

Dental Council - Code of Practice relating to: Infection Prevention and Control (April 2015)

While there is disagreement on the best way to manage the pandemic, it is agreed that respiratory droplets are the main route of SARS-CoV-2 transmission. The Dental Council's Code states that "the objective of Standard Precautions (and of Transmission based Precautions) is to break the Chain of Infection" [21]. WHO considers Standard Precautions to be the minimum level of infection control to be used for all patients.

However, the Chinese view is that, due to the unique characteristics of dental procedures, where a large number of droplets and aerosols could be generated, the standard protective measures in daily clinical work are not effective enough to prevent the spread of COVID-19, especially when patients are in the incubation period, are unaware they are infected, or choose to conceal their infection.

As stated previously, the South Korean approach is based on their belief that asymptomatic individuals are infectious. Indeed, there is no agreement as to how long an individual may incubate before symptoms become apparent. The HSE take the view that it could be up to 14 days while others believe can be between 1-24 days or longer [16], [22].

The risks of aerosol generating procedures in asymptomatic individuals raises the issue as to whether the only safe way to treat patients, at the moment, is to employ transmission-based precautions for all? At the very least, the Chinese experience of treating over 700 dental emergency patients in The School and Hospital of Stomatology, Wuhan University over the month of February this year, without any detrimental effects to the staff involved in delivering the treatments, requires very careful consideration before even essential treatments are deemed safe in dental practice [4].

Summary:

- COVID-19 is a new disease with a significant morbidity and a capacity to overwhelm our health service. ‘Keep calm and carry on’ is not an option;
- The absence of evidence-based dental advice creates uncertainty and high anxiety in a high-risk environment;
- The international response and the information gathered from managing previous endemic human coronavirus diseases indicate that non-essential dental treatment should cease in the Delay and Mitigation phases of the pandemic. There is a need for an immediate change in normal dental practice to protect patients and their communities and the dental team;
- All advice to the dental team must be based on evidence or best practice as we know it for this disease and must focus on the dental setting;
- Practitioners will only be able to treat those who have passed the Risk Assessment Pathway and are asymptomatic. However, the dental team can still only work safely with the appropriate PPE, which needs to be re-assessed for COVID-19;
- A referral pathway for patients, who fall outside those criteria, who need emergency dental treatment has to be established as a matter of urgency;
- What constitutes emergency treatment within independent (private) practice? Does emergency treatment fall within the remit of independent (private) practice?
- The Dental Council needs to review its Code of Practice (IPC), in particular, PPE and Transmission Based Precautions, to ensure that it provides the required guidance to registrants in relation to COVID-19;
- There is a need to provide emergency dental treatment throughout the crisis but that service needs to be supported with a review of treatment protocols, including IPC, for dental practitioners specific to our present knowledge of COVID-19;
- The introduction of new Infection Prevention and Control Protocols (IPC), including the choice and use of equipment, will require financial support and training to quickly upskill dentists providing the services at a time of inevitable financial hardship;
- Access to the appropriate PPE is essential for the protection of the dental team in providing emergency dental services.

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