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## COMMENTARY



## EDITORIALS



## ORIGINAL PAPERS



Togher et al state that the number of weekly neurology consults has increased from 13/week (2007) to 33/week (2018). The time to being reviewed has reduced from 87 hours to 6 hours.



Doherty et al report on 24 pregnancies to 11 mothers who are liver transplant recipients. The outcome in the series was 18 live births and 6 miscarriages.



Hannan et al consider the issue of non-attendance for scheduled medical appointments. Among 1472 endoscopy OPDs, 191 (13%) did not attend. The authors recommend mandatory confirmations.

## ORIGINAL PAPERS (Continued)

### DOES DNAR MEAN 'DO NOT TREAT': EXPLORING THE IMPACT OF A DNAR ORDER ON PATIENT CARE DECISIONS

Nolan et al explored the understanding of nurses and doctors about DNR. It was found that the respondents were less likely to undertake invasive interventions such as LPs, endoscopy, and central lines.

### A DECADE OF DOVE: MULTIDISCIPLINARY EXPERIENCE FROM AN OBSTETRIC ADDICTION CLINIC

Eogan et al describe the role of the Dove clinic, which deals with addiction problems in pregnancy. The attendance rate is 12/1000 pregnancies. Opioid addiction has become less common, but other addictions have increased.

### CYTOREDUCTIVE SURGERY (CRS) AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY (HIPEC) FOR PERITONEAL MALIGNANCY DURING THE COVID-19 PANDEMIC

Crotty et al describe the management of 12 patients with peritoneal malignancies. The procedures were complicated by the Covid pandemic, which posed many additional challenges.

### THE CURRENT USE OF LUMBAR PUNCTURE IN A GENERAL PAEDIATRIC UNIT

Coughlan et al have assessed the use of LPs in general paediatrics. Among 104 children, a CSF sample was obtained in 93% of cases. 74% were atraumatic.

### LOW PREVALENCE OF SARS-COV-2 DETECTED IN SYMPTOMATIC CHILDREN ADMITTED TO HOSPITAL

Lynam et al report that among 220 paediatric inpatients, 7(3%) children had Covid-19.

### INCREASED MENTAL HEALTH PRESENTATIONS BY CHILDREN AGED 5-15 AT EMERGENCY DEPARTMENTS DURING THE FIRST 12 MONTHS OF COVID-19

McDonnell et al report that during the period Feb 2020 – Feb 2021, the paediatric ED attendance decreased by 34 % but the mental health (MH) presentations increased by 8.9%. In particular, MH presentations increased 52% in July/Aug and 46% in Sept/Dec. The surges appear to be related to school re-openings.

## ORIGINAL PAPERS (Continued)

### THE BUDDY SYSTEM NEAR PEER MENTORING DURING A PANDEMIC

Eves et al report a near peer mentoring programme for paediatric NCHDs. Over a 6-month period there were 66 mentors and 33 mentees. When surveyed, 89% felt that it could be useful to NCHDs but only 21% felt that it was of personal benefit.

## OCCASIONAL PIECES

### COUNTING TOMBSTONES SS A FALLACY RE-THINKING QUALITY INDICATORS FOR OUR PATIENTS

### ONLINE PAEDIATRIC CLINICAL EXAMINATIONS IN THE COVID-19 ERA: AN ACCEPTABLE ALTERNATIVE

### TELEPHONE CONSULTATION IN THE COVID-19 ERA AN OCCUPATIONAL HEALTH PERSPECTIVE

## RESEARCH CORRESPONDENCE

### PERSPECTIVES OF INTERSTITIAL LUNG DISEASE HEALTHCARE PROFESSIONALS DURING COVID-19

Cassidy et al have assessed the impact of Covid-19 on healthcare professionals caring for patients with interstitial lung disease. Worry 43% and frustration 43% were the most commonly reported emotions.

## SHORT REPORTS

### GESTATIONAL DIABETES MELLITUS AND SEASONAL VARIATION

O'Malley et al found a GDM rate 53.5% among 202 mothers attending for a OGTT. There was no seasonal variation to the rate.

## CASE REPORTS

### BILATERAL OCCIPITAL ISCHAEMIC STROKE DUE TO SEPSIS

Gracias et al describe a 48-year-old patient who developed a bilateral occipital stroke secondary to abdominal sepsis. The underlying factors included haemodynamic compromise.

## CASE REPORTS (Continued)

### CAROTENAEMIA IN INFANCY

McCarthy and Dempsey describe a case of carotenaemia in infancy. The cause was a diet high in pureed vegetables.

### GENOMIC EVIDENCE OF SARS-COV-2 REINFECTION IN IRELAND

O'Donnell et al report a case of SARS-CoV-2 re-infection in a 40-year-old woman.

## LETTERS TO THE EDITOR

### FACILITATIVE MEDIATION AS AN ALTERNATIVE TO HIGH COSTS IN MEDICAL NEGLIGENCE CASES

### WASP VENOM IMMUNOTHERAPY A 5-YEAR CASE FOLLOW UP

### IMPROVING SURGICAL CONSENT

### AWARENESS OF THE PRESENCE AND ROLE OF PHYSICIAN ASSOCIATES IN THE IRISH HEALTHCARE SYSTEM

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### MATERNAL MORBIDITY AND MORTALITY REPORTING

### INTERNATIONALISATION AND THE OPPORTUNITY TO ENHANCE SPECIALIST TRAINING IN IRELAND

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*Issue: Ir Med J; Vol 114; No. 5; P345*

# How Best to Deal with Medical Litigation

J.F.A. Murphy - Editor of the Irish Medical Journal

Medicolegal claims are commonly initiated when an adverse clinical outcome is unexpected, unwanted, and harmful. The likelihood is increased when the patient or their family feel that medical facts are being withheld or that the lessons haven't been learned by the institution.

From the doctor's perspective, it is instinctive to be defensive when something happens to a patient. Physicians are very self-critical even when nothing untoward has taken place. This sense of guilt is accentuated when a preventable error has occurred. It is always difficult to rationalise matters when one sets out to do good and ends up with being accused of doing harm.

The defendant doctor has a sense of isolation when a lawsuit is commenced by a patient. The case tends not to be discussed with colleagues. Little help is offered about what is best to do. He or she is faced with the stressful legal process, often for the first time. The wheels turn slowly, and it may a number of years before matters are finally settled.

Litigation makes what is already a challenging and stressful job a lot worse. Furthermore, it is difficult to concentrate on one's day-to-day clinical duties when there is an adversarial high court case looming in the background.

Robert Francis, QC, Chair of Healthwatch, England states that litigation forces doctors and patients into opposite camps[1]. It obstructs the rebuilding of trust, obscures learning, and is enormously expensive. The annual cost of medicolegal cases to the NHS is 8.3 billion sterling.

The Getting it Right First Time (GIRFT) Document sets out the pathways to learning from litigation claims[2]. When a previous error pattern in a specialty is addressed constructively the claims rate falls. Orthopaedic surgery is an encouraging example. It improved from 10% to 5% of negligence claim costs in a 6-year period.

The Document points out that the common medicolegal allegations are failure or delay in diagnosis, and failure to interpret the clinical picture. When investigations are undertaken in a timely fashion, error can be avoided. Mismanagement of cauda equina syndrome is illustrated as an example of a common, costly error. The lack of availability of MRI scanning outside normal working hours is one of the problems. In the UK, a wider access to imaging is being rolled out in order to improve the identification of patients with the condition.

Consent issues are a common cause of malpractice claims. They affect elective treatments and surgery more than emergency procedures. In the former there is more time, and the patient should be provided with all the alternative options. The 'three-legged stool' approach for consent is recommended. The 3 components are; the procedure specific surgeon guided consent form, the patient specific dialogue and written information booklets. Patients should be made aware of the current national guidelines on the management of their condition. The option and consequences of no treatment should also be discussed. The written consent should be obtained 2-4 weeks before the procedure, where possible. This interval gives the patient time to consider their decision before the procedure is undertaken. Specific outpatient, consultant-led consent clinics are another approach.

It is important that patients' expectations of the benefits of the procedure are realistic. They need to be made aware of the level of restriction, discomfort, and pain that will be experienced following an intervention.

Information booklets must be written at a level that the patient can understand. Prior to their introduction they should be 'road tested' by a group of lay people. In one Irish survey it was found that 39% of the individuals have limited health literacy.

NALA (national adult literacy agency) advises on the use of plain English when communicating important information to the public[3]. Some of its key points are to be direct and use 'I, we, and you'. Avoid 'e.g., i.e., etc.' as they are confusing for patients. Do not use medical jargon. Use colour and images appropriately. Sentences should have a maximum of 15 words. The HSE has a large number of patient information leaflets, all of which have been NALA approved. NALA provides both advice and courses on how to write medical information pieces. If the patient remains uncertain about what to do following a consultation about the options, a second opinion should be readily available to them.

When consent is correctly obtained, it reduces subsequent allegations such as 'unnecessary operation', the 'wrong treatment' and 'unsatisfactory outcome to surgery'.

'Never events' such as wrong-site surgery, still feature in negligence claims. The terminology also includes cases where the correct side is operated on but where the location is incorrect. The importance of safety check lists is emphasised. The advice applies to both medical and surgical procedures. I am struck on how very few textbook descriptions of pneumothorax drainage note the importance of confirming the correct side to be aspirated. The commonest cause for wrong site procedures is miscommunication. It is more likely to happen in emergency circumstances such as the ICU and the ED. Another risk is the incorrect listing of the operation[4]. The safer surgery checklist, which was introduced by the WHO in 2009, has been an important advance[5].

Successful medical or surgical treatment depends on everything going to plan. It is understandable that this can't always happen. There will be occasions when the outcome is less than optimal. Every hospital department and general practice should have a pathway in place to deal with this eventuality. The senior clinicians should be engaged with at an early stage. They should be asked to provide comments on the letter of claim and be involved in the drafting of the letter of response. As the process progresses, they should be invited to attend the meetings with the legal counsel and the expert witnesses. This greater involvement of clinicians has been found to increase the efficient and smooth management of a lawsuit.

We need to continue to strive to reduce medical error. When cases arise, we should handle the claims efficiently and use the learning experience to prevent future episodes.

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# Therapeutic Advances in Peanut Allergy

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Peanut is the most common cause of food-related anaphylaxis in children, persisting into adulthood, unlike egg and milk allergy. Management of peanut allergy (PA), traditionally requires implementation of strict avoidance measures and perpetual emergency preparedness. This is burdensome for families leading to food anxiety, social exclusion and impaired quality of life[1]. Irish birth cohort data (2011-2013) show 1.9% (1200) of Irish infants, annually, develop PA. As around 80% of cases persist through childhood, it is estimated that around 20,000 Irish children have PA and at least a similar number of Irish adults are also affected.

The Learning Early about Peanut Allergy (LEAP) trial confirmed early introduction of dietary peanut for high-risk infants (severe eczema, egg allergy) between 4-11mths of age, reduced the relative risk of peanut allergy at age 5yrs by 81%[2]. PA also occurs in children in the absence of known risk factors, supporting a population-based approach to early allergen introduction[3]. Screening for peanut sensitisation prior to introduction remains controversial as sensitisation does not equate to true allergy and acts to delay peanut introduction as infants await hospital based peanut challenges. In Australia, where national feeding guidelines encourage early weaning without prior screening, 90% of infants ingest peanut[4]. In the US, initial "post-LEAP" guidelines advised screening of high-risk infants[3]. Recent data from the US, now shows an increase in both screening and in the prevalence of PA <12mths. A recent expert consensus recommends home introduction of allergens, including peanut, for all children regardless of level of risk, with the exception of families with a strong preference for screening, who are likely to otherwise delay introduction[5]. The success of introduction is markedly time sensitive, with better rates achieved in the youngest[6]. LEAP participants ingested peanut 3 times weekly until age 4. Follow-up shows persistence of tolerance 12 months after discontinuation. Tolerance is defined as sustained immunologic changes allowing ingestion without symptoms, in the absence of ongoing therapy.

Natural acquisition of tolerance is achieved in as few as 20% children and adolescents with confirmed PA. This has prompted widespread research into allergen-specific immunotherapy (AIT), the goal of which is to reduce clinical reactivity through gradual exposure to increasing doses of allergen. The efficacy of any immunomodulatory intervention has to outweigh the risk of inducing life threatening adverse reactions. Subcutaneous immunotherapy, although effective in inducing aeroallergen and insect venom desensitisation, triggered an unacceptable number of severe reactions when used as a route to deliver food allergens such as peanut[7].

Peanut oral immunotherapy (POIT) has, to date, been the best studied approach[8]. This process of desensitisation begins with a rapid escalation followed by an up-dosing phase during which increased doses of peanut are ingested under supervision at 1-2wk intervals, then repeated daily at home. On achieving optimum maintenance doses, daily ingestion continues indefinitely. In vitro changes include a rise in peanut specific IgG4 and a corresponding fall in sIgE levels. Over the past decade, studies have demonstrated, conclusively, that POIT effectively increases the threshold of reactivity to peanut. Efficacy and safety have been demonstrated across childhood from infancy to adolescence. A similar effectiveness is seen with high (3-4.5g approx. 12-15 peanuts) and low (300mg/approx. 1 peanut) maintenance doses but with less adverse events using the latter. The largest studies have been in the form of clinical trials examining the efficacy of a pharmaceutical-grade peanut powder preparation (AR101). The PALISADE and the ARTEMIS trial were multicentre (US, Ireland, UK, Europe, Australia), double-blind, randomised, placebo-controlled phase 3 trials (RCT) collectively involving over 750 participants. Across both studies, the median tolerated dose of peanut protein increased from 10 mg to 1000 mg(equivalent to 3-4 peanuts) between the entry and exit food challenges after a maintenance dose of 300mg[9,10]. On foot of these studies, Palforzia® has been licensed by FDA and European Medicines Agency(EMA) for the treatment of PA for children 4-17yrs. Meta-analysis of OIT trials have identified an increased risk of anaphylactic reactions over avoidance, however, these occur primarily during up-dosing[11]. Eosinophilic oesophagitis is a known risk, affecting maybe 1% of people on POIT. Quality of life measures show a positive impact on parents and participants due to the overall improved perception of risk in social environments. Discontinuation of daily exposure is associated with a waning of sustained unresponsiveness, as POIT does not induce tolerance. It is still not clear how long treatment should be continued. Some treated patients may prefer to stay on drug-grade peanut OIT, but others may prefer to transition to peanut containing foods. Pre-treatment and adjunctive treatment with the anti-IgE monoclonal antibody omalizumab, can shorten time to desensitisation and reduce risk of anaphylaxis. Dupilumab, an anti-IL4 receptor alpha antibody, is also being studied as an adjunct therapy. Many peanut allergic subjects are not exquisitely dose sensitive and this high dose tolerance can be exploited successfully with OIT at home[12].

Sublingual immunotherapy (SLIT) is a well-established route for desensitisation to aeroallergens such as grass pollen. SLIT food allergen treatment doses are1000 times less than those required for OIT, thus reducing severity of adverse events. A randomised placebo-controlled clinical trial involving peanut SLIT, demonstrated a 10-fold increase in the amount of peanut tolerated after 44 weeks of treatment[13]. To date, head-to-head comparison studies of OIT and SLIT show OIT to be more effective in that the final dose tolerated is significantly greater[14].

Epicutaneous immunotherapy (EPIT) involves the application of a Viaskin® adhesive dermal patch containing 250ug of peanut. Peanut is delivered to epidermal Langerhans cells, in turn promoting the proliferation of T-regulatory cells. In PEPITES, an RCT of children aged 4-11yrs, the difference in response rate, after 12mths compared with placebo, was 35.3% vs 13.6%, with minimal adverse events and high rates of treatment adherence[15]. After 3yrs follow up, the median cumulative reactive dose had increased from 144mg (equivalent to 1/3 peanut) to 944 mg (3-4 peanuts)[16].

Currently, none of the treatments detailed above are available in Ireland. The Viaskin® patch is currently not licensed for use anywhere outside research settings. OIT with Palforzia® is expected to start in Europe in 2022. Significant resources will be required to provide the obligatory baseline oral food challenge and approximately 20 day ward visits during the first year of treatment. AIT for food allergy should only be provided in tertiary care centres, equipped with the experience to counsel candidate patients and the skill set to proceed with desensitisation and respond to reactions.

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# The Impact of the Cyberattack on Radiology Systems in Ireland

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The National Integrated Medical Imaging System (NIMIS) is the software used in Ireland to electronically capture and store diagnostic images on a picture archiving and communication system (PACS)[1]. This data is stored and connected on a single imaging platform to allow inter-hospital communication which facilitates nationwide specialist consults and improved patient care overall[2].

In the early hours of the morning on May 14th, 2021, the Irish Health Service Executive (HSE) was hit with an unprecedented ransomware cyberattack which sought to steal data, encrypt it, and subsequently seek a ransom for its release[3]. This cyber infiltration was recognized by security firewall software and in a precautionary move, all affected HSE IT systems including NIMIS were taken offline in an attempt to protect patient data. From this point in time, all data was treated as potentially compromised until proven otherwise.

This of course had a significant and detrimental effect on patient care nationwide[4] as access to timely diagnostic imaging was either delayed or postponed. Most outpatient imaging was postponed. Concerningly this included oncology staging and surveillance scans. Some patients awaiting elective surgery had their procedures cancelled as pre-operative imaging was unavailable for review. Patients undergoing potentially curative radiotherapy had treatments postponed, the detrimental effect of which is yet unknown.

Diagnostic radiology is one of the most technologically reliant medical specialties[5], alongside others including but not limited to microbiology, radiation oncology and clinical biochemistry. In radiology, this temporary shutdown of the NIMIS software not only meant we could no longer see images on diagnostic-quality monitors, we also could not see previously performed imaging studies nor their reports which we would routinely refer to in order to assess for disease progression versus regression. The Radiology Information System (RIS) which was previously used by doctors to request scans was no longer accessible and as such medical and surgical inpatient teams were now having to handwrite radiology requests and walk them to the radiology department, a time-consuming process for the requesting teams and the referee alike.

In our department, a busy university teaching hospital, where previously we had twenty NIMIS reporting workstations, we were initially restricted to three non-designated monitors in the scan control rooms only, severely limiting both productivity and limiting quality assurance. For this reason, emphasis was placed on providing access to clinically emergent imaging only.

To try to best provide an emergent service, several steps were taken. Radiologists including Specialist Registrars (SpRs) and consultants kept a written record of all radiology requests made and all scan reports were handwritten on a formal report as well as transcribed into a master book for each modality. A copy of these reports was provided for each patient's medical notes, and the original copy was stored by radiology secretaries with a view to uploading them to the NIMIS PACS system at the end of this crisis. The hope was that this may alleviate the need for double reporting in the future as there would still be a significant backlog of scans to work through. Four days post ransomware attack, we had procured an extra two reporting station monitors.

One significant potential area of risk which was quickly identified was the concern that we might incorrectly scan the same patient twice, an adverse incident, which would be a reportable offence to the Irish Health and Information Quality Authority (HIQA)[6]. In an attempt to prevent this from happening, one secretary covering each modality began making spreadsheets of all vetted cross-sectional imaging, and each new request was cross-referenced against a master excel file to prevent duplicate requests.

Some unexpected positives did arise from this cyberattack. Due to the decreased number of image reviewing stations, trainee and consultant radiologists co-reported scans which led to unprecedented teaching opportunities[7].

It was ronic that the reduction in trainee teaching caused by one virus, namely the COVID-19 pandemic, was being somewhat mitigated by the threat of a novel cyber-virus. Due to the limited storage space on ultrasound machines, there was improved interaction between sonographers scanning the patient and radiologists. Real-time scanning in the presence of the SpRs and consultants was performed and discussed with results written on paper and decisions made in consensus. This allowed for improved teaching and interaction, which had been reduced with the Covid restrictions in the prior year. The presence of a team with the patient also arguably improved the patient experience with more patient interaction and discussion. In addition, turnaround time for reports were improved for inpatients. The presence of senior doctors at the time of scanning to ascertain key points in the patient's clinical history, as well as examining the patient where necessary made for improved patient care[8]. Real time discussion between the sonographers and radiologists at the time of scanning also arguably improves concordance between sonographer and final radiologist reports[9]. Finally, having an early decision process also meant less need for data storage space as only representative images were saved. This was important in maximize the number of cases that could be stored at a localmodality until the main back up system was restored.

Other modalities were equally affected, and similar processes were put in place. The return to a paper-based system was cumbersome and manpower-heavy particularly on the clerical side but did emphasise to us the importance of having a back-up paper system to mitigate against electronic failure.

Another feature of dealing with the crisis was liaising and sharing ideas and potential solutions with other Radiology departments around the country. The faculty of Radiology played an important role in sharing information, this was very much appreciated by radiology departments who may have felt otherwise isolated. Most Radiology departments dealt with the issue in a similar fashion however as some hospitals had a different IT infrastructure, there was some variation in methods employed to keep activity functional.

It is hoped that full functionality will be restored to all hospitals over the coming weeks. Hopefully this will not be something we have to face again in the future, however if we do, we might feel better prepared to tackle these issues from the outset rather than learning by trial and error. In addition, it is likely that a lookback and sharing of lessons learnt and experiences will lead to a more uniform response should the situation ever repeat itself.

**Declaration of Conflicts of Interest:**

The authors declare that they have no conflicts of interest nor financial disclaimers.

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# Neurology Inpatient Consultations and Referrals

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**Abstract**

***Aims***

St Vincent's University Hospital established an on-line referral system for the neurology consult service in 2007. We continue to review this service in order to seek improvement.

***Methods***

We examined multiple aspects of the electronic consult record received on inpatients from 2007 – 2018 (n=14,110).

***Results***

The average number of consults has increased from 13/week in 2007 to 33/week by 2018. The time between referral and the patient being seen has reduced from an average of 87 hours in 2007 to 6 hours in 2018. The majority of referrals (42%; n=6200) were from the emergency department (ED). 9% (n=1219) of all consults were discharged after neurology review. In 10% of cases (n=1437), the neurology team took over the care of the patient.

***Conclusion***

There has been a significant increase in demands on the neurology service in the last ten years. Despite this increased demand we have improved the efficiency of the service.

## Introduction

Acute neurological problems are common, accounting for between 10-20% of medical admissions, with approximately one quarter requiring follow up in a neurology clinic.[3,4] The requirement for specialist input for these admissions are increasing.

'Neurophobia', a term coined by Jozefowicz in 1994, was described as "fear of the neural sciences and clinical neurology" among medical students[3] and this has been found to spill over into doctors in training, hospital consultants and also General Practitioners[4]

The increasing number of referrals, combined with limited confidence among medical students and junior doctors, might potentially lead to over-reliance on specialists.

The neurology department in St Vincent's University Hospital (SVUH) established an online consult service in 2007, which has had previously published reviews.[5,6] While this service has been continuously monitored, we have not comprehensively audited this service since 2014. A growing acute medical unit (AMU) within the hospital, along with a year-on-year increase in general medical admissions, is felt to have significantly contributed to the increasing number of referrals to the neurology consult service.

In our neurology department we have four full time consultants. We have access to thirteen (unprotected) in-patient beds for neurology patients. Consults are seen daily by a neurology registrar or consultant.

We reviewed the service from mid-2007 until 2018. We sought to quantify the increased demand on the service and to assess the impact on patient care. We also compared the service with our previously published data and that published from other hospitals.[7,8]

## Methods

The referral form was an online form set up on the SVUH intranet network in 2007, designed by collaboration between the neurology team and the Information Technology (IT) department. (Image 1) To refer a patient for a neurology consultation, non-neurology doctors are required to fill in an electronic referral form (consisting of patient demographics, their location within the hospital, and drop down boxes outlining past medical history, possible presenting diagnoses, and results of investigations already performed). When the consult is seen by the neurology team, the consult is finalised by completing a number of drop-down boxes including the time the patient was seen, who the patient was seen by and the clinical outcome of the consult.

## Neurology Referral Form

Please fill in the details below. Some fields are mandatory and the form will not save without them. Fields marked with an asterix "*" are mandatory, and the form will not save unless you have filled in all the information.

**N.B. Please note that the referrals form will be checked twice daily up to 3PM. Any forms filled in after 3PM may not be checked until the following day. For urgent consults please call the registrar from the Neurology team.**

| | | | |
|---|---|---|---|
| MRN:* | | Surname:* | |
| D.O.B:* | Please use the dd/mm/yyyy format | First Name:* | |
| Sex: | Male | | |
| Consultant:* | AMU Consultant | Referring Doctor:* | |
| Department/Ward:* | ADC/OPD | Contact Number:* | |
| Urgency:* | Routine | Bed No.* | |
| Presenting Complaint:* | | | |
| Specific Consult Question:* | | | |
| Suspected Diagnosis:* | Brain Tumor Other: | | |
| Duration:* | 0 Hours 0 Days 0 Months | | |
| Past History:* | | | |
| Family History: | Stroke: Epilepsy: MS: IPD: Other: | | |
| Is Stroke Suspected | No | | |
| If stroke is suspected what are the risk factors: | DM Smoker FHx BP Cholesterol Other | | |
| Needs Inpatient Review:* | No | If No, in ADC?: | Yes |
| Previously seen by Neurology:* | No | If Yes, when: | Please enter year only |
| Why were they previously seen by Neurology?: | | | |
| Current Medication:* | | | |
| Smoker:* | No | | |

### Examination Details

| | |
|---|---|
| Gait: * | |
| Speech:* | |
| Intellect:* | |
| Cranial Nerves:* | |
| Motor Sensory:* | |
| Cerebellar:* | |
| Extrapyramidal:* | |
| Other: | |

**Investigations Requested:**

Bloods ECG EEG EMG/NCS MRI-Brain MRI-Cervical MRI-Thoracic MRI-Lumbar CT-Brain CT-Cervical CT-Thoracic CT-Lumbar Other

**Completed Results:**

| | |
|---|---|
| Bloods:* | Normal: Please check box for Yes (If not fill in box below with details) |
| ECG:* | Normal: Please check box for Yes (If not fill in box below with details) |
| EEG:* | Normal: Please check box for Yes (If not fill in box below with details) |
| EMG/NCS:* | Normal: Please check box for Yes (If not fill in box below with details) |
| MRI:* | Normal: Please check box for Yes (If not fill in box below with details) |
| CT:* | Normal: Please check box for Yes (If not fill in box below with details) |
| Other: | |
| | |
| Other comments: | |
| Possibly Medically Unexplained Symptoms: | No |

Save Reset

***Image 1: Screenshot of the neurology online referral system.***

A total of 14,110 consults were reviewed using this intranet database. Data was downloaded via the information and technology (IT) department to an excel spreadsheet, including all data that was originally included by both the consulting team and the subsequent reviewing neurologist. Duplicate referrals were deleted.

**Results**

Consults were reviewed over the period August 2007 until October 2018 (n=14110). The average number of consults has increased from 13 per week in 2007 to 33 per week by 2018. Our busiest week occurred in 2017 with 47 consults.

The time between the patient being referred and being reviewed by the neurology team on average was approximately 87 hours (2 days, 15 hours) in 2008. This had been reduced to 6 hours on average in 2018. This is calculated by the time the consult is entered on the system, until the time the neurology team 'complete' the consult, by completing the last section of the online referral. The average time between referral and the patient being seen has steadily fallen with time (Table 1).

| Year | Hours |
|---|---|
| 2008 | 87 |
| 2009 | 58 |
| 2010 | 99 |
| 2011 | 24 |
| 2012 | 45 |
| 2013 | 29 |
| 2014 | 16 |
| 2015 | 13 |
| 2016 | 11 |
| 2017 | 4 |
| 2018 | 6 |

***Table 1: Time between referral and patient being seen.***

Thirty-eight per cent of consults were seen by a neurology registrar alone (n=5348) and 62% were subsequently seen by or discussed with by a consultant neurologist (n=8706). The remainder (n=56) were seen by an SHO and subsequently discussed with a consultant.

The majority of the consults (44%; n=6200) were seen in the emergency department (ED). This was either via a direct referral from the ED team or from the admitting medical teams whose patients were awaiting a bed on the wards.

The most common suspected diagnosis requiring referral to the neurology service was epilepsy (17%; n=2319). Others common reasons for referral included stroke (10%; n=1456), transient ischaemic attack (6%; n=830) and multiple sclerosis (5%, n=660). A suspected diagnosis of 'NULL' was entered in 39% (n=5564), indicating the referring doctor had not felt able to formulate a differential diagnosis at the time of referral.

Almost 10% (n=1219) of patients were discharged directly home from the ED after being seen by the neurology team. These included patients who were medically admitted and awaiting beds, or direct consults on patients in the Emergency Department.

In 10% of cases (n=1437), the neurology team took over the care of the patient directly and 5% of cases were referred to neurology for outpatient (n=746), rather than inpatient, review. The latter group was either due to the patient being discharged by the admitting team prior to review or following a phone discussion with the neurology team.

Advice regarding treatment alone or suggested investigations was recommended in the remainder of cases (76%; n=10709) (Table 2).

| **Outcome** | **N=** | **%** |
|---|---|---|
| Discharge (same day) | 1219 | 9 |
| Take Over Care | 1437 | 10 |
| Referral to OPD | 746 | 5 |
| Advice Only | 4641 | 33 |
| Advice & Investigations | 6067 | 43 |

***Table 2: Outcome of all referrals.***

A significant change in management was taken as one in which the clinical diagnosis, investigations or therapy was altered upon review by the neurology team. Within our study a change in management was observed in 67% (n=8043) of patients (excluding the group in which 'Advice Only' was given, as this group was usually redirected to other specialties or no neurological input was required).

Table 3 shows how our current numbers compare to previous studies done within our own department.[1,2] The number of referrals per week has increased on average by 20 per week for the duration of the online component (approximately 250%) and 23 per week on average since the use of the paper based system.

| | Paper based | Previous Study of Online System – 2007-2008 (1 yr) | Current study of Online System – 2007 – 2018 (11 yr) |
|---|---|---|---|
| Number of referrals | 254 | 1016 | 14110 |
| *significant change in management | 70% | 79% | 67% |
| Time from referral to review | 'Most patients within 48hr' | 0-24: 77%<br>24-48: 11.8%<br>>48: 11.2% | 2007: 87 hr<br>2018: 6 hr |
| Take over care | 6% | 13% | 10% |
| Patients seen in ED | No info provided | 40% | 44% |
| Same day discharge | No info provided | 13% | 9% |
| Average number of referrals | 10/week | 15/week | 2007: 13/week<br>2018: 33/week |

** A significant change was taken as one in which the clinical diagnosis, investigations or therapy was altered upon review by the neurology team (compared to that of the admitting team or ED service.*

***Table 3: Comparison of the current and previous studies from our department.***

**Discussion**

The introduction and subsequent maintenance of an online neurology referral system has significantly enhanced the delivery of the neurology service within our hospital. In the last eleven years, the time between a patient being referred and being seen has reduced by about 81 hours, despite the number of referrals increasing in this time.

It is important to note during this time two full time consultant and two full time registrar posts were added to our department. However, an increase in staffing alone would likely not account for this improvement as we must also consider the growing burden on outpatient services. In the same time period, the numbers of out-patients seen in our department has increased from approximately 3,000 per year to almost 9,000 per year. We are now running 18 out- patient clinics a week.

Therefore, we would suggest that ongoing use of the online component of our referral service has been effective in streamlining the service and making it more efficient. It benefits, for instance, planning workload and a 'route' for the day as you are aware in advance of wards you need to visit, and this can easily be updated with access to any hospital computer. It also saves the time taken handwriting referrals and then delivering them to the neurology team. We also re-distributed the staff by dividing the roles among team members such that we rotated between periods each year dedicated to seeing referrals, looking after our in-patients and running out-patient clinics.

A suspected diagnosis of 'NULL' was entered in 39% of cases (n=5564), indicating the referring doctor had not felt able to formulate a differential diagnosis at the time of referral. We speculate that the current efficiency of our service may lead to a lower threshold for neurology referral. It may also have an impact on the neurological education of younger doctors in training as they are not required to enter a suggested diagnosis as consults are seen so quickly. However, we do feel it is still important in terms of prioritising patient care to maintain this efficiency.

In contrast to our previous review of the electronic system there were fewer patients taken over by the neurology team (10% vs 13%) and a significant change in management also decreased from 79% to 67%[2]. However, with increasing 'neurophobia' and the possibility of a lower threshold for neurology specialist referral,[5,6] this could be increasing the number of potentially 'inappropriate' consults, leading to this change in figures.

A previous study in another Irish tertiary centre with a paper-based system showed similar results to our previous paper system with stroke accounting for a larger proportion of diagnoses (22%)[7]. The number of patients whose care was taken over remained at 9% and it took on average 48 hour for a neurology consultant review. This agreed largely with figures from our previous paper-based system.

A study from 2011[9] in the UK showed that the neurology team took over care of approximately 8% of patients. Similar to previous studies, cerebrovascular disease and epilepsy made up the most frequently referred diagnostic categories. It also recorded the average time spent during a consultation (20.6 minutes with a range of 5 to 120 min) which would be helpful in assessing the burden of the consultation service to the neurology department. That study was also based on a paper system.

With 5% of patients directly deemed to only require outpatient referral (and 9% directly discharged by the neurology team this has led to a significant number of 'beds saved' (n=1965 over the study period), as these patients would likely have been admitted to or remained on medical wards if they had not been seen in a timely fashion by the neurology team, adding, we believe, to the importance of continually reviewing this service.

We would hope that further medical education measures[10] may lead to a much-needed reduction in potentially unnecessary consultations to our service, which may also extend to demands on our outpatient services. However, there is also a real possibility that a very efficient referral service could do just the opposite in that young doctors' first response to a neurology problem will be to refer safe in the knowledge they will be seen quickly. To help mitigate this possibility this we plan to educate new non neurology doctors in what is, and what is not, an appropriate neurology referral in the coming years. With this in mind we run a twice yearly week of large group tutorials focusing on the teaching of neurology to undergraduate students. We continue to audit these to assess benefit and indeed there has been documented short-term benefit[11], however longer-term follow-up on this within our centre is yet to be done. If a successful measure this could be extended to other specialities outside of neurology.

Other measures which could be considered could include registrar to registrar, or indeed consultant to consultant referrals, however this may not be feasible within the realms of most busy hospitals. It would appear given the number of patients who required out-patient follow up or were directly discharged following neurology advice that the potential of a Rapid Discharge Clinic, where patients would receive short term follow up may be beneficial. However, this is currently not an option in our service.

**Declaration of Conflicts of Interest:**
There are no conflicts of interest to declare.

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# Clinical Course and Maternal Outcomes Following Pregnancy in Liver Transplant Recipients

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**Abstract**

**Aims**

Studies have shown largely favourable outcomes for pregnancy following liver transplantation. However, concern remains regarding maternal and foetal complications. We sought to evaluate maternal and foetal outcomes of pregnancy, post liver transplant in the Irish National Liver Transplant Unit.

**Methods**

We conducted a retrospective study of all self-reported pregnancies between1993 to 2016. Information was collected regarding maternal and foetal outcomes.

**Results**

Twenty-four pregnancies were reported in 11 patients. Median age at delivery was 31.5 years (range 18-38) and median time post-transplant was 4.5 years (1-13). There were 18 live births (78%), 6 miscarriages and no stillbirths. Delivery was by caesarean section in 14/18 cases (78%). There were no congenital anomalies, nor maternal deaths. There were five deaths remote from pregnancy, four as a result of liver graft failure and one due to lymphoma. Deaths due to graft failure occurred 6, 9, 14- and 28-years following transplantation and 4,5, 2 and 12 years following initial pregnancy. Liver tests were abnormal prior to pregnancy in three out of four patients with subsequent graft loss but normal in all 6 long term survivors.

**Conclusion**

Short- and medium-term maternal outcomes are good for liver transplant recipients. Although maternal life expectancy in our study is shortened this is comparable to the life expectancy for patients post liver transplantation.

## Introduction

Liver transplant is a lifesaving procedure associated with excellent long-term survival rates [1]. In young females regular menstruation resumes within 12 months of transplantation in 74% of patients [2]. However, awareness of the need to consider contraception may be low. In a Polish study only one third of patients post solid-organ transplantation were using effective contraception [3]. Up to 50% of pregnancies may be unplanned [4]. In general, there is an increased incidence of hypertensive disorders, gestational diabetes and prematurity. However, in general, reported outcomes are good for both mothers and foetuses [5,6]. Nevertheless, a meta-analysis of 450 pregnancies in 308 liver transplant recipients concluded that complications rates were relatively high and that patient counselling and careful clinical decision making are important [7]. Long term maternal outcomes following pregnancy are less frequently reported. For this reason, we looked at long term maternal outcomes in liver transplant recipients attending the Irish National Liver Transplant Centre.

## Methods

This is a cohort study including all self-reported pregnancies amongst women attending the Irish National Liver Transplant Unit. St Vincent's University Hospital hosts the unit, which is the only adult liver transplant unit on the island of Ireland. A total of 1004 liver transplants were performed in adult recipients in between 1993 to 2016. Of these 400 (39.84%) were female and 155 (15.44%) were considered to be of child-bearing age (< 45 years). Follow up was until the end of July 2018. The medical notes of each woman who self-reported pregnancy was reviewed. Patient demographics and clinical parameters were recorded including indication for transplant, number of pregnancies, transplant to conception interval (TCI), maternal and foetal complications during pregnancy, immunosuppression, foetal birth weight and mode of delivery. For the majority of patients, care for post-LT was co-ordinated with a specialist maternal medicine clinic in the National Maternity Hospital, Dublin.

Data is presented using median and range for numerical values. Cumulative survival rates were estimated using the Kaplan-Meier method using Graphpad Prism software version 6.0f. (GraphPad Software Inc, San Diego CA, USA).

## Results

A total of 24 pregnancies were reported in 11 patients. Two patients were transplanted in the United Kingdom, one as a baby for biliary atresia and the second as an adult for primary biliary cholangitis. The patient with biliary atresia had 3 transplants. All other patients had a single liver transplant prior to pregnancy. Both patients are included as all their pregnancies occurred while attending our unit. One patient was excluded from analysis. She was transplanted in our unit but moved to the United Kingdom and had all her pregnancies occurred there. One patient had assisted conception for 4 pregnancies. The indications for transplant and the number of pregnancies per patient are summarised in Table 1**.** The median age at first pregnancy was 31.5 years (18-38) and the median time from liver transplant to conception was 4.5 years (1-13). Immunosuppression was tacrolimus alone (19 pregnancies) and cyclosporine alone (5 pregnancies).

*Maternal outcomes*

There were no maternal deaths during pregnancy or in the puerperium. Maternal complications are summarised in Table 2. Three patients developed respiratory infections requiring antibiotics. One patient had rupture of a splenic artery aneurysm requiring splenectomy two weeks post-partum and one patient had bleeding from oesophageal varices requiring band ligation. Four patients developed abnormal liver tests. Two were treated by an increase in tacrolimus dose at 6 and 32 weeks. In one patient labour was induced and the baby delivered by caesarean section. The fourth patient was initially transplanted for primary biliary cholangitis and had chronic active hepatitis diagnosed by liver biopsy prior to her 3rd pregnancy. At 12 weeks gestation she developed worsening liver tests and variceal bleeding requiring band ligation. She remained in hospital from 21 weeks gestation and her course was complicated by hospital acquired pneumonia. The baby was delivered by caesarean section at 33 weeks.

There were five deaths remote from pregnancy. Post-transplant, post pregnancy maternal survival and post pregnancy graft survival are shown in Figure 1. Mean twenty-year patient survival post liver transplant was in excess of 50%. For comparison purposes, current survival rates in our unit for elective first liver transplants are 93% at 1 year, 79% at 5 years and 68% at 10 years[8]. Twenty-year survival for first transplants, elective and emergency is 38.8%. One patient developed a B cell lymphoma and died 8 years following first pregnancy and 20 years following liver transplant. Four patients developed graft failure and died 6, 9, 14- and 28-years following transplantation and 4,5, 2 and 12 years following initial pregnancy. The patient with variceal bleeding in pregnancy developed hepatic encephalopathy 5 days post-partum and further variceal bleeding 2 months post-partum. Re-transplantation was attempted 9 months post-partum, but the patient died of massive intra-operative haemorrhage. The second patient was initially transplanted for Bylers disease (PFIC1) and was re-transplanted 2 years' post-partum for chronic rejection. She developed early post-operative hepatic artery thrombosis, had an emergency re-transplant but died intra-operatively. The third patient was initially transplanted for fulminant hepatic failure due to a paracetamol overdose. She had a re-transplant five years' post-partum for chronic rejection but died as a result of an intra-operative haemorrhage. The fourth patient developed graft failure and was listed for re-transplantation. She suffered recurrent severe variceal bleeding and was treated with emergency trans jugular intrahepatic portosystemic shunt but died as a result of intestinal ischaemia. Three of the five patients who died had abnormal liver function tests prior to pregnancy. One was known to have graft cirrhosis, one had steatohepatitis and the third chronic hepatitis on liver biopsy prior to pregnancy. An additional patient had a successful re-transplantation 2 years following pregnancy for late hepatic artery thrombosis.

*Foetal outcomes*

There were 18 live births (78%), 6 miscarriages and no stillbirths. Delivery was by caesarean section in 14/18 cases (78%). Seven caesarean sections were described as urgent or emergency. There were 7 pre-term births at 29,31,31,32,35 and 35 weeks' gestation. All were delivered by caesarean sections. Birth weights were available for 16 infants; median 3.02 Kg (1.67 -4.25 Kg). There were no congenital anomalies reported.

| | ***Number of patients*** | ***Live births*** |
|---|---|---|
| ***1 pregnancy*** | *5* | *4* |
| ***2 pregnancies*** | *3* | *6* |
| ***3 pregnancies*** | *1* | *3* |
| ***4 pregnancies*** | *1* | *3* |
| ***6 pregnancies*** | *1* | *2* |
| ***Aetiology of liver disease*** | *Hepatitis B* | *1* |
| | *Cryptogenic cirrhosis* | *1* |
| | *Paracetamol overdose* | *3* |
| | *Hereditary Haemorrhagic Telangiectasia* | *1* |
| | *Primary Biliary Cholangitis* | *1* |
| | *Biliary atresia* | *1* |
| | *Byler's disease* | *1* |
| | *Primary sclerosing cholangitis* | *1* |
| | *Alpha 1 antitrypsin deficiency* | *1* |

***Table 1.*** *Numbers of pregnancies and aetiology of liver disease.*

| ***Maternal complications*** | |
|---|---|
| *Hypertension* | *3* |
| *Pre-eclampsia* | *1* |
| *Venous thrombosis* | *1* |
| *Respiratory infection* | *3* |
| *Deranged liver function* | *4* |
| *Liver decompensation* | *1* |

***Table 2.*** *Maternal complications.*

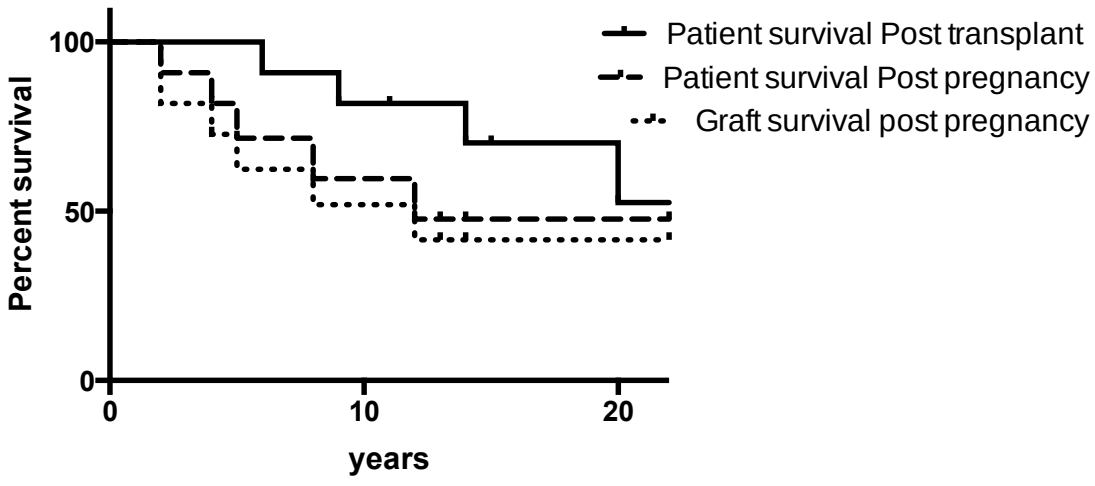


***Figure 1:*** *Actuarial patient survival post liver transplant was greater than 50% at 20 years.*

**Discussion**

In this study we report on 24 pregnancies in 11 patients following liver transplantation. Foetal outcomes were good with a live birth rate of 78%. There were no maternal deaths. Maternal and foetal mortality rates in Ireland are comparatively low with a maternal mortality rate of 9.8 and a foetal mortality rate of 4.8 per 100,000 in 2018[9].

However long-term follow-up of this post-transplant cohort of patients revealed significant liver graft loss and late mortality. Whether these rates of graft loss and mortality were accelerated by the preceding pregnancies is not clear.

There is relatively little data in the literature on remote deaths following pregnancy in women post liver transplant. A large study from the UK reported that 11/93 mothers died during follow-up and another 8 underwent re-transplantation [6]. In another study of 28 mothers followed for a median of 7.2 years at 2 centres there were no late maternal deaths or re-transplantations [5]. In a separate study from Kings College of 79 mothers followed for 52 months there were 3 maternal deaths[10].

Three quarters of infants were delivered by caesarean section and half of these were urgent or emergency procedures. The caesarean section rate is higher than the normal population (28%) and also higher than internationally reported figures of 45-50% [7,11]. Many of these caesarean births were related to preterm delivery associated with maternal pregnancy complications. Pregnancy related complication were as expected and in line with international experience.

Late deaths following pregnancy was significant in this cohort. One patient died as a result of late lymphoma and four because of graft loss. An additional patient had re-transplantation for late hepatic artery thrombosis. Despite this over all post-transplant survival was in excess of 50% at 20 years which is comparable with published results [1]. Acute cellular rejection has been reported in approximately 15% of pregnancies and appears to be more common if the pregnancy occurs within a year of liver transplantation[10]. However, it is unclear whether pregnancy itself contributes to rejection or graft loss [7]. Jain et al found in a large study of over 4000 patients 18-year mortality post liver transplant was 48% [12]. Therefore, it is unclear whether pregnancy itself contributes to rejection or graft loss [7].

The major limitation of this study is its small size and the number of late maternal deaths may be a chance finding and un-representative of the true risk. Our results indicate that pregnancy outcomes for mother and baby are generally good following liver transplantation. Although maternal life expectancy in our study is shortened this is comparable to the life expectancy for patients following liver transplantation.

**Declaration of Conflicts of Interest:**
The authors have no conflicts of interest

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# Outpatient Endoscopy: Addressing the Problem of Non-attendance for Scheduled Appointments

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**Abstract**

***Aim***

Patient non-attendance for scheduled appointments has significant resource and financial implications and has a knock-on effect for other patients on the waiting list. We set out to establish factors associated with non-attendance and to evaluate the effectiveness of currently implemented preventative measures.

***Methods***

A retrospective observational cohort study of non-attendances for gastrointestinal endoscopy was performed in the endoscopy unit over three-months.

***Results***

During the observation period, 1472 patients were scheduled to attend for outpatient endoscopy, with a non-attendance rate of 12.9% (n=191). Non-attendance was significantly higher for left-sided procedures (30.4%, n=52), non-urgent bookings (15.8%, n=163), direct access endoscopy (19.8%, n=73), patients under the age of 50 (20.6%, n=77), patients without health insurance (15%, n=163) or if the appointment was scheduled for either a Monday or a Friday. Mandatory confirmation of attendance by the patient was more effective at preventing non-attendance than text and letter reminders.

***Discussion***

Non-attendance for endoscopy results in wasted resources, financial loss, longer waiting lists and delayed diagnosis. Patients are more likely not to attend for left-sided procedures, procedures scheduled as non-urgent, procedures booked via direct access and procedures listed on either a Monday or Friday. Younger patients and those without private health insurance are also more likely to not attend. Mandatory confirmation is an effective means of improving patient attendance for scheduled endoscopy appointments.

**Keywords:** endoscopy; gastroscopy; colonoscopy; sigmoidoscopy; non-attendance.

## Introduction

Gastrointestinal endoscopy plays an essential role in both the diagnosis and treatment of gastrointestinal disorders. The burden of digestive diseases and the need for investigation has increased over the past decade, with demand for endoscopic colorectal cancer screening far exceeding supply[1,2]. It is essential for patients to have timely access to endoscopic investigation. However, many healthcare services report being unable to meet timeline targets for urgent procedures[3,4]. A significant factor in delayed access to endoscopy is the failure of a cohort of patients to attend for scheduled appointments, with non-attendance rates as high as 23% in some endoscopy units[5].

Non-attendance or "no-shows" at endoscopy results in wasted resources, financial loss, longer waiting lists and delayed diagnosis of potentially life-threatening diseases[5,6]. Despite non-attendance being well recognised as a serious problem in endoscopy departments across the world, few studies have investigated the factors associated with failed attendance[7-9]. A wide range of approaches have been used to address the problem of patient absenteeism including telephone reminders, letters, text messages, mandatory confirmation and predictive overbooking but have yielded inconsistent results[10].

Identifying predictors of non-attendance is important as this information may be used to inform the development of strategies within this subgroup of patients so as to avoid the knock-on consequences of non-attendance.

The aim of this study was to establish the factors associated with non-attendance for outpatient gastrointestinal endoscopy in our department and to evaluate the effectiveness of the currently used preventative measures.

## Methods

A retrospective observational cohort study of all non-attendances for gastrointestinal endoscopy was performed in the endoscopy unit of a busy Model 3 hospital over a three-month period. Our endoscopy unit receives referrals from different sources: in-patients, specialist outpatient clinics and 'direct access' requests (whereby a patient is booked directly for endoscopy without a specialist outpatient appointment beforehand) from General Practitioners or primary care centres, with endoscopy lists performed by both gastroenterologists and general surgeons. All patients referred for an elective outpatient OGD, colonoscopy, sigmoidoscopy or a 'double procedure' (concomitant OGD and colonoscopy) who failed to attend over a three-month period were included in the study. These were identified by manually reviewing endoscopy logbooks and recording those documented as not having attended for their appointment. Non-attendance was defined as failure to present for the scheduled procedure without prior notification of cancellation. Investigations performed on in-patients were excluded from the study.

Further data were collected on those who failed to attend by review of patient charts, endoscopy referral forms and Hospital InPatient Enquiry (HIPE) data including patient demographics (age and gender), the source of the referral (outpatient specialist clinic or direct access request), the type of examination (OGD, colonoscopy, left colonoscopy/sigmoidoscopy, double procedure), the urgency of the referral (urgent or routine), the speciality scheduled to perform the investigation (gastroenterology or general surgery), the day of the week the test was scheduled for (Monday to Friday) and the time of day the appointment was scheduled for (morning or afternoon list). The method employed to remind the patient of their appointment was also recorded.

Initially, in our centre, the gastroenterology department would send a reminder of the appointment by both text message and a posted letter, while the surgical department would send a letter only. However, two months into our observation period, mandatory confirmation by telephone call was introduced for all endoscopy appointments. This involves a telephone call requiring the patient to confirm their appointment. If they do not respond, their appointment is cancelled and given to another patient on the waiting list, with notification of the cancellation sent to the patient and the referring doctor.

All patient data was anonymised for the purpose of this study. No identifying information was retained by the authors or included in this article. As this was a retrospective service evaluation, Ethics Committee approval was not required in our institution. All statistical analysis was performed using the software package SPSS (SPSS Inc, Chicago, IL). A p-value of less than 0.05 was considered statistically significant.

## Results

*Procedure and Patient Demographics (table 1)*

During the three-month observation period, 1472 patients were scheduled to attend for outpatient endoscopy. These comprised of 621 patients for gastroscopy (42.2%), 631 for colonoscopy (42.9%), 171 for sigmoidoscopy or left-sided colonoscopy (11.6%) and 49 for a double procedure (3.3%). With regards to speciality, 1108 appointments were with a gastroenterologist (75.3%) with the remaining 364 (24.7%) with a general surgeon. The mean age of patients scheduled for endoscopy was 63 years (range 18-93 years), with 741 males (50.3%) and 731 females (49.7%).

| Predictive Factor | | Non-attendance rate (%) | p-value |
|---|---|---|---|
| **Gender** | *Male* | 13.2% (n=98) | 0.77182 |
| | *Female* | 12.7% (n=93) | |
| **Age** | *Less than 50 years* | 20.6% (n=77) | **<0.001** |
| | *50 years and above* | 10.4% (n=114) | |
| **Referral source** | *Direct access* | 19.8% (n=73) | **<0.001** |
| | *Specialist outpatients* | 10.6% (n=118) | |
| **Referral urgency** | *Urgent* | 6.3% (n=28) | **<0.001** |
| | *Routine* | 15.8% (n=163) | |
| **Speciality** | *Gastroenterology* | 12.9% (n=163) | 0.47152 |
| | *General Surgery* | 13.1% (n=48) | |
| **Time of procedure** | *Morning list* | 13.7% (n=111) | 0.35758 |
| | *Afternoon list* | 12.1% (n=80) | |
| **Health insurance** | *Private insurance* | 7% (n=28) | **<0.001** |
| | *No private insurance* | 15% (n=163) | |

***Table 1:*** *Predictive factors for non-attendance at endoscopy appointments*

*Non-attendance and Associated Factors (table 1)*

A non-attendance rate of 12.9% (191 patients) was recorded during the observation period. The mean age of patients who did not attend was 34.2 years, compared to 67.3 years for those that did. The non-attendance rate of those under the age of 50 years was almost double (20.6%, n=77) that of those 50 years and above (10.4%, n=114). There was no association between gender and adherence to the scheduled appointment. Non-attendance was higher with left-sided procedures (30.4%, n=52) compared to OGD (9.5%, n=59), colonoscopy (11.9%, n=75) or double procedures (10.2%, n=5)(figure 1). Non-attendance rates were observed to be higher on Monday (17.3%, n=49) and Friday (17.9%, n=54) compared to other days of the week (figure 2). Non-attendance for morning lists was 13.7% (n=111) compared to 12.1% (n=80) for afternoon lists, demonstrating no statistically significant difference. Patients were more likely not to attend if booked via a direct access request (19.8%, n=73) than patients who were booked after review in a specialist clinic (10.6%, n=118). Non-attendance was higher in those scheduled for routine procedures (15.8%, n=163) compared to urgent procedures (6.3%, n=28). Those with private health insurance were less likely not to attend (7%, n=28) than those without insurance (15%, n=163). There was no significant difference in non-attendance between surgical lists (13.1%, n=48) and gastroenterology lists (12.9%, n=143). (table 1)

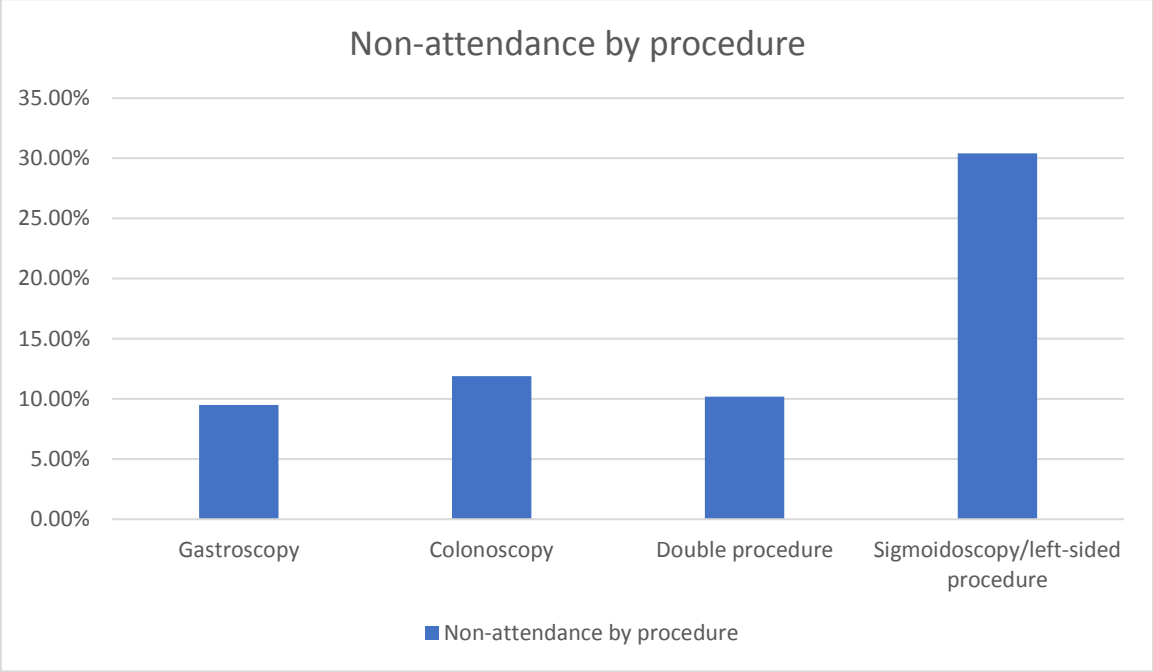


**Figure 1:** *Non-attendance by procedure.*

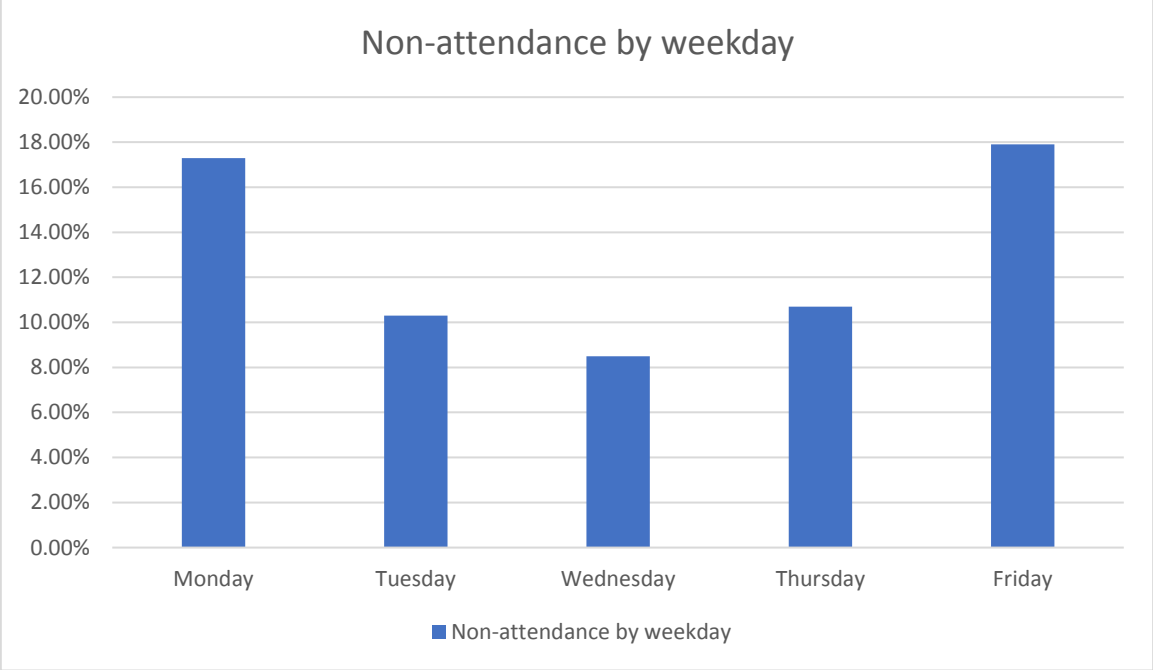


**Figure 2:** *Non-attendance by weekday.*

*Effectiveness of Reminder Methods*

During the observation period, 731 patients received a posted letter and text message to remind them of their appointment, 252 patients received a posted letter only, and the remaining 489 patients were scheduled based on mandatory confirmation by telephone call. Non-attendance was lowest in the mandatory confirmation group (4.7%, n=23) compared to those who received a letter and text reminder (16.5%, n=121) or those who received a letter only (18.7%, n=47) (figure 3).

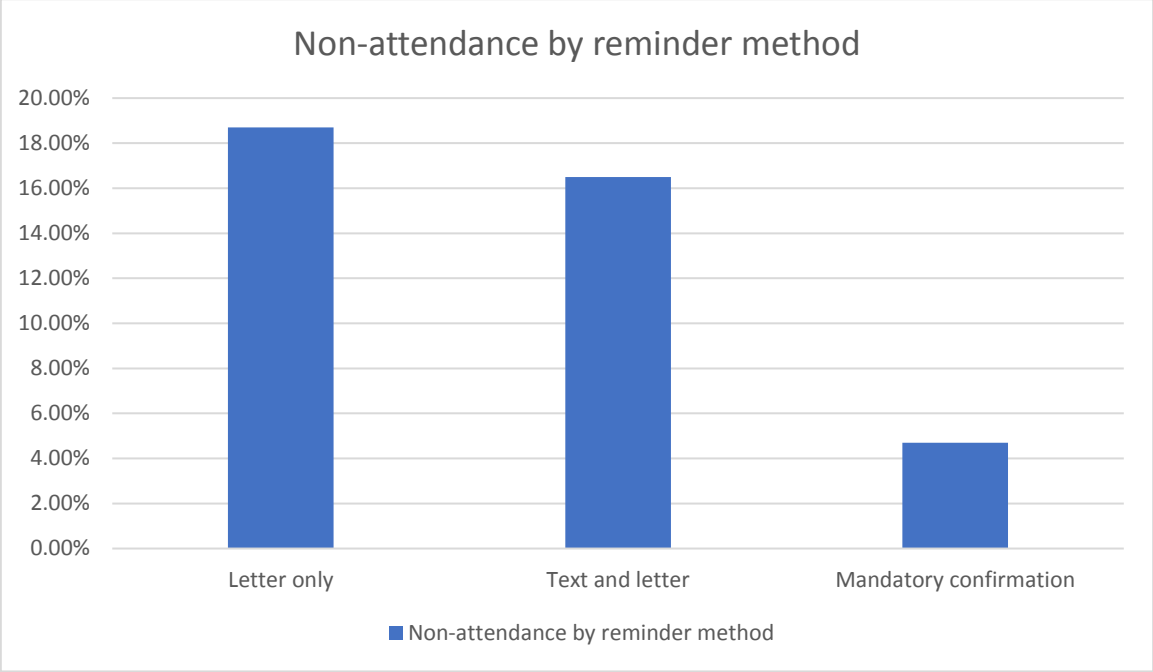


***Figure 3:*** *Non-attendance by reminder method.*

**Discussion**

Missed hospital appointments represent a serious problem for the healthcare service. They entail a significant waste of resources and have a detrimental effect on waiting lists which can result in delayed diagnosis and treatment of serious and time-critical diseases[11]. Many patients who fail to attend require a further appointment, thereby lengthening the waiting list further. Non-attendance is a significant cause of inefficiency in endoscopy units, leading to underutilisation of very costly equipment, manpower, appointment slots and specialist expertise[11-13]. This appears to be a global issue, with high rates of non-attendance reported across multiple healthcare systems in many countries[14-16]. It is unsurprising that delayed access to endoscopy can have detrimental implications for the treatment of gastrointestinal malignancy[17]. As the demand for access to endoscopy continues to increase and waiting times continue to lengthen, it is essential to address any factors that contribute to inefficient use of limited valuable resources[16].

Our findings demonstrate a high non-attendance rate for outpatient gastrointestinal endoscopy, with more than one in ten patients not presenting for their scheduled procedure. This is a hugely significant figure, but other units report even higher rates. Lee et al reported non-attendance of 23.3% in a fully open-access department, and the colorectal department of St Thomas' Hospital in London reported 21% of patients failing to attend[7-8]. While the problem of non-attendance and its consequences are well recognised, addressing the problem effectively has proved problematic[4].

Our study demonstrates that those referred for a left-sided procedure did not attend at a rate almost triple that of those referred for other endoscopic procedures. This is likely as a result of most left-sided procedures being non-urgent or routine procedures, typically performed for benign anorectal conditions or low risk lower gastrointestinal bleeding, both of which may entirely resolve with conservative measures[3]. Similarly, those referred for a routine procedure did not attend at a significantly higher rate than those referred for an urgent procedure.

This would appear to be a result of the severity of underlying symptoms and the presence of worrying red-flag features necessitating such urgency, which in turn results in greater motivation for the patient to attend[3]. Patients booked for routine procedures wait longer for their appointment, during which time symptoms may resolve or they may have had the procedure performed elsewhere. Patients referred via the direct access route missed appointments at a rate almost double that of those reviewed in a specialist clinic prior to booking. This may be a shortcoming of an open booking system, where the importance of the procedure may be poorly understood by the patient in a without an in-depth consultation in a specialist clinic prior to scheduling. Similarly, high rates of non-attendance in open access systems have been demonstrated elsewhere[7,18].

Younger patients seemed to be at higher risk of non-attendance, as did those without private health insurance. While we did not have access to information regarding patient financial income, we speculate that those with private health insurance may have greater financial resources which enabled them to overcome barriers to attendance. It has been similarly demonstrated in the American healthcare system that non-attendance is higher among patients with a lower socioeconomic status[18]. Interestingly, appointments were more frequently missed on both Friday and Monday, which may demonstrate reluctance to present to hospital either immediately before or immediately after the weekend.

We observed a significant improvement in attendance following the introduction of mandatory confirmation. The positive impact of telephone call reminders on outpatient attendance has been previously demonstrated, with Childers et al showing a 33% reduction in non-attendance[19]. However, to our knowledge, this is the first study to demonstrate the positive impact of a mandatory telephone confirmation strategy in the context of endoscopy lists. No significant difference in attendance was demonstrated between patients that received both text message and letter reminders when compared to those who only received a letter. It is well established that reminding patients about appointments reduces the rate of non-attendance[19]. However, our results demonstrate that a text reminder in addition to a letter does not result in a further significant reduction in non-attendance.

Demand for timely access to endoscopy continues to grow while wastage of resources in endoscopy departments by means of non-attendance persists, with potentially serious implications for both patient outcomes and the healthcare service. We have identified a cohort of patients who are at greater risk on non-attendance for scheduled endoscopy appointments. We have also demonstrated that the use of mandatory telephone confirmation is a particularly effective strategy at reducing such non-attendance.

**Declaration of Conflicts of Interest:**
The authors have no conflicts of interest to declare.

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# Does DNAR mean 'Do Not Treat': Exploring the Impact of a DNAR Order on Patient Care Decisions in an Irish Acute Hospital

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**Abstract**

***Aims***

A DNAR (Do-Not-Attempt-Resuscitation) order is a written document informing healthcare professionals (HCPs) that Cardio-Pulmonary Resuscitation (CPR) should not be attempted. However, in practice, it appears that the presence of a DNAR order may also affect treatment decisions other than CPR. The objective of this study is to ascertain the impact of DNAR orders on other patient treatment decisions.

***Methods***

A cross-sectional survey was conducted, using two case-based scenarios followed by 10 questions on treatment decisions. Two versions of the survey, each containing hypothetical clinical vignettes of deteriorating patients, were distributed to HCPs in an acute hospital. The only difference between the two versions was the presence or absence of a documented DNAR order in each scenario.

***Results***

Forty doctors and nurses participated in the study.

Respondents were less likely to recommend non-invasive/invasive treatment interventions if a DNAR order was documented, they were also less likely to recommend lumbar puncture, endoscopy, central line placement, blood cultures, transfer to ICU, intubation or CPR if a DNAR was documented. Significantly, (3/17) 18% of participants would intubate and (2/17) 12% would perform CPR despite a documented DNAR present.

***Discussion***

Limited knowledge among HCPs in interpreting DNAR orders presents a risk of denying patients life-prolonging treatments.

**Introduction**

The aim of a DNAR order is to promote patient autonomy, to prevent the futility of CPR in a patient whose underlying co-morbidities mean they would be unlikely to survive it or the sequelae that follow and to ensure dignity for the patient who is dying. A DNAR policy should ensure that the decision not to resuscitate should have no definitive implications on other treatment decisions and interventions.

However, it is well documented that the interpretation of a DNAR order varies considerably between doctors and often prevents the introduction of other therapeutic interventions that may be appropriate[1]. In one study in the USA, patients who were admitted for management of acute heart failure but who also had a DNAR order documented were less likely to undergo assessment of their left ventricular function or even to receive non-pharmacological counselling for their symptoms[2]. The DNAR order document itself is often misinterpreted as a surrogate marker for patients' goals of care by the attending HCPs.

In the Irish context, a recent study[3], revealed a persistent misunderstanding among HCPs with regard to DNAR orders to such an extent that over one quarter of nurses and almost one-third of primary care physicians believe a DNAR can preclude patients from receiving basic medical care. Conversely, another study[4] reported that despite a DNAR order being documented, 11% of respondents to a survey they had conducted would still do chest compressions if a patient had a cardiopulmonary arrest.

With the pending commencement of the Assisted Decision Making Act 2015 which makes provision for advance healthcare directives, patients appointing themselves not for CPR is likely to occur more frequently.

This study was conceived as part of a quality improvement project based on the clinical experience of the authors in the Irish acute hospital setting. We have noted over time that where a documented DNAR order is in place and where the patient is receiving input from the Palliative Care team, other treatment decisions appear to be influenced by these factors. The document itself is often misinterpreted as an implicit ceiling of care for all treatments.

This survey was prompted in particular by the authors' involvement in the care of a young man with an unresectable oesophageal malignancy. Due to his illness, this patient suffered recurrent aspiration pneumonias from which he recovered with antibiotics. The patient had daily reviews by the inpatient Palliative Care team and also had a documented DNAR. If a deterioration occurred out of regular working hours, an NCHD (non-consultant hospital doctor) was called by nursing staff to report vitals that warranted a medical review. They were also told that he was 'not-for-resus'. A septic screen, as per the hospital guidance, was not completed. In a number of instances, on review the following morning, the patient was on oxygen, poorly responsive and clearly septic.

The aim of this study was to determine the impact of a DNAR order on patient care decisions in the event of a clinical deterioration, in an acute hospital.

**Methods**

A cross-sectional survey was conducted. The anonymous paper-based survey tools were designed, with permission, in line with previous work by Beach and Morrison (2002)[1].

Two different versions of the survey were distributed. Each contained two hypothetical clinical vignettes of deteriorating patients followed by 10 questions to determine if the participant would perform certain diagnostic tests or interventions. The only difference between the two versions was the presence or absence of a signed DNAR order.

Case 1 described a seventy-two-year-old man who is a nursing home resident with a history of multiple myeloma and dementia. He was lethargic but rousable and we are told he either did or did not have a DNAR order in place. Questions that followed included whether to perform a CT scan, give a blood transfusion, complete a lumbar puncture if the patient deteriorated, transfer to ICU and whether to initiate CPR.

Case 1 depicted a forty-eight-year-old lady who was one year post mastectomy for breast cancer. Lymphadenopathy had been found on axillary node dissection, but she had been lost to follow up. She was now presented to the Emergency Department with what was diagnosed as a post-obstructive pneumonia and a DNAR either was or was not signed depending on the scenario. The questions that followed included; recommending intravenous antibiotics, performing a bone scan, performing a diagnostic thoracentesis for a pleural effusion, performing a colonoscopy to investigate gastrointestinal blooding, transfer to ICU and whether to initiate CPR or not.

During the course of an afternoon, nurses and doctors on two medical wards and an orthopaedic ward of an acute hospital (model 4) were asked to complete the survey. Paper surveys were left at the central station on each ward in a designated area and collected later that day having been returned to a collection point on each ward.

Participants were asked to indicate whether they would initiate or withhold treatments on the basis of the information provided to them in the vignette.

Because a DNAR order should not overly influence a HCPs decision to perform non-CPR procedures, answers were analysed on the premise that there was no difference between responses, despite the absence or presence of a DNAR order.

Demographic data collected from the participants included gender, ward and discipline/position. No identifying data were requested as part of the survey. Data were entered and stored on a single password-protected computer file which was only accessible by the lead investigator of the study (CN). Further security measures were deemed not necessary as no patient or HCP identifying information was collected.

Paper survey data were transferred to Excel for collation and onto SPSS software for analysis. A P value $<0.05$ was considered statistically significant. The Mann-Whitney U test was used to compare nonparametric variables.

Advice was sought from the local research ethics committee for this staff survey. As no patient information was being accessed and there was no risk of harm to staff, ethical approval was deemed unnecessary for this survey.

**Results**

Forty HCPs (twenty doctors and twenty nurses) participated in the study. Of these, fourteen were male and twenty-six were female. Twenty seven were working in the medical department and thirteen in the surgical department.

In general, respondents who received the vignettes containing a DNAR order were less likely to recommend either non-invasive or more invasive treatment interventions.

In both scenarios, patients were significantly less likely to have intubation ($p<0.024$ for Case 1, $p<0.000015$ in Case 2) and CPR ($p=0.10$ for Case 1, $p<0.00$ for Case 2) if they had a DNAR order signed in their chart. The patient described in Case 2 was also significantly less likely to be transferred to ICU if a DNAR order was in place ($p<0.007$).

The patient in Case 1 was less likely to undergo a lumbar puncture ($p= 0.516$), have an endoscopy ($p=0.745$), have a central line placed ($p=0.570$), be transferred to ICU ($p=0.416$), have dialysis ($p=0.498$), be intubated ($p=0.165$) or even have blood cultures taken ($p=0.766$) when a DNAR was in place as opposed to it being absent.

With regard to Case 2, when a DNAR order was documented in their chart, the patient in the vignette was less likely to have a diagnostic thoracocentesis ($p=0.588$), have an IVC filter placed ($p=0.978$), be transferred to ICU ($p=0.032$) or be intubated ($p<0.00$).

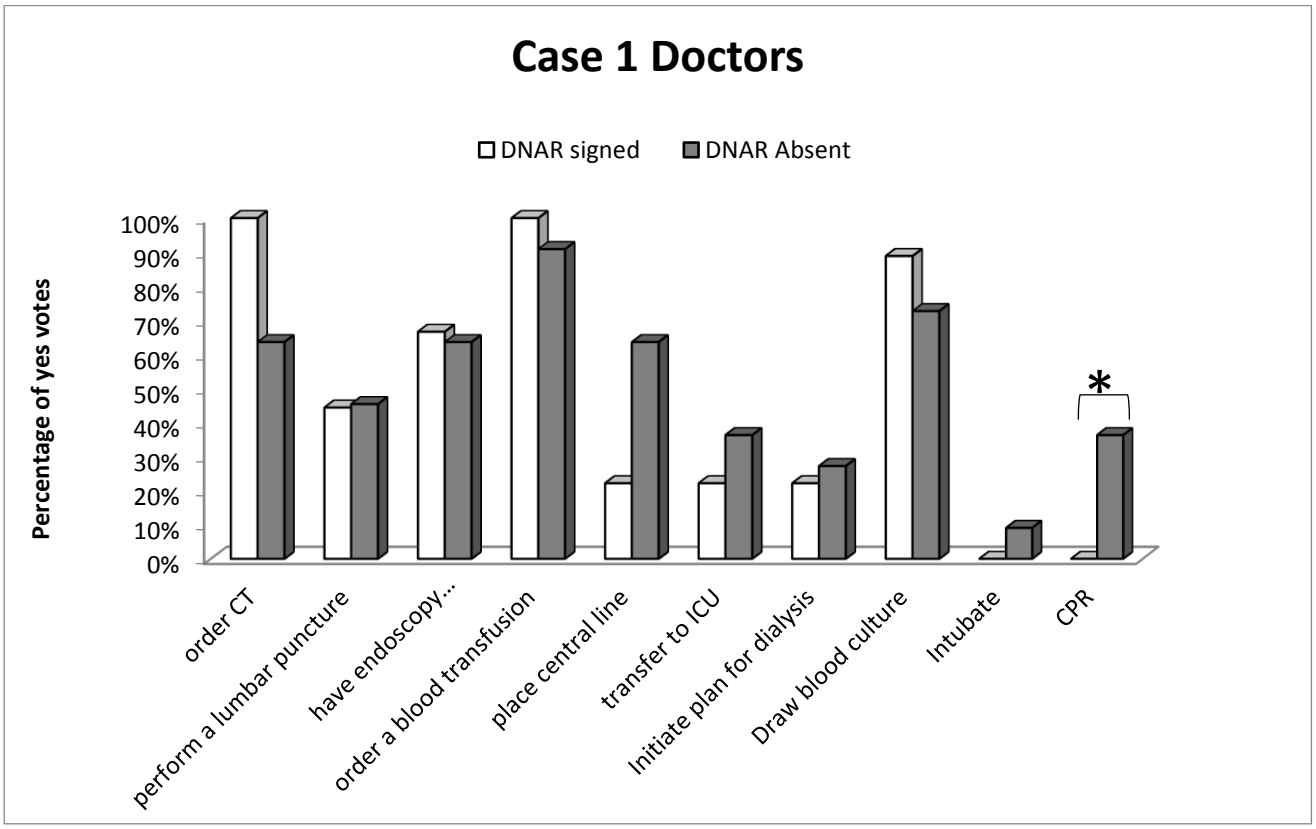
When comparing responses of doctors and nurses for Case 1 (Fig 1 & 2), both groups were less likely to initiate invasive treatments including dialysis ($p=0.882$ for doctors, $p=0.472$ for nurses), a lumbar puncture ($p=0.750$ for doctors, $p=0.571$ for nurses) or placing a central line ($p=0.131$ for doctors, $p=0.473$ for nurses) in the patient if a DNAR order was present. Conversely, both doctors and nurses were less likely to perform a CT brain when a DNAR order was present.

Notably, when the answers to Case 2 were compared (Fig 3 & 4), doctors were more likely to initiate non-invasive treatments including recommending admission ($p=1.0$), ordering a bone scan ($p=1.0$) or take blood cultures ($p=1.0$) in the patient who had a DNAR signed and less likely to consider an IVC filter ($p=0.882$), colonoscopy ($p=0.710$) or placing a central line ($p=0.656$). In the same clinical vignette however, nurses were more likely to perform or recommend admission ($p=0.792$), order a bone scan ($p=0.384$), take bloods cultures ($p=0.571$) or recommend a colonoscopy ($p=0.135$) in a patient who had a DNAR signed.

Significantly, in Case 2, 18% of respondents indicated they would intubate and 12% would perform CPR despite the presence of a DNAR documented.

Results from both cases 1 and 2 were inconsistent for some answers with some treatments being more likely to be initiated if a DNAR was present (ordering a CT and taking blood cultures in Case 1, having a colonoscopy, ordering a bone scan and taking blood cultures in Case 2).

**Figure 1:**




* Indicates statistical significance of $p<0.05$.

**Figure 2:**

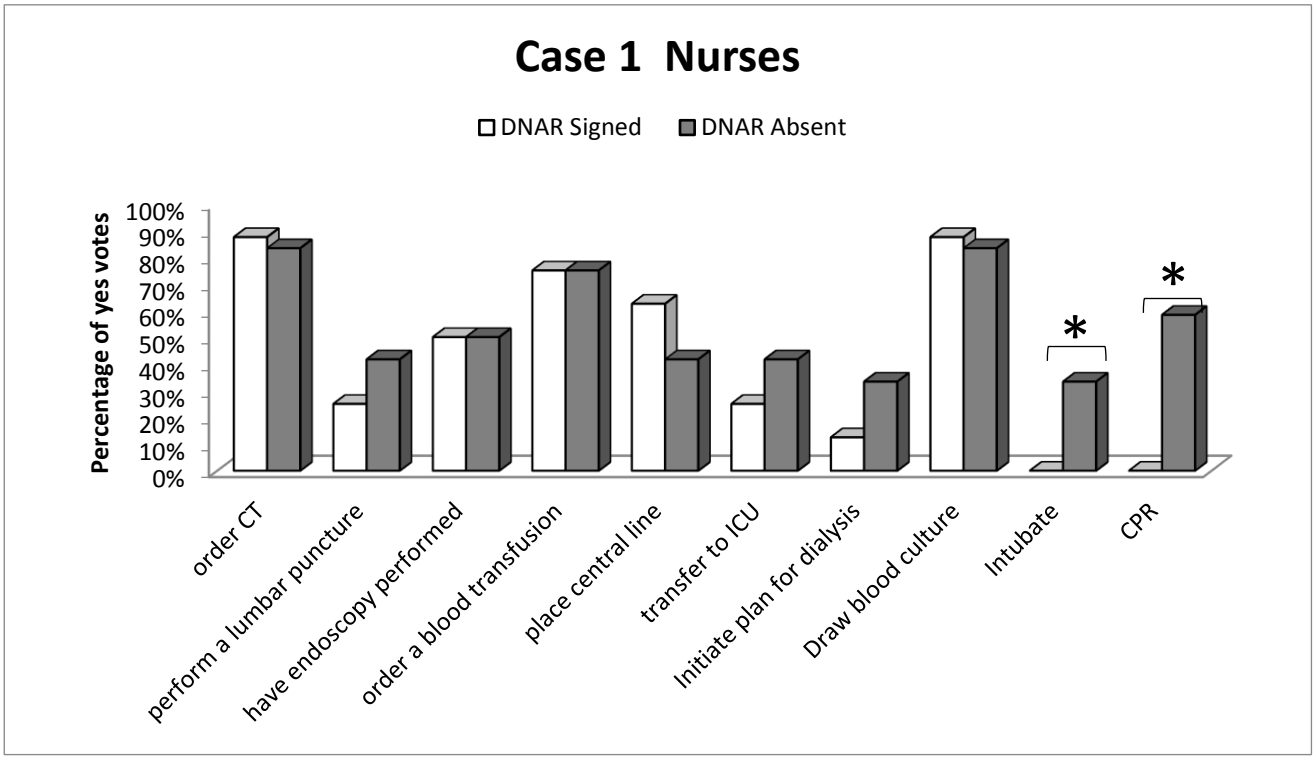
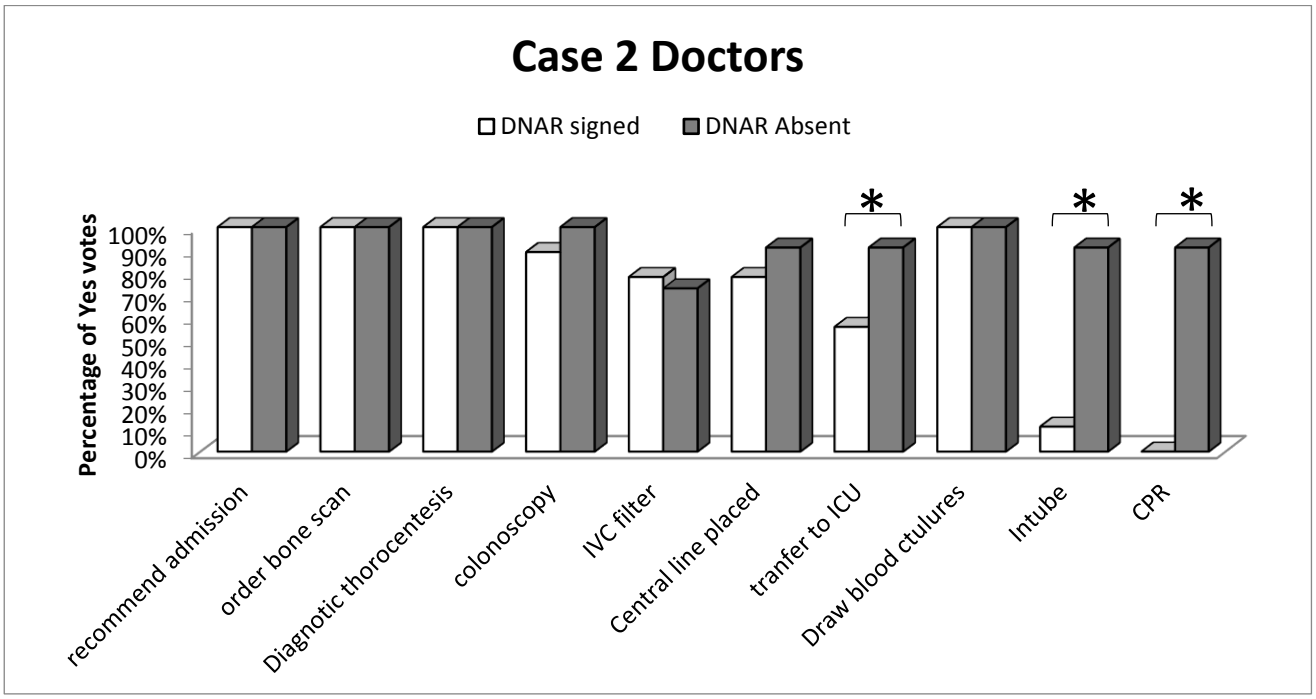


**Figure 3:**

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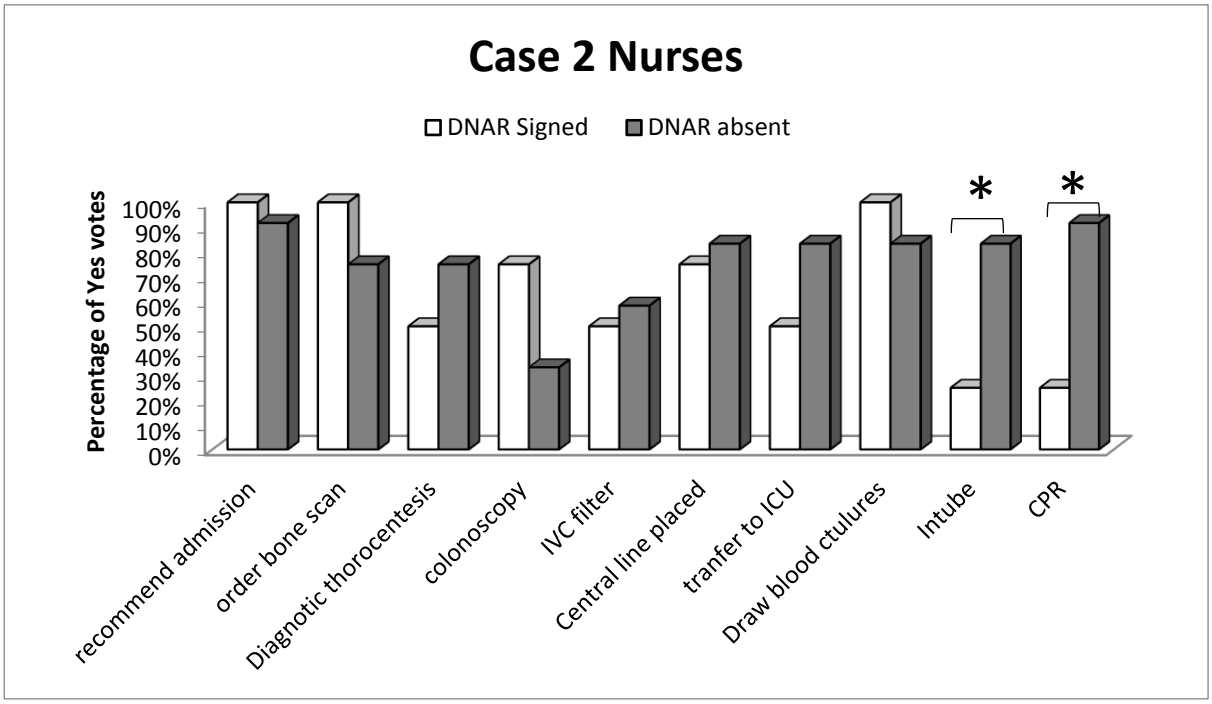


**Discussion**

The interpretation of DNAR orders can vary widely between HCPs and this in turn can lead to differing opinions of the appropriate management for patients with a signed DNAR order in their chart.

The purpose of a documented DNAR appointed by the patient themselves promotes patient autonomy but what if something more sinister lies beneath? If an individual decides they have no wish to have chest compressions when their heart stops beating, does this in turn lead to a lower ceiling of care for all other medical interventions? Is the assumption that if a patient chooses to forgo one life saving intervention i.e. CPR, they would also wish to have other treatments withheld on the basis of this decision?

The results across this project suggest that, when presented with identical clinical vignettes of hypothetical patients, HCPs are more likely to withhold treatments other than CPR in the presence of a DNAR order. These treatments range from invasive interventions like central line insertion to relatively less invasive procedures including taking blood cultures. This potentially indicates that respondents took a documented DNAR order as a marker of expected irreversible clinical deterioration.

These findings resonate with those of previous studies, highlighting the misunderstanding and misinterpretation of DNAR orders among healthcare professionals[3, 4]. It indicates that patients with a DNAR order were less likely to undergo either invasive or non-invasive treatments. However, despite this trend, results from both cases were inconsistent with some treatments being more likely to be initiated if a DNAR was documented. This may indicate that either the questions were misunderstood, or participants felt that these decisions were not relevant to them.

In one of the clinical vignettes, 12% of HCPs would perform CPR despite being consciously aware of a documented DNAR. This may reflect respondents' opinions, highlighting the assumption that the patient described would potentially survive a cardiac arrest or suggest that respondents were influenced by the patients' age. Even if this is the case, the decision to ignore the DNAR order is significant. It is of particular import if the patient themselves has decided against CPR. This has major implications in terms of trust in the health system and requires further exploration.

Findings highlight the need for continued multidisciplinary education and ongoing policy change in Irish hospitals with regard to DNAR forms and scenarios where escalation of patient care is appropriate. The *ad* hoc nature of filling the form needs to be addressed in order to abolish the ambiguity surrounding the ceiling of care when a patient with a DNAR order deteriorates. Effective training strategies to aid HCPs in initiating conversations with patients surrounding their goals of care need to be established.

Hospital policies need to distinguish DNAR status from palliative care[1] in order to restrict the scope of DNAR orders as they are often associated with treatment decisions other than emergency CPR.

This survey had a number of limitations. It was a single-centre project with a small sample size. The clinical vignettes used were hypothetical, therefore this may not accurately reflect health care professionals' practice. However, this study looked at the isolated effect of a DNAR status on a patients' medical management by reducing the other potential variables that would be present with the presentation of an actual patient.

The sole purpose of a DNAR order is to document cardio-pulmonary resuscitation preferences. The findings of this study clearly illustrate how the presence of a DNAR document may also influence other important and appropriate treatment decisions. This is of significant concern.

The results suggest limited knowledge among HCPs as to the appropriate interpretation of DNAR orders and the initiation of appropriate life-prolonging treatments. Further work is now needed to determine the educational needs of HCPs in providing consistency in interpretation of DNAR orders and to explore the need for effective training strategies to aid clinicians in initiating conversations with patients surrounding their goals of care.

**Declaration of Conflicts of Interest:**
The authors declare that there is no conflict of interest.

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# A Decade of DOVE: Multidisciplinary Experience from an Obstetric Addiction Clinic

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**Abstract**

***Aim***

To review a decade of attendances at an obstetric addiction clinic and compare with the general hospital population.

***Methods***

Retrospective study of activity between 2009 and 2018. Metrics were reviewed and compared with outcomes for the entire Rotunda Hospital population. Linear regression analyses and Chi square analyses were used as appropriate.

***Results***

The rate of attendance has remained stable over the decade studied, 12/1000births. Opioid addiction has significantly ($p=0.04$) declined and other addictions have increased ($p<0.001$). Comparing the addiction and non-addiction populations, caesarean section rates are equivalent while unassisted birth is higher (62.2% vs 49.9%, $p<0.0001$) and instrumental birth is lower (7.4% vs 17.4%, $p<0.0001$). Prematurity & Fetal growth restriction are more common in the population with addiction. Neonatal abstinence syndrome (NAS) and positive maternal virology have fallen over the decade.

***Discussion***

This limited retrospective review of women with addiction in pregnancy identifies a changing profile of attendances. It acknowledges the important role of the drug liaison midwife. It highlights increased risks for this population regarding prematurity and growth restriction, and it is important that these are reflected in care pathways and patient education. Further prospective multivariate analysis is advised to drive responsive service planning to optimise care of pregnant women with addiction.

## Introduction

Drug[1] and alcohol use in pregnancy is a worldwide issue, with Ireland being ranked as one of the top five countries for prevalence of both alcohol use during pregnancy and fetal alcohol syndrome (the most severe form of Fetal Alcohol Spectrum Disorder (FASD) [2]. The consequences of continued alcohol and drug misuse can be significant. As well as the potential risk of neonatal abstinence syndrome (NAS), infants born to mothers who misuse substances during pregnancy face a greater risk of prematurity, low birth weight, behavioural issues and learning difficulties[3].

Pregnancy may provide opportunities to engage vulnerable women into essential health care. However, women with addiction may have poor adherence with antenatal appointments, presenting late in pregnancy or not until they are in labour [4,5] which may reflect a service which fails to recognise their lifestyle and needs[6].

Specialist care for pregnant women with a history of opioid addiction is underpinned by evidence highlighting that compared to ongoing heroin use, Opioid Substitution Treatment (OST, - primarily methadone), along with optimal multi-disciplinary care, has been associated with improved perinatal outcomes[7] although adverse perinatal outcomes remain common in methadone exposed pregnancies[8].

Drug Liaison Midwives (DLM) were appointed to the three Dublin maternity hospitals in 1999. Women can self-refer to the service, or can be referred by primary care, an antenatal first visit (following routine enquiry) or directly from the community addiction services. Coordination by the DLM enables fast access to obstetric and drug treatment services (if not already in treatment) to stabilise maternal drug use and can significantly reduce stigma and harm [9,10]. The National Maternity Strategy[11] and the National Drugs Strategy[12] have emphasised that involvement with the maternity services provides opportunities to reduce drug dependence and have endorsed the role of the DLM and the associated multidisciplinary team approach, with a plan to roll out similar services to other maternity units.

At the Rotunda Hospital, this care is provided by the DOVE Clinic. The name DOVE began as an acronym for 'Danger Of Viral Exposure', but now we generally use 'DOVE' for its representation of hope and peace which resonates well across specialties and cultures. Although the hospital publishes an annual clinical report of key service activity each year, there has been limited focused research to date on ongoing provision of care for pregnant women with addiction[13,14]. This paper provides a detailed 10 year review of women with addiction in pregnancy, patterns of drug use, obstetric and neonatal outcomes including comparative metrics with the general hospital population.

## Methods

Annual reports of key service activity for the decade between 2009 and 2018 were collated and reviewed. Metrics were reviewed and compared with outcomes for the entire obstetric population from published Annual Clinical Reports of the Rotunda Hospital and presented per 1000 births >500g.

Rates of referral to DLM services, commencement of OST, misuse of other substances, positive virology and NAS were calculated per 1000 births. Linear regression analyses were used to examine the association between outcomes of interest and year of birth. The Chi square statistic was used to compare delivery categories between women care for in the DOVE clinic and the entire obstetric population. Stata SE 16 (College Station, TX: StataCorp LLC) was used for all analyses.

**Results**

Figure 1 demonstrates that attendances at the DOVE clinic have been stable over the past 10 years. With an average of 8793 births over 500g annually over the same decade, this represents a rate of attendance of approximately 12/1000 births. The number of women presenting with opioid addiction has significantly (p=0.04) declined and less women commenced OST for the first time in pregnancy in more recent years (p=0.002).

***Figure 1: Rates of contact with Drug Liaison Midwife (DLM), opioid addiction, commencement of opioid substitution treatment (OST) and non-opioid addiction over the decade studied per 1000 births.***

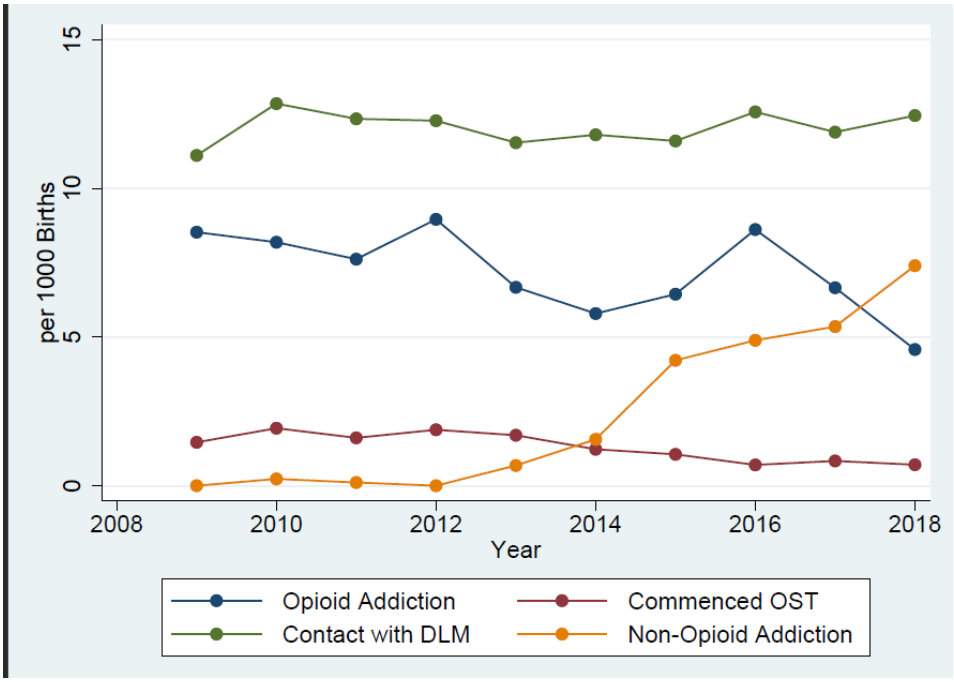
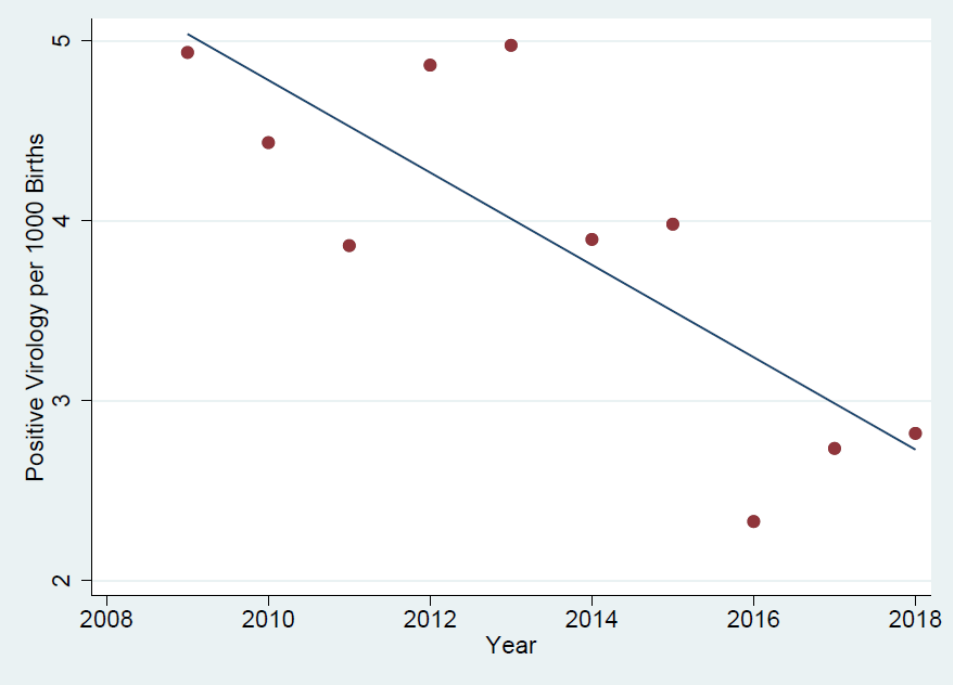



Figure 1 also demonstrates the changing patterns of addictions over the past decade, particularly in recent years. The graph demonstrates that disclosed addictions during pregnancy have changed, specifically the number presenting with non-opioid addiction has significantly (p<0.001) increased. To respond to this, *t*he DOVE clinic has evolved from providing care solely for women with opioid addiction, to providing support for those who disclose addiction to other substances (most frequently alcohol, benzodiazepines, cannabis, cocaine and over the counter analgesics).

Figure 2 demonstrates that the number of women attending the DOVE clinic with addiction who also have positive virology (HIV, Hepatitis B & C) has significantly (p=0.005) reduced.

***Figure 2: Ten-year prevalence of positive virology (HIV, Hepatitis B and Hepatitis C) per 1000 births.***




This review also compared labour outcomes and events of women attending the addiction service to the general hospital population recorded in annual clinical reports. When compared with figures for the general hospital population where a mean of 49.9% had unassisted vaginal births, women attending the addiction service were significantly ($p<0.0001$) more likely (62.2%) to have unassisted vaginal births. Instrumental delivery rates were significantly lower in the population with addiction (7.4% compared with 17.4%, $p<0.0001$). Caesarean section rates are similar in the two groups (30.4% in the population with addiction, compared with 30.07% in the general hospital population, $p=0.85$).

This review also identified that both prematurity and birthweight less than 2.5kg are overrepresented in women with addiction. In the general obstetric population 6.9% of women deliver less than 37 weeks' gestation, compared with 17.4% of the population with addiction ($p<0.0001$). Furthermore, infants born to women with addiction were significantly more likely to weigh less than 2.5kg than infants in the general hospital population (26.1% compared with 6.5%, $p<0.0001$).

Figure 3 demonstrates figures for NICU admission for infants born to women with addiction. While infants may be admitted due to neonatal abstinence syndrome (NAS), they may also require admission for other reasons e.g. low birth weight, prematurity and its associated complications. Newborns of mothers attending the DOVE clinic with addiction are more likely to require admission to NICU than infants of mothers in the general hospital population, and regression analysis does not identify a significant change in the proportion of infants of mothers with addiction requiring NICU admission ($p=0.43$) over the past decade. However, admissions for NAS per 1000 births have reduced over the period studied ($p=0.045$) (figure 4).

***Figure 3: Neonatal Intensive Care Unit (NICU) admission and Neonatal Abstinence Syndrome (NAS) rates compared with number of births in the clinic population.***

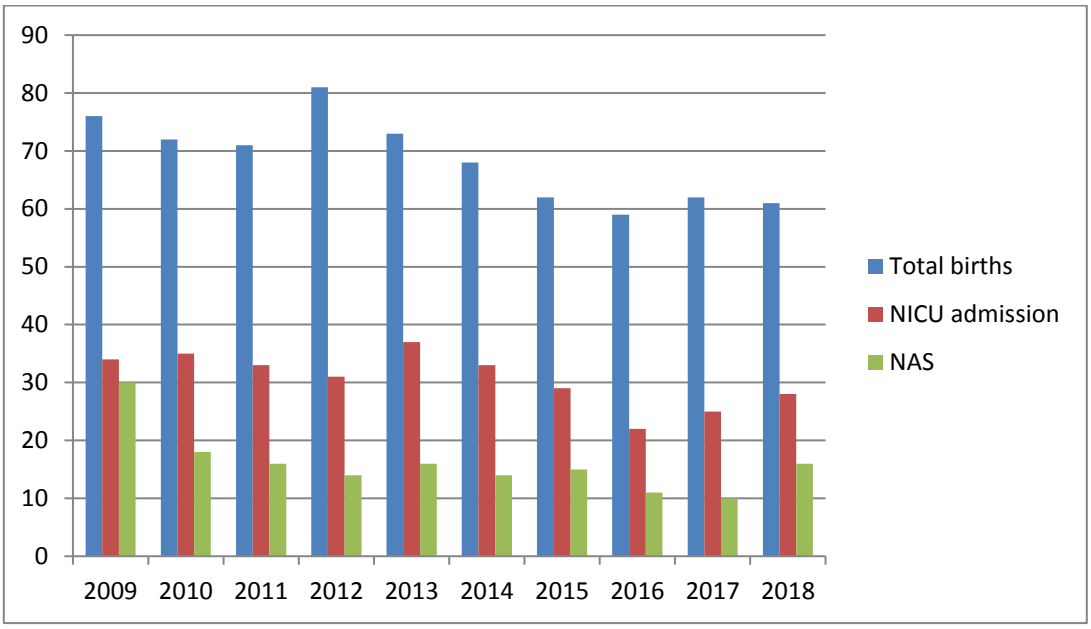
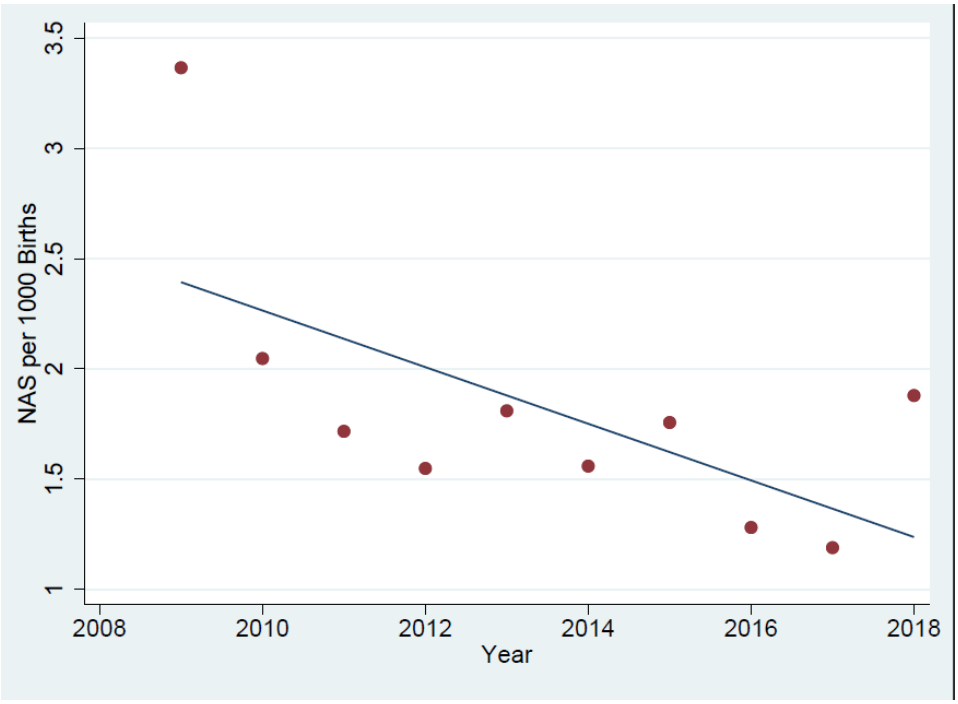



***Figure 4: 10 year prevalence of Neonatal Abstinence Syndrome per 1,000 births.***




Similarly, while only limited specific data on perinatal mortality and SIDS (sudden infant death syndrome) are available, both of these outcomes appear to be over represented in the population with addiction, with a mean of just less than one stillbirth (approx. PNMR 11.8 per 1000 births) and one SIDS (approx. rate 11.8 per 1000 births) annually, compared with an overall PNMR of 5.4/1000 birth in 2018 [15] and a SIDS rate of 0.58/1000 [16].

**Discussion**

This limited retrospective review of women attending the DOVE clinic with addiction in pregnancy identifies a number of trends and areas for comparison with the general obstetric population. While acknowledging the important role of the DLM it highlights areas for improvement in data collection and interventions to limit the additional maternal and neonatal health risks posed by addiction in pregnancy. This also provides worthwhile data for parent education as women plan pregnancies and navigate antenatal care.

The review highlights a relatively stable number of clinic attendances over the past decade. This represents the number of women who attend for antenatal review by the DLM, not the number of clinic visits or indeed those who miscarry, relocate geographically or terminate a pregnancy. Some women have a single review by the DLM, for example to address resolved addiction, and complete the remainder of their antenatal care in another antenatal clinic. The study demonstrates that the pattern of addiction has evolved since 2009, with less women presenting with opioid addiction and commencing OST for the first time in pregnancy in more recent years. These findings are consistent with other studies, which have highlighted a decrease in opioid misuse but an ageing opioid dependant population [17]. Fertility rates in this population may also be influenced by expanded availability and awareness of contraceptive options including provision of injectable contraceptives and referral for long acting reversible contraception (LARC) by the addiction services.

However, while opioid addiction has fallen, women are more likely to attend with other addictions. The service, and its allied agencies, need to ensure access to responsive care for these addictions to support affected women and to limit potential adverse effects.

In more recent years, the number of women with addictions with HIV and hepatitis has decreased. This is a positive development and may reflect changing addiction patterns and a reduction in the prevalence of intravenous drug misuse. Additionally, enhanced public health policy regarding broad, accelerated access to OST, expansion of needle exchange[18] and condom distribution services may have contributed.

The comparative data on mode of delivery between those with addictions and the general obstetric population are interesting and worthy of further prospective multivariate review incorporating other factors which influence intervention (age, parity and BMI). However, it is notable that while instrumental delivery rates are consistently lower in the population with addiction, caesarean section rates are not similarly low, perhaps due to the potential impact of positive serology on obstetric care (e.g. limitations on fetal blood sampling). The lower rates of instrumental birth in the population with addiction are particularly interesting, given that these neonates are more likely to be growth restricted and born prematurely, factors which might be expected to increase instrumental delivery rates for suspected fetal distress.

This review has also highlighted that infants of mothers with addiction have a relatively high likelihood of NICU admission, not simply for NAS. It is reassuring to note that the proportion of infants requiring admission for NAS has reduced over the decade. These metrics are important in terms of antenatal education of women with addiction, in order to prepare them for potential interventions that may be required and to optimise factors which may mitigate risk.

The perinatal mortality and SIDS data, although based on small numbers and extrapolated, are also notable. These rates may be influenced by prematurity and low birth weight, but they are worthy of ongoing prospective review to identify modifiable risks (e.g. social and lifestyle factors).

The strengths of this paper include that it represents a decade of care provision in a single clinical site with an established service caring for pregnant women with addiction. Undoubtedly it is limited by its retrospective nature and some of the metrics collated in this paper are based on small numbers (e.g. PNMR and SIDS rate). Nevertheless, the information is important to drive further analysis and subsequent improvement of these important outcomes in this vulnerable population. We look forward to embracing the opportunities of an electronic health care record (Maternal & Newborn Clinical Management System, MN-CMS) and enhanced data analytic capacity to produce insights that help improve outcomes for women and babies.

This paper highlights the work of a multidisciplinary antenatal service for changing patterns of addiction over the past decade. There are increased risks for this population in terms of prematurity and growth restriction, and it is important that these are reflected in care pathways and patient education.

Other development opportunities in the service include introduction of onsite vaccination for patients who find it challenging to access primary care as well as enhancing pathways for postpartum contraception. Developing Transitional Care facilities for families affected by NAS would also be a positive development to reduce separation of the mother from her infant.

It is also important that the data summarised in this paper is used for professional development of staff involved in the provision of care for this vulnerable group in order to enhance care and reduce stigma. We look forward to ongoing data analysis using MNCMS as well as implementation of the National Maternity Strategy and the National Drugs Strategy to enable other clinical sites nationally to offer a similar package of multidisciplinary care. National roll out of MNCMS in the remaining 15 maternity units will also enable review and analysis of national metrics on an ongoing basis.

**Declaration of Conflicts of Interest:**
Nothing to declare.

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# Cytoreductive Surgery (CRS) and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) for peritoneal malignancy during the COVID-19 Pandemic

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**Abstract**

***Aim***

COVID-19 has instigated rapid alterations in surgical care. Performing CRS-HIPEC for peritoneal metastases during such challenging times has required several perioperative changes. We report our early experience of undertaking CRS-HIPEC during the COVID-19 pandemic.

***Methods***

A retrospective review of all patients undergoing CRS-HIPEC was conducted (1st April/20 – 28th May/20). Data was retrieved from a prospectively maintained peritoneal malignancy database.

***Results***

Twelve patients (M:F, 5:7; median, 56yr (26-70yr)) underwent CRS-HIPEC. Five patients had peritoneal metastases of colorectal origin, with a median peritoneal-carcinomatosis-index (PCI) of 12, while four patients had advanced pseudomyxoma peritonei (median, PCI 23). Patients were pre-operatively assessed for SARS-CoV-2. Operating theatres (OT) with laminar-air-flow-systems and high-efficiency-particulate-air-filters were utilized. Essential personnel were permitted through a one-way entry/exit pathway. Double plume extractors were used to remove surgical smoke throughout the operation. HIPEC was conducted using the closed rather than open abdomen technique. Patients were transferred via a modified critical care pathway to HDU. Early results have identified no significant COVID-related complications.

***Conclusion***

Initial experience of surgery for peritoneal malignancy in the COVID-19 era is encouraging. We will continue to carefully audit our perioperative outcomes as our experience builds.

## Introduction

Coronavirus disease 2019 (COVID-19) was first reported in Wuhan, Hubei Province, China in November 2019. The illness rapidly disseminated through over 160 countries in subsequent months and was declared a global pandemic by the World Health Organisation on March 11, 2020. In Ireland the death toll associated with COVID-19 is approximately 1,691 with over 25,000 people affected.[1] Public health authorities swiftly rationalised resources and increased hospital capacity to accommodate for the surge of COVID-19 patients. The Association of Coloproctology of Great Britain and Ireland (ACPGBI) guidelines initially recommended the cancellation of elective surgeries in order to create adequate resources and facilities to care for patients with COVID-19 requiring hospitalisation and critical care support.[2]

General and colorectal surgery has been particularly impacted given the wide variety of elective procedures offered by the specialty, with the majority deemed non-urgent. Peritoneal malignancy, however, is a progressive disease that requires urgent surgical assessment and management, as delays can lead to a higher tumour load and a reduced possibility of achieving a complete cytoreduction. Although the benefits of performing CRS-HIPEC for peritoneal malignancy during the pandemic remain unchanged, the risks have increased substantially. The COVIDSurg Collaborative group published a study in the Lancet evaluating the outcomes of 1,128 patients undergoing surgery with perioperative SARS-CoV2 infection. They reported a 23.8% 30-day mortality rate,[3] with demonstrable alterations in the risk-to-benefit ratio of surgery for individual patients based on their disease status, age, frailty, and comorbidities. The availability of healthcare staff and facilities, such as ICU/HDU bed capacity is a key factor when approaching decision making for treating patients during the COVID-19 pandemic. Utilizing already depleted critical care resources may lead to added pressures on the healthcare system and should therefore only be considered when these resources are not required for COVID-19 patients. Lastly, a relatively high proportion of COVID-19 cases in Ireland are healthcare workers, thus emphasizing the importance of protecting healthcare staff, especially in high-risk settings.[1] The detection of SARS-CoV-2 in gastrointestinal tissue, faeces and, more recently, peritoneal fluid affirms CRS-HIPEC's status as a high-risk procedure that requires strict compliance with infection prevention and control (IPC) measures to maximise patient and staff safety.[4]

Adaptation to the COVID-19 pandemic has led to the implementation of several pre-, intra- and postoperative changes to facilitate the protection of healthcare staff and patients. We describe our experience of performing CRS-HIPEC during the COVID-19 pandemic.

## Methods

A retrospective review of a prospectively maintained registry was conducted on all patients who underwent CRS-HIPEC at the National Centre for Peritoneal Malignancy between 1st April 2020 – 28th May 2020. Anaesthetic risk was stratified using the American Society of Anaesthesiologists (ASA) score. The peritoneal carcinomatosis index (PCI) was calculated in accordance with the Peritoneal Surface Oncology Group International (PSOGI).[5] At the end of the operation, the completeness of cytoreduction (CC) was assessed.

**Results**

*Patients*

Demographic, operative and pathological data was obtained from electronic patient chart (Table 1). Twelve patients (5 male, 7 female; median age, 56 years) underwent CRS with 11 receiving HIPEC during the study period, a comparable workload to the same period during the previous year. The majority of patients had an ASA score of 2 (n=10, 83%*)*. Five patients had peritoneal metastases of colorectal origin, while 4 had pseudomyxoma peritonei. A median PCI of 12 was noted for the colorectal cases. The patients with pseudomyxoma peritonei had a higher overall tumour burden with a median PCI of 23. The remaining 3 patients had gastric (n=2) and ovarian (n=1) pathology. Ten patients (*83%*) underwent a complete cytoreduction (CC-0/1). Of the remaining 2, one was deemed inoperable and the other underwent major tumour debulking for advanced pseudomyxoma peritonei. The median length of hospital stay (LOS) in CRS patients was 12 days (range, 6-20 days).

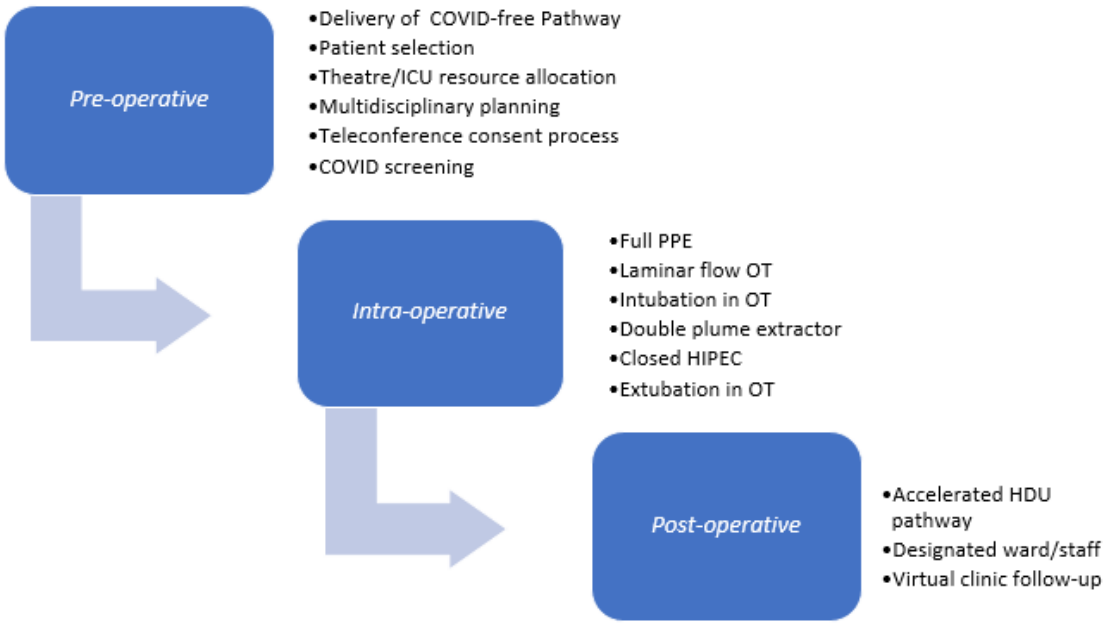
| **Explanatory variables** | CRS +/- HIPEC Patients (*n = 12)* |
|---|---|
| **Age** (median (range)) | 56yrs (26 – 70) |
| **Gender** (n (%)) | |
| Male | 5 (42%) |
| Female | 7 (58%) |
| **Origin of Peritoneal Malignancy** (n) | |
| Colorectal | 5 |
| Pseudomyxoma | 4 |
| Ovarian | 1 |
| Gastric | 2 |
| **Peritoneal Carcinomatosis Index** (n) | |
| PCI $<$ 5 | 3 |
| 5 $\geq$ PCI $<$ 10 | 4 |
| PCI $\geq$ 10 | 5 |
| **Completeness of Cytoreduction** (n) | |
| CC-0 | 6 |
| CC-1 | 4 |
| CC-2 | 0 |
| CC-3 | 2 |
| **Performed HIPEC** (n) | |
| Yes | 11 |
| No | 1 |
| **Operating Time** (median ((range)) | 325m (75 -603) |
| **Morbidity** (n) | |
| Epidural blood patch | 1 |
| Pleural tap | 1 |
| **Length of Hospital Stay** (median(range)) | 12 days (6-20) |

*Table 1: Baseline characteristics of CRS-HIPEC patients.*

*Pre-operative*

Initial consideration was given to performing elective CRS-HIPEC at a COVID-free site. However, taking into account the complexity of cases and requirement for specialist expertise in radiology, pathology, and anaesthesia, it was decided that utilizing a COVID-free pathway within our current hospital would be more appropriate (Figure 1). Patients with peritoneal malignancy were discussed at the multidisciplinary meeting (MDM) and underwent rigorous preoperative anaesthetic assessment. In our cohort the majority of patients were young (median age, 56 yr), fit (n=11, 91% ASA ≤2), and deemed a low peri-operative anaesthetic risk. The operating surgeon performed a virtual consultation with patients to discuss the procedure and explain the consent process. Most notably, patients were informed of the increased risk of pulmonary complications and mortality from contracting COVID-19 perioperatively despite the establishment of "cold" pathways and strict IPC measures. Critical care resources were closely monitored, with limitations in healthcare staffing or ICU/HDU bed capacity precluding admission of patients for CRS-HIPEC. Suitable patients were admitted to an isolated room on a dedicated surgical ward the night before surgery, contingent on them having met the COVID-19 elective surgery criteria. This required strict social isolation for 14 days, a clinically asymptomatic period of 7 days prior to surgery, a pre-operative COVID-19 assessment and a negative COVID-19 swab within 72 hours, as part of our local hospital policy.

*Figure 1: Flowchart of patient pathway.*




*Intra-operative*

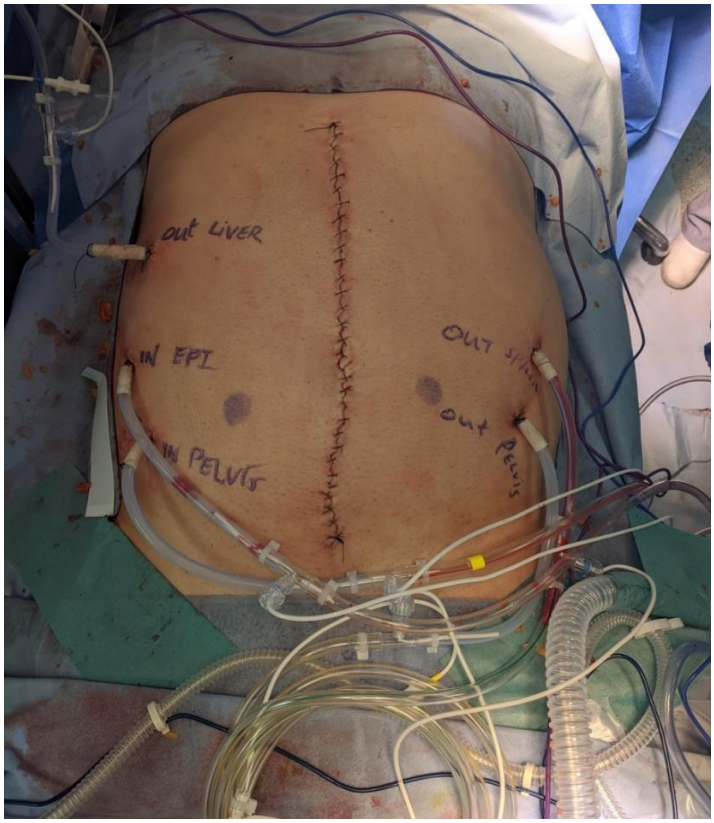
During the pandemic 4 out of 12 theatres were operational daily with the remaining theatre staff being redeployed to HDU, ICU, general or COVID wards. As our patients were deemed low-risk, standard operating theatres with ultra-clean laminar air-flow ventilation systems and high-efficiency particulate air filters were utilized.

Only essential staff were allowed into the theatre wearing full PPE in a one-way entry/exit pathway. All allocated personnel were required to sign-in their details for contact tracing if necessary. Only essential equipment was kept in the main operating theatre with the remainder in a side room in which a nurse 'runner' was present should any equipment be required.

Intubation and ventilation were performed via a secure closed circuit. Given that CRS-HIPEC generates more plume than routine surgical procedures[6] and SARS-CoV-2 RNA has been detected in gastrointestinal tissue, blood, stool and peritoneal fluid,[4] a plume extractor (RapidVac™, Covidien) was used on high power to reduce surgical smoke and potential aerosol transmission. In addition, we adopted disposable monopolar diathermy pencils (ClearVac™, ConMed) with integrated smoke evacuators.

Traditionally we routinely performed the open (Coliseum) HIPEC technique as it provides an even distribution of chemotherapy throughout the abdominal cavity and allows direct access to the abdominal contents and chemoperfusate.[7] The disadvantage of this technique is that there may be an increased risk of vapour dispersion from the abdominal cavity thereby potentially exposing theatre staff to carcinogenic and/or viral particles. By comparison, the closed HIPEC technique uses a closed-circuit method to reduce the risk of aerosol contamination in the OT. As neither technique has been proven superior regarding disease-free progression or overall survival,[8] we have now adopted the closed technique to reduce the exposure to chemoperfusate and aerosol transmission from COVID-19 (Figure 2).

*Figure 2: Set-up for closed HIPEC.*



*Post-operative*

Post-operatively, non-essential staff exited the room before the patient underwent extubation. Patients recovered in the operating theatre until ready to be transferred to ringfenced beds in the HDU. The conventional critical care pathway was modified to minimise patient contact with potential COVID-19 carriers. For example, a designated "cold" route from theatre was established to prevent vulnerable post-operative patients from inadvertently coming into close contact with a COVID-19 patient whilst in transit to the HDU. Individual nurses were allocated to specific patients in the HDU to minimise the variation in patient contact and potential spread of COVID-19. Once suitable for ward-level care, patients were transferred to a designated single room on a surgical ward with specified nurses. A select number of patients were recruited to an accelerated post-operative care pathway and transferred directly from the operating theatre to the ward and nursed in a single isolation room. Virtual clinic follow-up was arranged for 6 weeks post-discharge. During the study period, morbidity was low, with no COVID specific complications recorded. Two post-operative complications requiring minor intervention (Clavien-Dindo grade llla) were noted. Two healthcare workers directly involved in the treatment of CRS-HIPEC patients contracted COVID-19 in our institution during the study period. The early detection and fastidious implementation of the aforementioned precautions prevented the spread of COVID-19 to both healthcare staff and patients.

**Discussion**

The delivery of a peritoneal malignancy service is possible during COVID-19 when appropriately resourced with strict infection precautions. The restructuring of our traditional perioperative pathways has allowed us to maintain a high standard of healthcare for CRS-HIPEC patients, whilst ensuring minimal transmission of COVID-19 infection to patients and healthcare workers. In addition, applying unconventional methods, such as performing a closed HIPEC technique has additional benefits by reducing aerosol contamination in the OT, and the subsequent risk to healthcare staff during CRS-HIPEC cases. Our initial experience of CRS-HIPEC for peritoneal malignancy during the COVID-19 pandemic has been encouraging and we will continue to audit our perioperative outcomes as our experience builds.

**Declaration of Conflicts of Interest:**
All named authors hereby declare that they have no conflicts of interest to disclose.

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# The Current Use of Lumbar Puncture in a General Paediatric Unit

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**Abstract**

***Aim***

This study evaluated the use of Lumbar Puncture (LP) in a general paediatric unit over a 3-year period.

***Methods***

Index patients, who had a successful LP, were identified from the microbiology database and failed LP procedures were identified from a chart review of the serum PCR database. Data abstracted included 1) patient age, 2) LP indication, 3) LP procedure outcome; classified as atraumatic, traumatic or failed, 4) grade of doctor undertaking the procedure and 5) the final diagnosis.

***Results***

We identified 104 paediatric patients, of whom 29(27.9%) were neonates. LP was indicated for the evaluation of acute undifferentiated illnesses, with 33 (31.7%) patients having fever without source beyond the neonatal period and 16 (15.4%) being neonates with fever. A CSF sample was obtained in 96 (92.4%) patients, with 71 (73.9%) being atraumatic. Successful LP was undertaken by Consultants in 4 (4.1%), Registrars in 83 (86.5%) and SHOs in 9 (9.4%) patients. 14 (14.6%) patients had positive CSF cultures with an additional 23 having positive cultures or serology (9 blood cultures, 11 urine cultures and 3 positive serum PCR).

***Conclusion***

Skill in LP performance is still required, to evaluate acute undifferentiated illness, in general paediatric units and ancillary methods to aid SHOs with LP skill development is desirable.

## Introduction

Lumbar puncture (LP) and the analysis of cerebrospinal fluid (CSF) is required for the evaluation of acute undifferentiated febrile illnesses in children. LP is also utilised to investigate certain neurological diseases, to administer intrathecal medications, and it forms part of the treatment protocol for specific malignancies.

With the introduction of enhanced immunisation regimens, the incidence of invasive bacterial disease is declining[1,2] and as such, LP is becoming a low-frequency procedure. However, it remains an expected competency for Basic Specialist Trainees (BST) in Paediatrics[3].

The aim of this study was to assess the current use of LP in a general paediatric unit which provides secondary level hospital care.

## Methods

With ethical approval from the Mayo University Ethics Committee, a retrospective observational study was conducted in patients under 15 years, who required LP during the 3-year period from 2014 to 2016 inclusive. During the 3-year study period approximately 5,000 babies delivered, and 4,600 medical paediatric patients were admitted to our hospital.

Patients who underwent LP, with successful acquisition of CSF samples, were identified from the microbiology database. Patients who had LP attempted, with no CSF acquisition, were identified through a chart review of all patients in whom a serum polymerase chain reaction (PCR) was performed during the study period.

We are confident that this database allowed us to identify those patients who had a failed LP; as prior to undertaking a LP, the need to exclude sepsis is discussed with the parent. Having voiced concerns with regards to potential sepsis or meningitis, should procedure be unsuccessful, a serum PCR is obtained.

Soon after birth, some neonates have a partial sepsis work up performed, if they are experiencing symptoms of respiratory distress or if they are born to mothers who have prolonged rupture of their membranes, prior to commencing antibiotic therapy. In this sepsis work-up, a full blood count, C-reactive protein and blood cultures are routinely performed. However, LP is not done as part of the sepsis work up in our unit.

Data abstracted from each patient's chart included 1) the patient's age, 2) the primary indication for the LP, 3) the procedure outcome (classified as 'successful', 'traumatic' or 'failed'), 4) the number of LP attempts undertaken, 5) the outcome of the CSF analysis, 6) the grade of the doctor performing the procedure (Consultant, Registrar or Senior House Officer), and 7) the patient's final diagnosis.

LP was performed aseptically, in accordance with the standard health service guidelines. The following definitions were utilised A) 'Successful LP' was the procurement of a viable CSF sample for analysis B) 'Failed LP' was inadequate CSF acquisition for analysis, following needle insertion and C) 'Traumatic LP' was the finding of >400 RBC/$mm^3$ in the CSF sample[4].

**Results**

One hundred and four children, under the age of 15 years, underwent LP during the study period. Patients were aged as follows: 0-7 days, 21 (20.2%); 8-28 days, 8 (7.7%); 29 days to 1 year, 41(39.4%); >1 year-5 years, 18 (17.3%); >5 years, 16 (15.4%).

Indications for LP were the 1) presence of fever without focus beyond the neonatal period (n=33, 31.7%), 2) evaluation of a febrile neonate (n=16, 15.4%), 3) perception of 'septic appearing patient' (n=18, 17.3%), 4) evaluation of suspected meningitis (n=16, 15.4%), and 5) assessment of a non-specific febrile illness (n=21, 20.2%).

A viable CSF sample was obtained in 96 patients (92.4%). 71 (73.9%) of these were atraumatic and 25 (26.1%) were traumatic. 4 LPs (4.1%) were carried out by Consultants, 83 (86.5%) by Registrars and 9 (9.4%) by Senior House Officers (SHO). Documentation relating to the number of attempts made to secure the CSF sample could not be clarified in single operator procedures.

Eight (7.7%) patients had unsuccessful LP performance and these were classified as failed procedures. 3 (37.5%) underwent 1 attempt, 3 (37.5%) had 2 attempts and 2 (25%) had 3 attempts. The initial LP attempt was undertaken by an SHO in 3 patients, a Registrar in 2 patients and a Consultant in 3 patients. Following Consultant review, none were subjected to further LP attempts.

In those with a successful LP, 14 (14.6%) patients had a positive CSF PCR; however, 23 other patients had evidence of infection with 9 positive blood cultures, 11 positive urine cultures and 3 patients had a positive PCR test (see table 1).

| **Positive CSF Culture (n=14)** | **Positive Blood Culture (n=9)** | **Positive Urine Culture (n=11)** | **Positive Serum PCR (n=3)** |
|---|---|---|---|
| Enterovirus (n=10) | Group B streptococcus (n=6) | Escherichia coli (n=10) | Meningococcus B (n=2) |
| Human Herpesvirus-6 (n=1) | Streptococcus pneumoniae (n=2) | Klebsiella (n=1) | Enterovirus (n=1) |
| Streptococcus pneumoniae (n=1) | Escherichia coli (n=1) | | |
| Neisseria meningitidis (n=1) | | | |
| Human Parechovirus (n=1) | | | |

*Table 1: Positive Results in patients with Successful LP (n=37)*

Of the 67 patients with a negative CSF PCR, negative blood cultures and negative urine cultures (including those 8 patients with a failed LP), the following were the final diagnoses: unspecified viral syndrome (n=39); gastroenteritis (n=17); bronchiolitis (n=5); laryngotracheobronchitis (n=2); myocarditis (n=1); argininosuccinic aciduria (n=1); Addison's disease (n=1); immune thrombocytopenic purpura (ITP) (n=1). For patients diagnosed with myocarditis, argininosuccinic aciduria, Addison's disease and ITP, it was their first presentation to the hospital.

**Discussion**

This study represents an evaluation of the use of LP in infants, children and adolescents, presenting with acute undifferentiated illnesses to a general paediatric unit. A viable CSF sample was obtained in 96 (92.4%) patients and 25 (24%) samples were traumatic, using our predefined definition[4]. Most successful LPs were performed by Registrars (n=83, 86.5%), the majority of whom had trained outside of Ireland and had achieved this competency in their native countries (India, Pakistan, Sudan and Romania). In a study by Nigrovic[5] of 1459 LPs, 952 (66%) were successful after the first attempt and 875 (60%) were atraumatic; however, a definition of 500 RBC/$mm^3$ was used. The higher success rate of 68.3% in obtaining atraumatic CSF samples, in this study, reflects the competency of the registrars who performed the procedures.

Traumatic lumbar puncture is associated with inappropriate antibiotic use, elevated treatment cost, and significant discomfort for patients.[6,7] Following a traumatic LP, the presence of red blood cells in the sample complicates the interpretation of CSF microscopy.[8] For this study, traumatic LP was defined as the presence of >400 RBC/$mm^3$ in the CSF sample.[4] Using the same definition, the Glatstein et al.[4] study of 127 LPs demonstrated that 24% of paediatric LPs were traumatic on the first attempt and this increased to 50% where more than one attempt was made. We found that 25 (26%) were traumatic on the first attempt and this increased to 60% where more than one attempt was made. This suggests that the addition of other factors, such as the presence of increasing patient distress, increases the risk of traumatic LP with further attempts.

Our data shows that a high proportion of infectious aetiologies account for the final diagnoses of the study cohort. 3 (2.8%) patients had a positive serum PCR, 9 (8.65%) had a positive blood culture and 11 (10.5%) had a positive urine culture. In those with successful LP, there were 14 (14.5%) patients with a positive CSF PCR. Therefore, LP remains an important test in the evaluation of the acutely unwell paediatric patient.

Current practice provides limited learning opportunities for SHOs in LP performance, with only 9 (8.65%) LPs undertaken by SHOs during the study period. As a competency-based curriculum is integrated into Basic Specialist Training in Paediatrics[3], an alternate paradigm needs to evolve in order to enhance skill acquisition in LP.

LP performance is improved by correct positioning, appropriate technique, ultrasound guidance LP (USGLP) and enhanced operator's skill.[9-11] To aid skill development, simulated deliberate practice and USGLP could be introduced. Point of care USGLP is a feasible adjunct to current practice, which would generate an ancillary skill set for NCHDs. Kim et al.[10] found that USGLP was associated with increased confidence amongst trainees in identifying an LP insertion site, as it allows the user to comfortably identify anatomical landmarks via static or dynamic imaging. If more than one attempt is made, US recognises the presence of a haematoma, thereby reducing the risk of traumatic LP.[10] A systematic review by Olowoyeye et al.[11] found that US reduced the risk failed LP, when compared with palpation method (risk ratio = 0.68 (95% CI 0.25 to 1.80; p=0.43, NNT 14.7)). Although this was not considered statistically significant, US significantly reduced the risk of a traumatic tap when compared to the traditional palpation method (RR=0.53, 95% CI 0.33 to 0.83, NNT= 8.3).[12] Simulated practice can also improve LP competency.[12,13] With iterative cycles of performance, the learner can try, fail and adapt technique in a safe setting. Kessler et al.[12] demonstrated that the number needed to teach is two. They also highlighted the 'low level of experience and skill' in LP amongst trainees.[12] This suggests that the traditional model of 'see one, do one, teach one' is inadequate and a move towards other teaching modalities, as outlined, is required.

Point-of-care ultrasound (POCUS) is becoming an essential skillset for paediatricians. Incorporation of POCUS in clinical care enhances the traditional practice model, whereby clinicians can make dynamic decisions within the immediate clinical setting. Its scope of practice has diagnostic, resuscitative and procedural applications e.g. focused cardiac, lung and renal assessment, LP guidance, incision and drainage.[13,14] In a 2018 survey, 85.4% of paediatric emergency training centres in the United States offered a dedicated training program for POCUS[15]. The American Academy of Pediatrics recommends a structured curriculum, which includes didactic training sessions, bedside and hands-on workshops, image evaluation and one-to-one feedback. This is to be followed by 'longitudinal experience' and competency assessment. Although the American College of Emergency Physicians[16] recommends a 4-8 hour training course for single or combination applications, with the successful completion of at least 25 procedures in each modality, there are limited publications on paediatric POCUS and it is not known what level of training is required to establish competency. Despite its widespread integration in many countries, on an ad hoc basis, a standardised educational programme has yet to be established in Ireland. The challenges facing the integration of this into basic specialist training includes lack of training for faculty, effective collaboration with imaging services, quality assurance and the co-ordination of dedicated training days[17,18]

The strength of this study was the retrospective approach, broad inclusion criteria and design that ensures all subjects who underwent LP were captured and correlated with the final diagnosis. For all patients, parents were counselled on the indication for LP and in the event of unsuccessful LP, alternative investigation strategies were utilised. Its limitations included the relatively small number of procedures per year, thus necessitating a three-year review and the unavailable documentation relating to the number of LP attempts made in single operator procedures.

LP plays an important role in the investigation of patients with acute undifferentiated illness in general paediatric units. The integration of ancillary tools such as USGLP and simulation into practice would enhance skill acquisition for junior trainees.

**Declaration of Conflicts of Interest:**
The authors declare that they have no conflict of interests in this article.

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# Low Prevalence of SARS-CoV-2 Detected in Symptomatic Children Admitted to Hospital

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**Abstract**

***Aims***

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) originated in Wuhan, China in 2019 and is responsible for the condition known as COVID-19. COVID-19 was first reported in Ireland in February 2020 with University Hospital Limerick's (UHL) first paediatric case reported on 4th March 2020. Studies have shown clinical manifestations of children's cases are generally less severe than those of adults.

UHL serves a catchment population of approximately 100,000 children. We aimed to describe the clinical presentation, and prevalence of SARS-CoV-2, in children requiring inpatient hospitalization during the initial phase of the pandemic in Ireland.

***Methods***

Data were examined relating to all inpatients aged 0 – 16 years admitted with a queried or confirmed diagnosis of COVID-19 from 8th February 2020 to 8th June 2020. Emergency Department notes and inpatient records along with laboratory and radiology records were reviewed.

***Results***

220 paediatric inpatients were tested by PCR for SARS-CoV-2 during this period; 101 (45.9%) were female. Ninety-five (43.2%) were diagnosed with 'viral illnesses'. Seven (3.2%) had laboratory-confirmed SARS-CoV-2, with an average age of 8.1 years (range: 0.59 years to 13.77 years). There were two Kawasaki-like illnesses admitted; both tested negative for SARS-CoV-2 on PCR. In our SARS-CoV-2 positive cohort, there was no associated significant morbidity and no associated mortality.

***Conclusion***

During the initial phase of the COVID-19 pandemic, prevalence of confirmed SARS-CoV-2 in symptomatic hospitalised children was low at 3.2%.

## Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) originated in Wuhan, China in 2019 and is responsible for the condition known as COVID-19. COVID-19 was first reported in Ireland in February 2020, with the first paediatric cases reported in University Hospital Limerick (UHL) in March 2020[1].

During March 2020, the Irish government closed all schools, colleges, and childcare facilities and all non-essential businesses, venues, and public amenities, while banning all non-essential travel and contact with people outside the home[2].

Studies have shown clinical manifestations of children's cases are generally less severe than those of adults[3]. We aimed to describe the clinical condition, and prevalence of SARS-CoV-2, in children requiring inpatient hospitalization in a regional hospital during the initial phase of the pandemic in Ireland.

## Methods

UHL is the Model 4 hospital for the Mid-West of Ireland. It serves a catchment population of 385,000, comprising of approximately 100,000 children. The Paediatric Emergency Department (ED) is one of the busiest in Ireland with approximately 16,500 attendances each year[4]. The Paediatric Department is a 50-bedded inpatient unit, providing surgical and paediatric care to children up to the age of sixteen years.

We included all paediatric admissions between February 8$^{th}$, 2020 and June 8$^{th}$, 2020 who were swabbed for SARS-CoV-2, using a clinical registry of all inpatients swabbed. February 8$^{th}$ 2020 was chosen as the starting date as our first query COVID-19 case was admitted on this date; June 8$^{th}$ 2020 was chosen as the end date as it coincided with the introduction of Phase Two of the Roadmap for Reopening Society and Business, reversing many restrictions[5].

Patient charts were obtained via the Medical Records Department at UHL. Demographics, vitals in triage, ward of admission, length of stay, weight, Paediatric Early Warning Scores (PEWS), presenting symptoms, COVID-19 contact history, travel history, underlying conditions, treatments, discharge diagnosis, and tertiary care transfers from UHL were recorded. Nasopharyngeal swabs or combined oral/nasopharyngeal swabs were obtained and transported in a viral medium to the laboratory. Testing was performed initially at the National Virus Reference Laboratory in University College Dublin using RT-PCR. Local testing began 24$^{th}$ March 2020. A positive case was determined as a patient in whom SARS-CoV-2 was detected in upper respiratory tract sample. Highest/lowest values of white cell count, neutrophil count, lymphocyte count and C-reactive protein (CRP) were recorded. Radiology reports were collated from the radiology reporting system.

This study was reviewed and approved by the Research Ethics Committee at UHL. Positive cases were consented in a follow-up phone call in July 2020. For SARS-CoV-2-negative patients, the data are presented as summary data, to avoid inadvertent patient identification. Compliance with Data Protection Legislation was maintained at all times.

**Results**

During the study period, 220 inpatients were tested for SARS-CoV-2. Of these, 101 (45.9%) were female. 213 (96.8%) were admitted to the paediatric unit while seven (3.2%) were admitted to specified 'COVID Units' in UHL. Average length of stay was 2.5 days (range: 0-15) with a median length of stay of two days. The average age was 4.36 years (range: 0.01 years to 15.9 years). There were seven (3.2%) laboratory-confirmed cases of SARS-CoV-2.

Of the seven patients with Sars-CoV-2 detected, four (57%) were female. Of the seven tests, four (57%) occurred in March, one (14%) occurred in April and two (29%) occurred in May. Five (71%) were admitted to the paediatric unit while two (29%) were admitted to 'COVID Units'. Average age was 8.1 years with an age range of 0.59 years to 13.77 years. No laboratory-confirmed case required admission to the Paediatric High Dependency Unit (HDU) at UHL or transfer to a tertiary level centre. Mean length of admission was 3.2 days with the longest admission lasting seven days. Two patients required seven-day admission early in the pandemic as criteria at that time required a 'not detected' PCR result pre-discharge. The presenting complaints for the entire cohort are presented in Table 1.

*Table 1: Presenting Complaints*

| | *Total Cohort (220)* | *Positive Cohort (7)* |
|---|---|---|
| | | |
| Pyrexia | 148 (67.2%) | 6 (85.7%) |
| Cough | 66 (30%) | 2 (28.6%) |
| Vomiting | 61 (27.7%) | 0 |
| Increased work of breathing | 41 (18.6%) | 1 (14.3%) |
| Reduced oral intake | 40 (18.2%) | 1 (14.3%) |
| Coryza | 29 (13.5%) | 0 |
| Abdominal pain | 25 (11.4%) | 2 (28.6%) |
| Diarrhoea | 22 (10%) | 1 (14.3%) |
| Rash/skin infection | 17 (7.7%) | 0 |
| Wheeze | 13 (5.9%) | 0 |
| Seizure-like activity | 12 (5.5%) | 0 |
| Lethargy | 11 (5%) | 0 |
| Urinary symptoms | 10 (4.5%) | 0 |
| Sore throat | 9 (4.1%) | 0 |
| Other | 8 (3.6%) | 0 |
| Irritability | 5 (2.3%) | 0 |
| Chest pain | 4 (1.8%) | 0 |
| Reduced output | 4 (1.8%) | 0 |

**Total cohort results are calculated as percentage of total population admitted. Positive cohort results are calculated as percentage of total SARS-CoV-2 positive patients.*

Ten (4.5%) patients had oxygen saturations less than 94%. As per PEWS, 127 patients' heart rates were outside the recommended range for their age while 28 patients' respiratory rates were outside their recommended range. On arrival, 79 (35.9%) patients had a PEWS score of zero. Highest PEWS during admission ranged from 0 to 12; median PEWS during admission was two. Of note, highest PEWS were not retrieved for 48 (21.8%) patients. When defining pyrexia as a temperature greater than 37.5C, 58 (26.4%) patients had pyrexia in triage.

In positive patients, two (28.6%) patients' heart rates were outside the normal range for their age. No respiratory rates were outside the recommended range. In triage, four (57%) of positive cases had PEWS of 0. Highest PEWS for this cohort was noted as three; both mean and median PEWS during admission was one. Two (28.6%) patients had a documented pyrexia in triage.

Blood results are presented in Table 2. Full blood count and CRP were performed in 193 (87.7%) patients. CRP was raised in 131 cases (range: 0-371) with a median of 15mg/L. Results were defined as normal, increased or decreased based on the normal range reported in the iLab system, which produces age-specific ranges for each parameter. Bloods were performed in five (71.4%) of our positive cases. CRP was mildly raised in two of our positive cohort. White cell count was abnormal in three of our positive cohort (60%), raised in two and decreased in one. Neutrophils were abnormal in one of our positive cohort (20%) while lymphocytes were increased in one case (20%) and decreased in one case (20%).

*Table 2: Laboratory Investigations.*

| *Total Cohort Tested* | n = 193 (87.7%) | | |
|---|---|---|---|
| | *Normal* | *Increased* | *Decreased* |
| White cell count (x$10^9$/L) | 107 (55.4%) | 68 (35.2%) | 18 (9.3%) |
| Neutrophils (x$10^9$/L) | 88 (45.6%) | 91 (47.2%) | 14 (7.3%) |
| Lymphocytes (x$10^9$/L) | 117 (60.6%) | 8 (4.1%) | 68 (35.2%) |
| CRP (mg/L) | 62 (32.1%) | 131 (67.9%) | |

104 (47.3%) patients had chest x-ray imaging; 52 (50%) were reported as normal. Peribronchial thickening was noted in 21 cases (20.2%), infiltration in eight (7.7%) and consolidation in eight (7.7%). Other reports included opacification (6.7%), interstitial changes (1.9%), hyperinflation (1.9%), atelectasis (1%), pleural effusion (1%), pneumothorax (1%) and bronchovascular prominence (1%). One positive patient underwent chest x-ray imaging which showed "patchy infiltrates in left lower zones".

Diagnoses at discharge were divided broadly as follows; 95 (43.2%) viral illnesses, 29 (13.2%) urinary tract infections, 30 (13.61%) lower respiratory tract infections, 18 (8.2%) neurological/seizures and 11 (5%) skin/eye infections. Nine (4.1%) were diagnosed with surgical issues (one was SARS-CoV-2 positive), eight (3.6%) with tonsillitis, four (1.8%) trauma injuries and two (0.9%) hip effusions; four had oncology-related diagnoses while two had haematological diagnoses. Three (1.3%) were treated for likely neonatal sepsis. Two (0.9%) patients had Kawasaki-like illnesses. Two patients received behavioural diagnoses, while one had constipation.

A diagnosis of 'viral illness' was made in 4 of our positive cases. One was a surgical patient with appendicitis; one had a diagnosis of post-streptococcal glomerulonephritis. Our final patient was asymptomatic and diagnosed as a result of being a close contact of a positive case. Neither of our Kawasaki-like illnesses had SARS-CoV-2 detected by RT-PCR. They have not undergone serology testing at this point. Both patients have fully recovered.

In total, six patients (2.7%) were known contacts of patients with COVID-19 while eight (3.6%) had recently returned from foreign travel. Of those known to be close contacts of cases, two had SARS-CoV-2 detected while inpatients at UHL; these two cases were also associated with recent travel abroad.

Underlying medical conditions were a feature in 85 (38.6%) admissions including asthma in 15, sequelae of prematurity in seven, cardiac lesions in seven, renal impairment in seven, epilepsy in six, malignancies in four, Trisomy 21 in three, haematological diagnoses in three and three with ventriculoperitoneal shunts. Two (28.6%) of our positive cases had underlying medical conditions; one had a history of atopy, the other had post-streptococcal glomerulonephritis.

Supplementary oxygen was required in 19 (8.6%) cases with one patient requiring high flow humidified oxygen via nasal cannula (HFNC) and one requiring non-invasive ventilation (NIV). Antibiotics were prescribed for 107 (48.6%) patients; the most commonly prescribed antibiotics were Co-Amoxiclav in 33 (30.8%) cases, Gentamicin in 30 (28%) and Ceftriaxone in 21 (919.6%). The antiviral Aciclovir was used for six (2.7%) of total patients. Tertiary care was required for nine (4.1%) patients.

There was no supplementary oxygen requirement for any positive patient, and no positive patient required HFNC or NIV. Co-Amoxiclav was prescribed in one case (14.3%). Antivirals were not utilised in these cases nor was tertiary care required.

On follow-up phone interview with our positive cohort, one patient reported ongoing symptoms of fatigue and headaches; the other six patients were well. There was no associated mortality.

**Discussion**

We present the first detailed study of children presenting with symptoms suggestive of COVID-19 to an Irish hospital. Our study of 220 inpatient swabs conducted at the Paediatric Department in UHL found 3.2% were positive for SARS-CoV-2 during a four-month period from February to June 2020, coinciding with the initial phase of the pandemic in Ireland. As of 8$^{th}$ June, 367,780 tests had been carried out in the Republic of Ireland with 25,215 positive results; this is a positive rate of 6.9%. Children aged 0-14 accounted for 1.91% of positive cases in Ireland and 1.14% of hospitalized positive patients[6]. There was a total of 1,691 COVID-19-related deaths in Ireland during this period; we had 0 mortalities in our cohort, in keeping with an extremely low mortality rate in the paediatric COVID-19 population, approximately 0.09%[7].

There appears to be little symptomatically to differentiate COVID-19 from other childhood infections. Respiratory symptoms featured in 43.6% of total inpatients tested with a corresponding percentage (43%) diagnosed with a 'viral illness'. 28.5% of our positive cohort presented with respiratory symptoms with 57% presenting with gastrointestinal symptoms. Our COVID-19 cohort experienced a milder course of illness when compared to severity reported by adult populations[9]. 14.3% of our positive patients were asymptomatic; 85.7% received supportive care only. Average length of stay was two days, shorter than the usual length of stay reported for adult populations[10]. Testing pre-surgery resulted in an incidental finding of COVID-19 in one case.

COVID-19 was not associated with a significant rise in PEWS; our highest PEWS in a COVID-positive patient was three. Pyrexia was the most common symptom in our positive cohort (86%); however, pyrexia is a non-scoring parameter in PEWS[11].

Criteria for SARS-CoV-2 swabbing changed as understanding of this condition evolved. Similarly, radiology recommendations were amended over time to rely more on clinical signs and symptoms as opposed to chest x-ray findings. Our usage of chest x-ray decreased significantly in keeping with this; ultimately, 47.2% of our cohort obtained chest radiographs.

Multiple children with significant background diagnoses were admitted with queried COVID-19; none tested positive. The Mid-West has a significant population of children with cystic fibrosis, with 88 paediatric patients living with CF in the region; we had no COVID-19 admissions within this cohort, likely reflecting strict cocooning by this group. Schools in Ireland were closed from March 12th. All non-urgent outpatient services were postponed; 'telehealth' rose to the forefront of healthcare. Limerick is the third largest city in the Republic of Ireland; however, the UHL catchment area includes a large rural population with significant opportunity to social distance. These factors may all have contributed to a reduction of COVID-19 circulating in our population.

We had two Kawasaki-like illnesses admitted during this timeframe; these tested negative for COVID-19. The Paediatric Inflammatory Multi-System Syndrome (PIMS) associated with COVID-19 often presents with symptoms similar to Kawasaki Disease. A pre-print study at the University of Birmingham, showed that every child who had PIMS and tested negative for SARS-CoV-2 PCR subsequently showed high anti-SARS-CoV-2 antibody levels in their blood[12]. We have not had the opportunity to perform serology testing on our two cases.

Laboratory findings were essentially non-specific in our population. Bloods were performed in 71% of our positive population with 60% showing abnormal white cell count; this was raised in 40% yet reduced in 20%. Lymphocytes were raised in 20% and reduced in 20%. These results are similar to Xia et al who report white cell count decreased in 20% with lymphocytes raised in 15% and reduced in 35%[13].

Ten infants less than one month old were tested for SARS-CoV-2 with no positive cases. It should be noted that the maternity hospital in this region is located on a different site to UHL, possibly influencing our low numbers in this population.

Our study has several limitations. Only children admitted to hospital were included, introducing a clear selection bias, and so our findings cannot be generalised to the wider paediatric population in the community. However, the threshold to swab admitted patients was relatively low and, for the majority of the study, included children presenting with a pyrexia and/or respiratory symptoms and/or gastroenterology symptoms; therefore, if a child was symptomatic with COVID-19, they were likely to be detected. We cannot comment on the prevalence of SARS-CoV-2 in asymptomatic children. The prevalence of SARS-CoV-2 was low in children, even in this group presenting to hospital with symptoms. Therefore, we cannot comment on clinical factors that would predict positivity, nor can we comment with confidence on the clinical course of infection in children. The retrospective design of the study limits our ability to elicit an explanation for this, but one might hypothesise, as per other studies, that children are less severely affected when infected, or may be less likely to become infected altogether, or perhaps "lockdown" was effective at a national level[14].

In conclusion, despite a low threshold for testing, our study demonstrates a low prevalence of SARS-CoV-2 in children requiring admission to hospital with symptoms suggestive of COVID-19 during the initial phase of the pandemic. Despite this, a high index of suspicion continues to be required to detect cases, and to minimise cross infection risk to patients and staff.

**Declaration of Conflicts of Interest:**
I can confirm that there are no conflicts of interest related to this paper.

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# Increased Mental Health Presentations by Children Aged 5-15 at Emergency Departments during the first 12 months of COVID-19

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**Abstract**

***Aims***

To determine changes in mental health (MH) attendance at Emergency Departments (ED) by children aged five to 15 during the COVID-19 pandemic.

***Methods***

Analysis of MH presentations during the first year of the pandemic compared with prior year for three public paediatric EDs serving the greater Dublin area with a paediatric population of 430,000.

***Results***

Overall, ED attendance during the 12 months to 28th February 2021 was 34.3% below prior year, while MH presentations were 8.9% above prior year. MH attendances initially decreased by 26.8% (2020: 303; 2019: 414) during the first four months of the pandemic (March to June), lower than the corresponding decrease of 47.9% for presentations for any reason (2020: 11,530; 2019: 22,128). However, MH presentations increased by 52.4% in July and August (2020: 218; 2019: 143), and by 45.6% in September to December (2020: 552 ;2019: 379), dropping 28.1% below prior year in January (2021: 87; 2020: 121) before returning to prior year levels in February 2021 (2021: 107; 2020: 106).

***Conclusion***

Following the initial COVID-19 lockdown, ED presentations by children for acute MH care increased significantly over prior year, with this increase sustained throughout 2020. Long-term stressors linked to the pandemic may be leading to chronic MH problems, warranting increased funding of MH services as part of the response to COVID-19.

## Introduction

Mental health (MH) presentations at the emergency department (ED) by children have been increasing over recent years[1,2]. However, paediatric MH presentations fell in many countries during the initial and most restrictive stage of public health measures implemented in response to COVID-19[3,4]. While this may be due to strict stay-at-home measures leading to a decline in help-seeking behaviour[2], this may also indicate hospital avoidance due to concerns about contracting COVID-19, or a belief that health services were unavailable due to the diversion of resources to tackling the pandemic[5]. The closure of schools may have temporarily removed pressure from some children with MH problems, with the stay-at-home measures leading to some children benefiting from increased family support. However, for others the absence of a structured school day and access to supports within the school setting may have exacerbated MH problems. The stay-at-home measures may also be a source of additional stress within the family. Public health measures such as the cancellation of sporting and cultural activities and restrictions on social gatherings, have significantly impacted the lives of children and young people.[6] As the pandemic continues, these challenging living conditions may exacerbate existing MH problems, while an increase in new presentations might be expected due to the accumulated negative effects of the public health crisis, social isolation, and economic recession[7].

The demand for child and adolescent mental health services (CAMHS) struggled to meet the needs of children before COVID-19[1,8,9], and these services have been severely disrupted by the pandemic[10]. While MH attendance at an adult ED in Dublin fell during the initial eight weeks of the pandemic[11], an increase in attendance by adolescents (aged 16-18) was noted (13 versus 2). Should the expected increase in paediatric MH problems transpire, CAMHS and hospital psychological medicine will need to be fully resourced to adapt rapidly to the crisis needs of children and young people[12]. As the ED is a gateway to these services for many children[3] with more severe or acute MH problems, identifying changes in the pattern of MH presentations can provide a timely signal of need. This report expands on existing literature from the early stage of the pandemic by presenting timely surveillance on the changed pattern in ED MH attendances in the first 12 months of the COVID-19 pandemic.

## Methods

Statistical and graphical analysis of MH presentations at EDs from 1st March 2020 to 28th February 2021 compared with prior year (2019/20) is presented, split over four time periods: March – June (Period 1), the period of the most severe public health restrictions, including a 7-week period of lockdown; July and August (Period 2), as restrictions abated and COVID-19 case numbers remained low over the holiday period; September to December (Period 3), as children returned to school with reported cases of COVID-19 increasing and a further six-week period of stay-at-home measures commencing on 21st October 2020. The country entered a further lockdown on 28th December following a brief period of reduced restrictions and increased mobility over the Christmas period. During the final time period, January and February 2021 (Period 4), the country remained in lockdown and schools moved to remote/on-line learning after the Christmas period.

Electronic records of attendance were extracted from the ED administrative system at the three public paediatric emergency departments in the greater Dublin region (Children's Health Ireland (CHI)), serving a paediatric population of 430,000. The collective annual ED census is 120,000, and accounts for over one third of national public ED paediatric attendances. Using ICD-10 classification as a guide, MH attendances were identified from the recorded first diagnosis and crossed-checked against presenting complaint. Statistical analysis was completed using Stata 16 (StataCorp, College Station, Texas, USA), while graphical analysis used both Stata 16 and Microsoft Excel. Ethical approval was granted by the COVID-19 National Research Ethics Committee (reference: 20-NREC-COV-034).

**Results**

Table 1 presents aggregate and mean daily attendance figures for ED presentations overall, with comparable statistics for MH presentations, for each of the four periods outlined above. Table 2 presents the characteristics of MH attendances over these four periods, including the proportion of presentations out-of-hours, self-referred, triaged as urgent, admitted, and by gender. For the 12-month period from 1st March 2020 to 28th February 2021, overall attendance decreased by 34.3%, (2020/21: 38,951; 2019/20: 59,327), with MH presentations increasing by 8.9% (2020/21: 1,267; 2019/20: 1,163).

In period 1 (March – June 2020), MH presentations decreased by 26.8% compared to the same period in 2019 (2020: 303; 2019: 414), a level lower than the corresponding decrease of 47.9% (2020: 11,530; 2019: 22,128) for presentations for any reason (Table 1). During this period, the proportion of visits self-referred (defined as presentations not referred by a general practitioner (GP)) increased to 78.9% from 68.6% (2020: 239; 2019: 284), with many GPs moving to remote consultation (Table 2).

***Table 1: Emergency department presentations for children aged 5 - 15 (12 Months to February 2021).***

| | 2019/20 | 2020/21 | Difference | *P*-values |
|---|---|---|---|---|
| **12 months from 1st March – 28th February** | | | | |
| Total Presentations (all reasons) | 59,327 | 38,951 | -20,376 (-34.3%) | |
| Total Mental Health Presentations | 1,163 (2%) | 1,267 (3.3%) | 104 (8.9%) | |
| **March - June 2020 (Period 1)** | | | | |
| Total Presentations (all reasons) | 22,128 | 11,530 | -10,598 (-47.9%) | |
| Total Mental Health Presentations | 414 (1.9%) | 303 (2.6%) | -111 (-26.8%) | |
| *Daily Attendance (mean ± SD)* | | | | |
| All reasons | 181 ± 33 | 94 ± 32 | -87 ± 33*** | <0.001 |
| Mental Health | 3 ± 2 | 2 ± 2 | -1 ± 2*** | <0.001 |
| **July - August 2020 (Period 2)** | | | | |
| Total Presentations (all reasons) | 8,439 | 7,198 | -1,241 (-14.7%) | |
| Total Mental Health Presentations | 143 (1.7%) | 218 (3.0%) | 75 (52.4%) | |
| *Daily Attendance (mean ± SD)* | | | | |
| All reasons | 136 ± 17 | 116 ± 15 | -20 ± 16*** | <0.001 |
| Mental Health | 2 ± 1 | 3 ± 2 | 1 ± 2*** | <0.001 |
| **September – December 2020 (Period 3)** | | | | |
| Total Presentations (all reasons) | 19,732 | 15,540 | -4,192 (-21.2%) | |
| Total Mental Health Presentations | 379 (1.9%) | 552 (3.6%) | 173 (45.6%) | |
| *Daily Attendance (mean ± SD)* | | | | |
| All reasons | 162 ± 31 | 127 ± 31 | -32 ± 31*** | <0.001 |
| Mental Health | 3 ± 2 | 5 ± 3 | 2 ± 2*** | <0.001 |
| **January – February 2021 (Period 4)** | | | | |
| Total Presentations (all reasons) | 9,028 | 4,683 | -4,345 (-48.1%) | |
| Total Mental Health Presentations | 227 (2.5%) | 194 (4.1%) | -33 (-14.5%) | |
| *Daily Attendance (mean ± SD)* | | | | |
| All reasons | 150 ± 31 | 79 ± 16 | -71 ± 23*** | <0.001 |
| Mental Health | 4 ± 2 | 3 ± 2 | 0 ± 2 | 0.239 |

Significance: ***p<0.001, **p<0.01, *p<0.05. SD = standard deviation

Total ED presentations for the summer months of July and August (Period 2) were 14.7% lower than 2019 numbers (2020: 7,198; 2019: 8,439). As national restrictions were lifted in July, MH presentations began to increase (Figure 1), with a disproportionate increase on prior year over the summer months (July +46.2% (2020: 95; 2019: 65); August (+57.7% (2020: 123; 2019: 78)). MH presentations by girls increased over this period (Period 2) to 67.4% (147/218) of presentations from 53.8% (77/143) in the prior year. Self-referral rates were no longer statistically significant versus prior year, suggesting increased GP accessibility. MH presentations were notably higher in the week prior to schools reopening in August (Figure 2).

***Table 2: Proportional changes in mental health presentations for children aged 5 - 15 (12 Months to February 2021).***

| | 2019/20 | 2020/21 | Difference | *P*-values |
|---|---|---|---|---|
| **March - June 2020 (Period 1)** | | | | |
| Mental Health/All Presentations | 1.9% | 2.6% | 0.7%*** | <0.001 |
| Aged 12 – 15 | 81% | 81% | -1% | 0.814 |
| Female | 68% | 63% | -4% | 0.220 |
| Out of Hours | 53% | 60% | 8% | 0.068 |
| Self-referrals | 69% | 79% | 10%** | 0.003 |
| Triaged as Urgent | 69% | 72% | 3% | 0.747 |
| Presentations resulting in hospital admission | 39% | 38% | 0% | 0.798 |
| **July – August 2020 (Period 2)** | | | | |
| Mental Health/All Presentations | 1.7% | 3.0% | 1.3%*** | <0.001 |
| Aged 12 - 15 | 75% | 73% | -2% | 0.871 |
| Female | 54% | 67%* | 13%* | 0.029 |
| Out of Hours | 59% | 55% | -4% | 0.375 |
| Self-referrals | 82% | 75% | -7% | 0.266 |
| Triaged as Urgent | 64% | 62% | -2% | 0.945 |
| Presentations resulting in hospital admission | 34% | 30% | -4% | 0.489 |
| **September - December 2020 (Period 3)** | | | | |
| Mental Health/All Presentations | 1.9% | 3.6% | 1.7%*** | <0.001 |
| Aged 12 - 15 | 83% | 81% | -2% | 0.157 |
| Female | 64% | 69% | 5% | 0.315 |
| Out of Hours | 49% | 47% | -2% | 0.945 |
| Self-referrals | 71% | 70% | -1% | 0.597 |
| Triaged as Urgent | 70% | 69% | -1% | 0.270 |
| Presentations resulting in hospital admission | 44% | 41% | -3% | 0.620 |
| **January - February 2021 (Period 4)** | | | | |
| Mental Health/All Presentations | 2.5% | 4.1% | 1.6%*** | <0.001 |
| Aged 12 - 15 | 79% | 85% | 6% | 0.943 |
| Female | 66% | 71% | 5% | 0.251 |
| Out of Hours | 53% | 55% | 2% | 0.620 |
| Self-referrals | 74% | 84% | 10% | 0.149 |
| Triaged as Urgent | 76% | 64%* | -12%* | 0.014 |
| Presentations resulting in hospital admission | 45% | 47% | 2% | 0.909 |

*Significance: ***p<0.001, **p<0.01, *p<0.05. P-values are based on difference in daily proportion, other than out of hours which is based on weekly. Out of hours is defined as from 6pm to 8am Monday to Friday and all day/night at weekends and bank holidays. Self-referrals are visits not referred by a General Practitioner (GP). Percentage (%) for mental health presentations is of total presentations, while all other percentages are of mental health presentations. Triaged as urgent is defined as a score of 1 or 2 on the 5-point Irish Children's Triage System.*

Mental health presentations in September to December (Period 3) were 45.6% above prior year (2020: 552; 2019: 379), however there was considerable variation in the extent of the year-on-year increase over this period. MH presentation increases were modest in September (+8.7% (2020: 113; 2019: 104)), and more pronounced in October (+30.5% (2020: 137; 2019: 105)). Weekly MH attendance increased once again in mid-October, reducing over the school midterm in late October (Figure 2). As the schools reopened after the one-week midterm break, with COVID-19 case numbers rising and more severe restrictions introduced, MH presentations peaked. November experienced the highest monthly MH attendance on record with a 51.3% increase compared to prior year (2020: 171; 2019: 113). December was the lowest monthly MH attendances in 2019, however December 2020 was 129.8% higher (2020: 131; 2019: 57), though 40 patients (23.4%) below the November 2020 peak.

As the country entered a further period of lockdown on 28th December and schools remained closed in January and February (Period 4), MH presentations were 14.5% below prior years (2021: 194; 2020: 227). February 2021 was in line with prior year.

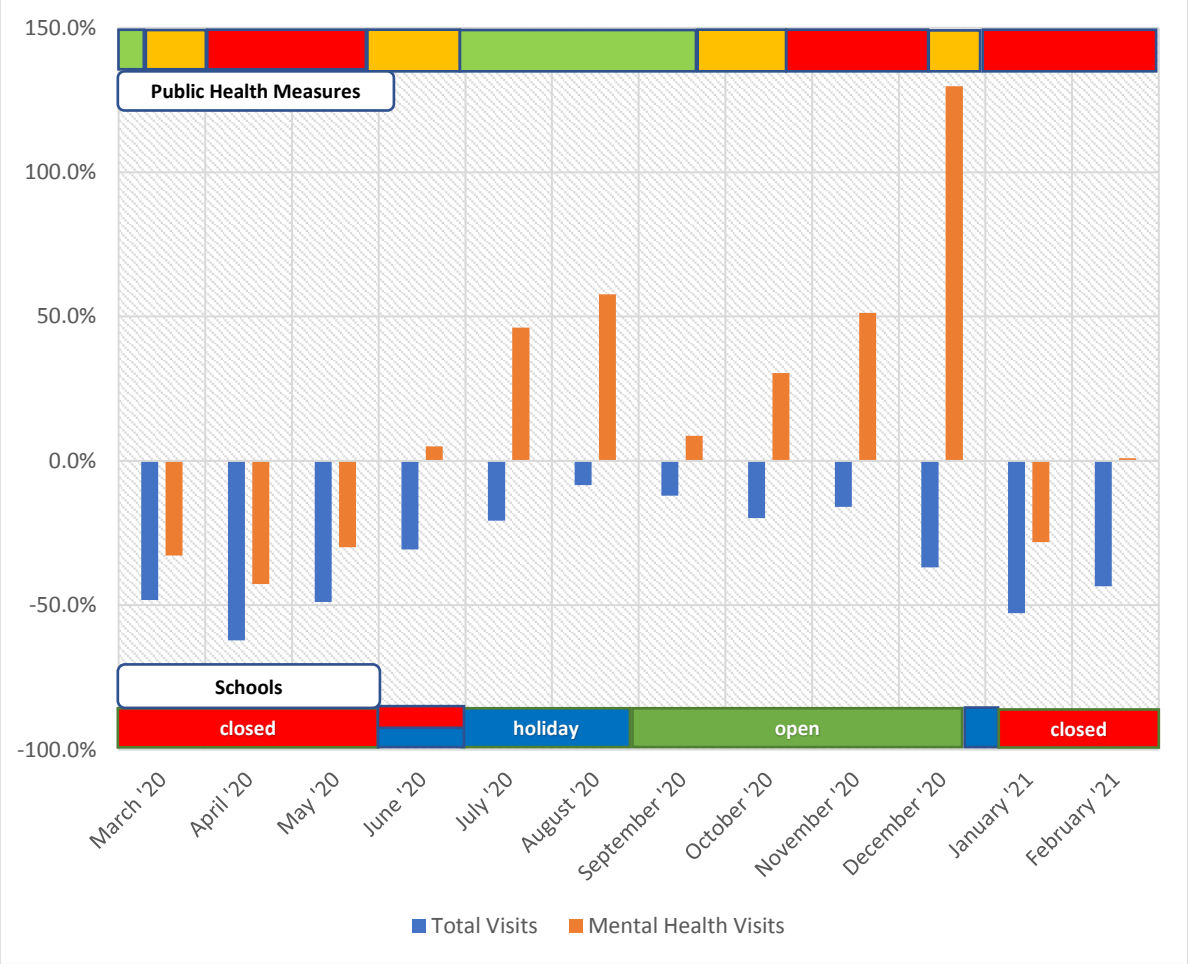


***Figure 1: Emergency Department Attendance Age 5 to 15: monthly change versus prior year.***

*Notes: The extent of public health restrictions impacting children & adolescents are represented on the top bar by colour: green (minimal restrictions e.g. social distancing, mask wearing in shops/indoor venues and hand hygiene), amber (varying levels of restrictions on travel, social gatherings and sporting & cultural activities) and red (stay-at-home, no visitors, closure of non-essential businesses). The bottom bar indicates whether schools were open (green), on holiday (blue – note primary schools usually close July and August, while secondary schools close for three months in June for those not taking state exams) or closed (red).*

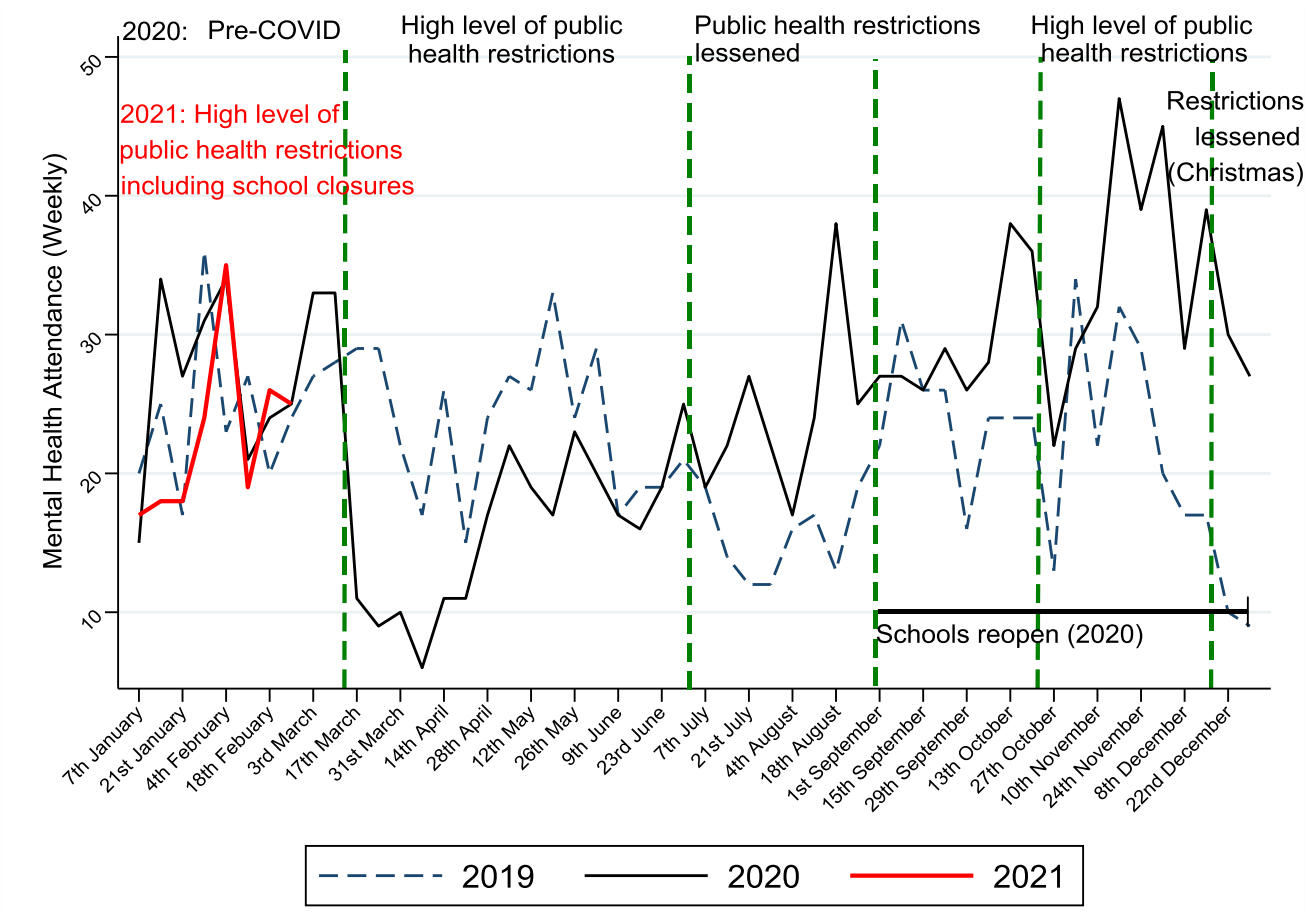


***Figure 2: Weekly Emergency Department Attendance Age 5 to 15 for Mental Health.***

**Discussion**

Paediatric MH presentations at EDs for school-aged children fell during the most restrictive stage of public health measures introduced to curtail the spread of COVID-19, consistent with findings from many countries including the US and the UK[3,4], but in contrast to findings from Australia[13], where the prevalence of COVID-19 was lower[14]. The collective experience of coping with the challenges of the pandemic as a community and the opportunity to spend more quality time with family members may have had a positive impact for some young people[15]. For others, a break from school may have provided a welcome respite[15]. However, as restrictions were lessened and the prevalence of COVID-19 remained low, MH presentations at EDs increased, with attendance for each month from June to December above prior year, while ED presentations for other reasons remained lower than prior years. This subsequent increase may suggest unmet need during the initial lockdown, with fear of contracting COVID-19 in a hospital setting and concerns about the health service being overwhelmed leading to delayed access[5].

The evidence also supports the concern that the pandemic has adversely impacted MH. An Irish survey of young people conducted in late June/early July provides some insight on the MH of many adolescents, with MH identified by respondents as the most common negative effect of COVID-19, including overthinking, concern, worry, anxiety, depression and a sense of utter hopelessness[6]. The spike in attendance prior to many schools re-opening may be due to concerns held about the imminent return to school and school safety. A UK survey of adolescents with pre-existing MH problems indicated that many found the immediate return to school challenging due to academic pressure and the need to make-up for lost time, concerns about safety and social distancing measures, and difficult relationships with peers[16]. Nonetheless, MH attendance was above prior years in the weeks before and following school re-opening, with a dramatic increase in November 2020 suggestive of the enduring stressor associated with the pandemic leading to ongoing MH problems. The disproportionate increase in MH presentations compared to decreases for all other presentations warrants further investigation.

The COVID-19 pandemic has caused severe disruption for CAMHS worldwide[10], with many children and adolescents unable to access much needed MH supports[12,15]. While many countries reported that MH is part of their national COVID-19 response plans, few have allocated sufficient funding to support the response[10]. Pre-COVID-19, ED MH presentations by children and adolescents were rising[10] and the pandemic has added momentum to this increase. CAMHS in Ireland were recognized to be grossly under-resourced, with demand exceeding availability, lack of out of hours services [9], and an over reliance on ED care.

This study uses a unique dataset compiled from attendances at the three public paediatric EDs serving the greater Dublin area, representing over one third of paediatric ED attendances nationally. Therefore, these findings relate to a substantial number of children and, as public health restrictions were consistent across the country, should be nationally representative. Nonetheless, regional variation in CAMHS resourcing and the structure and response by EDs and CAMHS to the challenges presented by the pandemic may limit the generalizability of these findings outside the greater Dublin area. A further limitation of this analysis was the inability to carry out a temporal analysis by MH diagnosis due to a change in the practice of coding diagnosis on the ED administrative system at one participating hospital in late 2019, a lack of granularity in coding at another site, and the temporary closure of one of the three EDs during this period.

This report suggests increased demand on the ED for acute MH care, particularly in the period following the reopening of schools. Urgent resourcing of CAMHS and consideration to out of hour's access needs to be part of the response to COVID-19. Furthermore, the impact of the COVID-19 imposed restrictions on youth needs to be carefully assessed, least the cure is worse than the cause.

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The authors have no conflicts of interest to declare.

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# The Buddy System: Near Peer Mentoring During a Pandemic

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**Abstracts**

***Aim***

Near-peer mentoring (NPM) is an effective educational model for personal and professional development. We aimed to develop, implement and evaluate a NPM programme for NCHDs in a paediatric hospital during the Covid-19 pandemic.

***Methods***

This was a prospective, questionnaire-based initiative. Registrars (mentors) were paired with senior house officers (mentees) for 6 months of mentorship. A mentoring template was created. This outlined 4 core themes: paediatric training, career development, professional skills and work-life balance. Questionnaires were distributed following the period of mentorship to evaluate the effectiveness of the programme. Both quantitative and qualitative data were collected. Thematic analysis was used to provide insights on the mentorship programme.

***Results***

All NCHDs (n=99) wished to participate in the mentorship programme. Nineteen NCHDs responded to the survey (response rate 19.2%). 89% of respondents (n=17) felt the programme could be useful to NCHDs in general, but only 21% (n=4) felt it was of personal benefit. Thematic analysis revealed that the programme provided a positive opportunity for mentorship. The interdepartmental rather than intradepartmental nature of the pairings was identified as a negative feature, affecting both the accessibility and value of the encounters.

***Conclusion***

This study highlights the benefits of a successful NPM programme for paediatric NCHDs in Ireland. Support for the programme was high amongst both mentors and mentees. Simple modifications are required to further improve this mentorship initiative.

**Background**

Life as a non-consultant hospital doctor (NCHD) can be emotionally draining. A recent National Survey of wellbeing of 1,479 hospital doctors in Ireland highlighted that 50% of doctors are emotionally exhausted and overwhelmed by work and reported that one-third of respondents were experiencing burnout, which was significantly associated with younger age and lower years of practice [1]. This is higher than our international counterparts in the UK, Canada, the USA and Australia. Work dissatisfaction amongst junior doctors in the UK and Ireland has also been well described in recent years with key issues being working conditions, training, career opportunities, lack of support, loss of respect and value, reduced investment in training and lack of consistent teamwork [2,3]. Retention of hospital doctors has been a critical issue for healthcare services in Ireland for many years, as hundreds of Irish-trained doctors emigrate overseas each year to continue their postgraduate training. Poor working conditions in Ireland has also been identified by the Royal College of Physicians in Ireland as a key factor in the emigration of junior doctors [3].

COVID-19 pandemic has had a significant negative impact on the health and wellbeing of healthcare professionals [4]. Exam cancellation, family displacement, health anxiety and modification of work responsibilities were some of the extra stresses involved. Reduced training exposure has been highlighted as an issue, for surgical trainees in particular, with peer mentoring suggested as part of the solution to address this [5,6]. Social isolation during this period may impact on minority groups more than others, widening inequality [7]. During this critical period, efforts must be made to improve supports for NCHDs in Ireland to encourage them to stay. Multiple studies have found that Near Peer Mentoring (NPM) programmes introduced during this challenging pandemic era have had positive impacts on medical students including their coping and mental preparedness and enhancing social supports [8,9]. Similar positive results have been found in the areas of academic medicine [10]. It has also been suggested that mentors must change their approach to meet the new challenges of the COVID-19 era [11]. This unique environment provides an ideal opportunity for brief NPM intervention.

Near-peer mentoring (NPM) describes a mentoring relationship between individuals 'closer in age, experience and rank [12]. The importance of peer/near-peer mentoring for doctors has been acknowledged as a successful educational model for personal and professional development in the medical literature [13,14]. NPM has advantages over traditional faculty-trainee mentoring programmes both regarding approachability and impartiality. It has also been found to be more accessible to women and minority groups [10]. It is recommended that mentors should not be the educational supervisor of the mentee, and likewise should not be involved in the assessment or appraisal of their mentee. Eisen et al. described the results of a NPM programme aimed at junior paediatric trainees in the UK [12], and a study by Okereke et al. found that junior doctors perceive senior non-consultant doctors to be more accessible and approachable as mentors than consultant colleagues [15]. Mentoring has been reported to positively influence faculty retention and to reduce burnout risk highlighting its potential value in NCHD wellbeing and retention of the medical workforce [16]. Thus, the NPM structure is an attractive model to guide personal and professional development among junior doctors at this point in time.

Similar programmes have been rolled out across UK and Ireland in universities and healthcare settings. Benefits to mentees in the literature include social benefits, professional benefits, academic benefits and emotional benefits [17]. A recent study by Ong et al. highlighted a positive association between the mentoring of core medical trainees in the East-London Deanery and better training outcomes and Membership of the Royal College of Physicians (MRCP) examination pass rates [18]. Mentors have learned key transferrable skills such as communications skills, responsibility, and problem solving [17].

The European Working Time Directive has resulted in reduced working hours for junior doctors in Ireland. As a result, sustained, positive relationships with more experienced colleagues may be harder to initiate, and informal mentoring relationships perhaps less likely to develop in this clinical environment. The National Model of Care for Paediatrics in Ireland describes mentoring as 'an essential service' to promote paediatric research [19]. Although mentoring is a core skill specified by the Royal College of Physicians in Ireland for Higher Specialist Trainees in Paediatrics, formal universal mentoring programmes for trainees are lacking. The demand for NPM amongst junior doctors in Ireland has not been established, nor have the potential benefits of NPM relationships been elicited. The effectiveness of this model among paediatric trainees within this cultural context is not yet clear.

The aims of this NPM programme were 1) To implement a near peer mentoring programme for all NCHDs in CHI at Temple Street, a tertiary paediatric hospital. 2) To improve mentor management experience. 3) To improve mentee understanding of the importance of work-life balance, to support mentees with decisions around audit and research, training scheme applications, examinations, and skills acquisition.

**Methods**

This was a prospective, questionnaire-based quality improvement initiative. All NCHDs in the hospital were included (N=99). This was an opt-out program, with no NCHDs asking to withdraw from the project. Two registrars (mentors) were teamed up with one senior house officer (mentee) to provide mentorship over a 6-month study period. Information was communicated via NCHD WhatsApp group and via email. A mentoring template was created to provide a framework for the mentorship meetings. The template was based on four key themes: 1) Paediatric Training in Ireland: Mentee career objectives, Basic and higher paediatric specialist training, professional competency schemes, job application processes, interview techniques. 2) Research and Audit: Research and audit skills, publication advice, presentation skills. 3) Professional Skills: Clinical, procedural and communication skills. 4) Work-Life Balance: Avoiding burnout, eliciting mentee concerns, lessons learned by mentors. These themes were chosen to reflect key areas of professional life as a junior doctor, while also exploring overall physician well-being. The chosen themes had also been highlighted by Eisen et al in their study of NPM amongst UK paediatric trainees [12]. Mentor-mentee groups ('Buddies') were advised to meet 4-6weekly and to explore the above themes. Reminders were sent every 2 months to the mentors and mentees.

No formal training was provided; this decision was made due to a combination of time constraints, burden of other meetings and trainings, the sustainability of the project with future groups of NCHDs, and the hypothesis that the Buddy programme would have beneficial effects on mentors and mentees even without mentorship training.

A mixed-methods survey collecting both quantitative and qualitative data was used to explore the research objectives. Quantitative data on NCHD participation in the programme was collected, along with qualitative data on NCHD attitudes to the overall impact of the NPM programme including management experience, work-life balance, audit and research, training scheme applications, examinations, and skills acquisition. The questionnaire was modified from two previously validated and published tools for mentoring relationships: The Munich Evaluation of Mentoring questionnaire (MEMeQ) and the Mentoring Competency Assessment tool [20,21]. In addition, free text responses were provided to elucidate deeper insights into NCHD individual attitudes and perspectives towards mentoring. The questionnaire was developed through the Survey Monkey application and distributed to all mentors and mentees at the end of this 6-month NPM programme. Distribution was via WhatsApp group and email. Responses were collected through the same application, and data interpretation was performed through Microsoft Excel and through the application's own software.

Formal ethical approval was not sought for this study due to its lack of patient contact, and lack of any perceived negative outcome on patient care or staff wellbeing. As mentoring is a regular occurrence in the hospital setting in a less structured manner, the interventions in this study were not new ones, and therefore formal ethical approval not deemed to be necessary. The format of the study, the aims of the programme, and any potential issues were discussed with the clinical director and the NCHD committee who approved the commencement of the programme. Following discussion with the NCHD committee, it was agreed that pathways should be clearly developed to guide mentors and mentees who encountered issues during their meetings. These pathways were developed based on current staff supports including the COVID-19 support line, the occupational health department, the wellbeing department, and the professionalism group.

**Results**

In total, 99 NCHDs participated in the mentorship programme over the 6-month study period (66 participants were mentors, and 33 were mentees). The response rate to the questionnaire was low at 19.2% (n=19). 78.9% (n=15) of respondents met at least once with their buddy, with most (68% respondents, n=13 ) meeting only once. Exact reasons for limited meetings were unclear from the data gathered but a number of factors are likely to have contributed including the lack of perceived interest in the programme, lack of time to participate, and lack of confidence to participate in the programme. The thematic analysis below also reveals contributory information.

The questionnaires showed that 89% of respondents (n=17) felt the programme could be useful to NCHDs in general, but only 21% (n=4) felt it was of benefit to them. When mentors and mentees were analysed separately, results were comparable with response rates of 12.1% (n=8) and 30.3% (n=10) respectively. 20% (n=2) from each group felt the programme useful to them, and 88% of mentors (n=7) and 90% (n=9) mentees felt it could be useful to NCHDs in general. Statistical analysis of the responses was not completed due to low response rate. It is interesting to explore the reasons why the programme was felt to have theoretical benefit, despite limited participation.

Limited NCHD participation in the programme may be due to lack of time or motivation but may also be reflective of core problems with the structure and delivery of the programme. The low response rate means that any assumptions regarding the reasons for poor participation must be deduced from the previously published literature rather than from this study. Reasons for low participation in NPM programmes are poorly documented in the literature but may include busy clinical setting or inadequate resources [22]. Strategies to combat low participation rates are predominantly focused on addressing the aforementioned barriers, although one study used a financial incentive of a coffee voucher to encourage participants to meet [23].

Thematic analysis was performed using an inductive method. Free text responses were gathered and the themes from them extracted. 3 rounds of thematic extraction were carried out, and 2 key themes were revealed. A) The project was felt to provide a positive opportunity for mentorship; “it was great to have someone to speak to” (mentee). B) The nature of the pairings (interdepartmental rather than intradepartmental) was raised as a negative feature by multiple respondents, with negative feedback regarding the ease of contacting mentees, the value of these encounters, and the lack of benefit when the mentee wasn’t from the same department or specialty; “It is... difficult to contact NCHDs outside your department” (mentor).

**Discussion**

This study demonstrates that a NPM can be implemented for NCHDs, but that its impact on mentors and mentees is unclear. The results show that NCHDs feel NPM programmes such as the Buddy System could be helpful to NCHDs, but only 20% of respondents found this programme to be helpful to them. This indicates that a NPM may be beneficial, but that it is not achieving its maximum potential impact in its current state. The impact of the COVID-19 pandemic on this NPM is difficult to tease apart from other external factors. However, the need for additional supports during this pandemic is compelling based on the aforementioned literature in terms of doctor retention, training, and wellbeing.

The thematic analysis reveals that the programme was viewed positively, but that the interdepartmental nature of pairings may have been counter-productive to the process. This brings to mind the evidence from some studies that peer mentoring is effective when colleagues share “ a location, interest, or goal” [10]. The non-departmental pairing of NCHDs may have contributed to poor participation in the study, and also to poor response rates to the questionnaire.

Further efforts should be placed in developing a NPM that pairs mentors and mentees from within the same department, and analyse the effect that this change has on the success of the mentor-mentee relationship. Although not highlighted in the responses, the lack of formal mentoring training for participants may potentially have impacted the success of the NPM. The necessity for a mentorship training programme for NPM is not widely discussed in the literature, but evidence suggests that traditional mentorship programmes are enriched by the training process [24].

Our study has a number of limitations. There was a relatively small cohort of doctors studied, and the response rate to our questionnaires was low. This fact is a limitation but also provides useful information about the perceived value of the programme by NCHDs; response rates to questionnaires are correlated with interest in the topic, and non-responder bias is likely to be significant here [25]. As discussed in the results section above, there are a multitude of potential reasons for low participation and response rates which must be explored and addressed in future studies. Due to the low number of respondents, the impact of this NPM on mentor acquisition of key transferrable skills such as communications skills, responsibility, and problem solving was not assessed. This is an important outcome that requires re-evaluation in a larger sample size. Secondly, it must be acknowledged that the doctors had a working relationship with the doctor involved in coordinating this study. Although the questionnaires were strictly anonymous, this may have led to some response bias when the doctors were completing the questionnaires.

In conclusion, NPM has the potential to reap numerous rewards for mentors, mentees and organisations. There is a scarcity of robust data evaluating the effectiveness of NPM programmes among NCHDs. Our study has highlighted the implementation of a simple, time effective NPM programme for paediatric NCHDs. Support for the programme was high among mentors and mentees, but further modifications are required to maximise NCHD involvement. We recommend further research on the effectiveness of NPM among NCHDs with department-specific pairings, incentives for regular meetings, consideration of the potential need for training, and evaluation of the specific impacts of the NPM on mentor skills and mentee wellbeing.

**Declaration of Conflicts of Interest:**
All authors declare no support from any organisation for the submitted work, no financial relationships with any organisations that might have an interest in the submitted work, and no other relationships or activities that could appear to have influenced the submitted work.

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# Gestational Diabetes Mellitus and Seasonal Variation

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**Abstract**

***Aims***

The aim of this study was to investigate whether there was seasonal variation in biochemical measurements and the incidence of GDM in a cohort of women screened selectively where laboratory standards were implemented stringently

***Methods***

The one step, 2-hr 75g oral glucose tolerance test (OGTT) was conducted in a cohort with at least one maternal risk factor for GDM at 26-28 weeks' gestation after an overnight fast and the latest laboratory standard was adhered to. Fasting serum specimens were obtained at the same visit for insulin and c-peptide measurement.

***Results***

A total of 202 women attended for the OGTT at a mean gestation of 27.5±1.0 weeks gestation with a GDM rate of 53.5%(n=108) in this at-risk cohort. There was no difference in the fasting, 1-hr or 2-hr glucose or insulin or c-peptide levels across the seasons. The percentage of women diagnosed with GDM also did not vary according to the seasons.

***Discussion***

In this well characterised population where laboratory standards were implemented strictly and glycolysis was inhibited, we found that there was no seasonal variation in the results of maternal glucose, insulin, HOMA-IR or C-peptide measured at the time of an OGTT at 26-28 weeks gestation. Previous studies showing a minor seasonal variation in GDM rates may be explained by variations in glycolysis rates depending on differences between winter and summer in room temperature where the phlebotomy was performed.

**Keywords:** Gestational diabetes mellitus, Oral glucose tolerance test, Laboratory methods, Pregnancy, Seasonal Change.

## Introduction

One of the epidemiological challenges in contemporary obstetrics is the wide variation in the reported prevalence of Gestational Diabetes Mellitus (GDM) globally. It varies depending on whether screening is selective or universal, the test used, whether it is a one-step or two-step process, on what diagnostic criteria are used, on preanalytical and analytical laboratory standards, on the gestation at screening, the setting for screening and on the population screened.[1,2] In a post hoc analysis of the 15 centres in the Hyperglycaemia and Adverse Pregnancy Outcomes (HAPO) study the prevalence varied from 9.3% to 25.5% (overall 17.8%).[3]

In a secondary analysis of a recent study, we investigated whether there was seasonal variation in biochemical measurements and the incidence of GDM in a cohort of women screened selectively where laboratory standards were implemented stringently.[3]

## Methods

This study was conducted in a large maternity hospital between October 2017 and November 2018. Women who were aged ≥18 years with sonographic confirmation of a singleton viable pregnancy and at least one maternal risk factor for GDM were included. Written consent was obtained. The one step, 2-hr 75g oral glucose tolerance test (OGTT) was conducted after an overnight fast (of ≥8 hours) and the latest laboratory standards were adhered to and have previously been reported.[2] Fasting, 1-hour and 2-hour samples reached the laboratory on ice for prompt centrifugation after a mean duration of 17±9.7, 13±9.0 and 13±8.9 minutes respectively.

An additional fasting venous blood sample was collected in a Sarstedt EDTA Monovette 7.5ml tube and plasma aliquots were stored at -80°C for the duration of the study. The samples were sent in bulk to an external company with GMP compliance and ISO 13485 and 9001 accreditations for analysis using the Bio-plex Pro Human Diabetes Assay (Bio-Rad Laboratories, Cat #171A7001M, Lot #64213365). This assay analyzed for 10 biochemical markers including insulin and c-peptide.

Statistical analysis was conducted using SPSS version 24.0 (IBM Corp). Data were assessed for normality and analysed using non-parametric tests and binary regression analysis. This study was approved by the Hospital's Research Ethics Committee.

## Results

Of the 275 women recruited, 202 attended for the OGTT at a mean gestation of 27.5±1.0 weeks gestation. The mean age was 31.5±5.3 years and the mean BMI was 30.6±6.1kg/$m^2$. In this selectively screened cohort whose blood glucose samples had the highest international preanalytical and analytical standards applied, the GDM rate was 53.5%.

Table 1 compares the median levels of fasting plasma glucose (FPG), 1-hr glucose, 2hr glucose, insulin, the Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) and c-peptide according to the season when the analysis was conducted. There was no difference in any of the glucose or biomarker levels across the seasons. The percentage of women diagnosed with GDM also did not vary according to the seasons.

***Table 1: Maternal glucose, insulin, HOMA and C-peptide and the GDM rate according to the four seasons.***

| | Spring (n=27) | Summer (n=33) | Autumn (n=42) | Winter (n=100) | P value |
|---|---|---|---|---|---|
| Fasting plasma glucose (mmol/L, median (IQR)) | 5.1 (0.5) | 5.0 (0.7) | 5.0 (0.6) | 5.0 (0.6) | 0.774 |
| 1-hr plasma glucose (mmol/L, median (IQR)) | 8.6 (3.6) | 8.8 (3.1) | 8.0 (2.9) | 7.6 (2.9) | 0.175 |
| 2-hr plasma glucose (mmol/L, median (IQR)) | 6.2 (1.8) | 5.8 (2.2) | 5.9 (1.6) | 6.0 (1.5) | 0.182 |
| GDM diagnosed (%, n) | 59.3% (16) | 63.6% (21) | 45.2% (19) | 52.0% (52) | NS~ |
| Insulin (pg/ml, median (IQR)) * | 252.7 (170.6) | 289.5 (161.3) | 287.7 (175.5) | 267.6 (210.4) | 0.522 |
| HOMA-IR (median (IQR)) * | 1.6 (1.2) | 1.9 (1.1) | 1.8 (1.3) | 1.7 (1.4) | 0.276 |
| C-peptide (pg/ml, median (IQR)) * | 1728.4 (708.3) | 1705.5 (658.4) | 1597.5 (952.6) | 1660.5 (689.5) | 0.638 |

*Abbreviations: IQR- interquartile range, GDM - gestational diabetes mellitus, HOMA-IR - Homeostatic Model Assessment of Insulin Resistance.*
*~Binary regression analysis showed no association between GDM diagnosis and any of the seasons investigated (all p>0.05)*
**n=27, 33, 40 and 96 for Spring, Summer, Autumn and Winter respectively.*

**Discussion**

In this well characterised population where laboratory standards were implemented strictly and glycolysis was inhibited, we found that there was no seasonal variation in the results of maternal glucose, insulin, HOMA-IR or C-peptide measured at the time of an OGTT at 26-28 weeks gestation. We also found no seasonal variation in the prevalence of GDM. Previous studies showing a minor seasonal variation in GDM rates may be explained by variations in glycolysis rates depending on differences between winter and summer in room temperature where the phlebotomy was performed.

A strength of this study was strict adherence to the latest international laboratory standards supervised by a single researcher (EOM). A potential weakness of the study is that it is a small single centre study conducted in a country where the climate is mild and the seasonal variations in outdoor temperature is relatively small. However, the cohort was well characterised biochemically with particular attention to preanalytical sample handling.

Recent studies have reported seasonal variations in the prevalence of GDM. In a recent secondary analysis of the two Australian HAPO centres in Brisbane and Newcastle enrolled in 2001-6 (n=2120), maternal measurements at the time of the OGTT were correlated to monthly temperature records from the Australian Bureau of Meteorology.[4] There was a small but significant increase during winter in fasting plasma glucose (FPG), HA1C and HOMA-IR. Another Australian study of 7369 OGTTs in the three years 2012-4, however, concluded that GDM was possibly over-diagnosed in summer and underdiagnosed in winter.[5]

As a result of this study and previous research we suggest that variations in OGTT measurements are more likely due to variations in maternal sample handling rather than seasonal variations. Our findings highlight the need for larger epidemiological studies of seasonal variations in different climates globally in both hemispheres.

**Declaration of Conflicts of Interest:**
The authors declare no conflicts of interest.

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# Bilateral Occipital Ischaemic Stroke Due to Sepsis

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**Abstract**

***Presentation***

A 48-year-old female presented with LIF pain. CT Abdomen/Pelvis revealed sigmoid diverticulitis with pericolonic abscess (Hinchey 1B).

***Diagnosis***

X became peritonitic while awaiting percutaneous abscess drainage. An emergency Hartmann's procedure was therefore performed. She bilateral visual loss post-extubation which was attributed to bilateral occipital infarcts seen on MRI Brain. TOE, telemetry, CT Angiogram Intracranial/Carotids, and a Haematology blood panel revealed no aetiological source. The cause of X's stroke was concluded to be a combination of sepsis-related cerebral hypoperfusion and hypercoagulability.

***Treatment***

She was given Aspirin 300mg daily for two weeks and discharged on Aspirin 75mg od for life.

***Discussion***

This case underscores the association between infection and ischaemic stroke, even without an underlying cardiac, vascular, or haematological cause. It emphasises the importance of rapid and effective source control in patients with infection to prevent sepsis and associated sequelae. This includes stroke, which can precipitate significant and permanent functional deficits in otherwise young and healthy patients.

**Introduction**

Infection has been implicated as a risk factor for ischaemic stroke, with multiple mechanisms proposed to underlie this relationship.[1-3] The case below demonstrates the association between sepsis and stroke; a 48-year-old female patient who developed bilateral occipital infarcts due to perforated diverticulitis.

**Case**

A 48-year-old female (X) presented to hospital with LIF pain and per rectal bleeding. Her medical background and family history were non-contributory, and she took no regular medication. CT Abdomen/Pelvis revealed sigmoid diverticulitis with a pericolonic abscess (Hinchey 1B). She was kept NPO, prescribed TPN, and initially improved under conservative management with IV antibiotics (Cefuroxime and Metronidazole).

X underwent repeat CT Abdomen/Pelvis on day six post-admission, which showed that her abdominal abscess had reduced in size. However, a new left renal infarct was also visible. The subsequent plan was to treat with therapeutic low-molecular weight heparin and pursue percutaneous abscess drainage under CT guidance. However, X became hypotensive, tachycardic, and peritonitic while being transferred to Interventional Radiology. A repeat CT Abdomen/Pelvis showed intra-abdominal free fluid and pneumoperitoneum consistent with bowel perforation and abscess rupture. She then underwent an emergency Hartmann's procedure.

X was gradually weaned off sedation, ionotropes, and antibiotics in the ICU. She was extubated on day fifteen post-admission and complained of bilateral blurred vision on waking. Neurological examination suggested global visual field deficits. A non-contrast CT Brain suggested bilateral occipital infarcts, which was confirmed on MRI Brain (see Image 1).

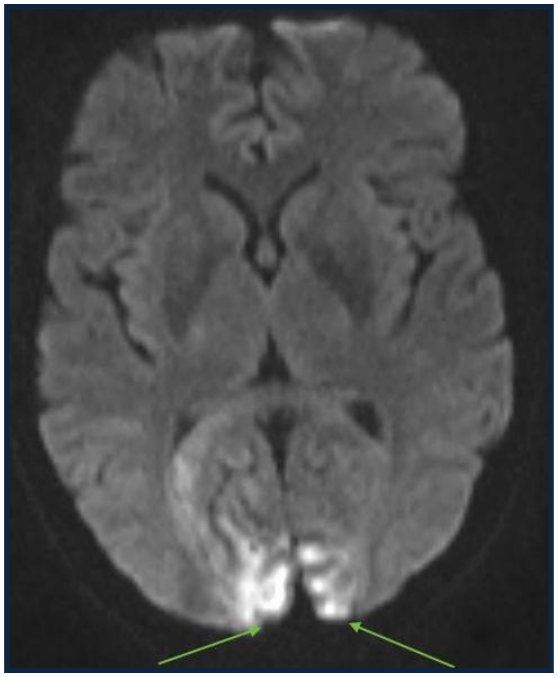

***Image 1: Axial DWI MRI Brain showing bilateral occipital infarcts.***

X next underwent aetiological investigation. CT Carotid/Intracranial Angiogram showed basilar artery thrombus but outruled carotid disease (see Image 2). A TOE did not find any evidence of LV/LAA/peri-valvular thrombus, infective vegetations, or an atrial septal defect, and telemetry did not detect any arrhythmia. A normal platelet count and fibrinogen level excluded DIC and TTP. Haematology concluded that X's renal and occipital infarcts were precipitated by a combination of non-DIC hypercoagulability and sepsis-induced hypoperfusion. She received 2 weeks of Aspirin 300mg po daily and was prescribed Aspirin 75mg po od for life thereafter.

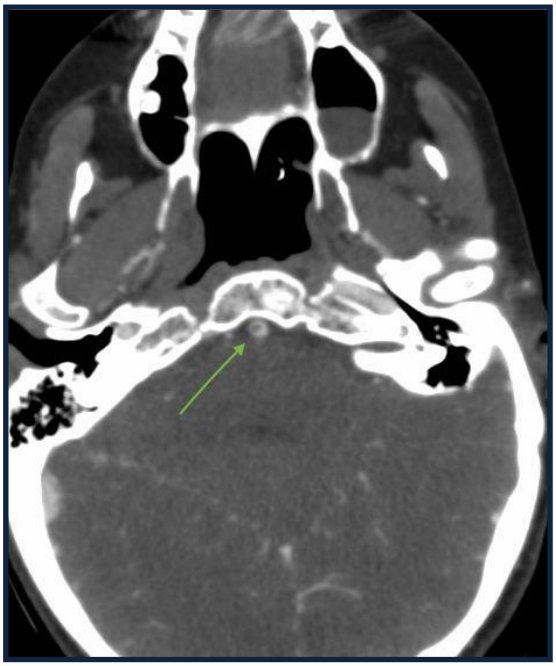

***Image 2: Axial MIP CT Angiogram showing basilar artery thrombus.***

**Discussion**

Ischaemic stroke is becoming more common amongst young individuals and can occur due to embolism, thrombosis, and systemic hypoperfusion.[4-5] Importantly, infection can be found in up to 13% of young stroke patients belonging to any of the aforementioned aetiological subcategories.[6] For example, sepsis has been associated with cardio-embolic stroke through the development of new-onset Atrial Fibrillation.[7] Thrombosis can occur in infected patients due to co-existing coagulopathy, which has been found in up to 80% of septic patients.[3,8] Cerebral infarction can also occur if infection precipitates haemodynamic instability and systemic hypoperfusion including the brain.[3]

X's case adds credence to the link between infection and cerebral thrombosis. This can be clinically challenging however, as sepsis-related hypercoagulability can range from severe prothrombotic states like DIC to milder forms such as immunothrombosis (fibrin activation to control local infection).[9-10]

Indeed, X's basilar clots and renal infarct occurred in the absence of any detectable haematological derangements. This underscores the need for a high clinical index of suspicion in infected patients for thrombosis including stroke. Lastly, X's deterioration into septic shock is a classic example of the haemodynamic compromise that can occur during infection, with end-organ damage through cerebral hypoperfusion. Aggressive source control must therefore be pursued to prevent sepsis and associated sequelae such as stroke, which can severely reduce function and quality-of-life in young and previously healthy patients like X.

**Declaration of Conflicts of Interest:**

There are no financial interests or connections, direct or indirect, or other situations that might raise the question of bias in the work reported or the conclusions, implications or opinions stated – including pertinent commercial or other sources of funding for the individual authors or for the associated departments or organizations, personal relationships, or direct academic competition.

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# Carotenaemia in Infancy

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**Abstract**

***Presentation***

Carotenaemia in infancy can develop due to excess dietary carotenoids, resulting in a yellow-orange discolouration of the skin. These changes are more commonly seen over the palms, soles, and nasolabial folds, with sparing of the sclera.

***Diagnosis***

This is based on a combination of clinical findings, occasionally aided by specific lab investigations such as beta-carotene levels.

***Treatment***

Specific interventions are not typically required, as skin changes tend to self-resolve as diet naturally evolves.

***Discussion***

We identified this condition in an infant, whose diet was rich in carotenoids since commencing pureed and solid foods. Whether this increases the chances of developing carotenaemia has not been definitively confirmed, but we will discuss the potential pathophysiology behind this infrequently seen condition.

## Introduction

A 9-month-old girl was reviewed for gross motor delay. Delivered at term, with a birth weight of 3.14kg, she had an unremarkable neonatal period and medical history. In addition to mild hypermobility and hypotonicity in her lower limbs, she was noted to have a yellowish discolouration of her skin, primarily affecting her palms, soles, and nasolabial folds (Image 1 and 2). Her sclera remained unaffected, and there were no further developmental concerns.

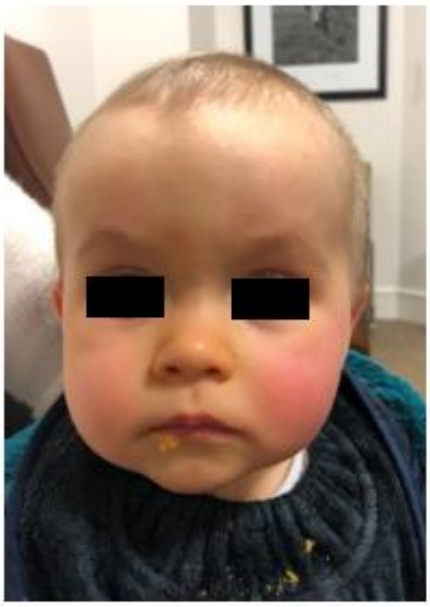

*Image 1*

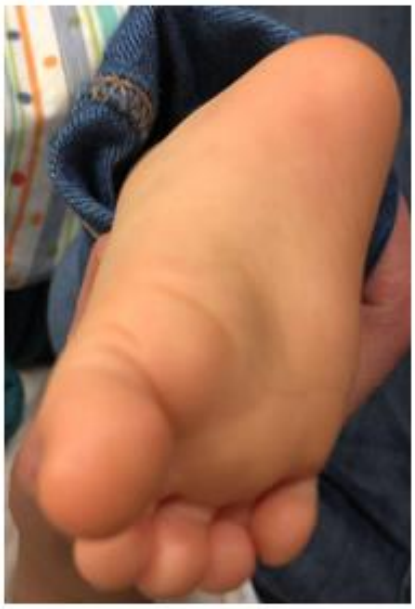

*Image 2*

**Case Report**

A detailed dietary history revealed a significant intake of pureed vegetables containing high levels of carotenoids, such as carrots, sweet potatoes, and pumpkin, the so called 'Orange Diet'. Specific blood tests were requested, primarily looking at levels of Beta Carotene. The parents subsequently introduced a varied diet over time, and within 9 months her skin tone had returned to normal.

**Discussion**

Carotenaemia is a well-documented condition but can be difficult to diagnose when unfamiliar with its typical pattern and aetiology. A key feature that distinguishes it from jaundice is the absence of scleral icterus, in addition to the palmoplantar and nasolabial fold distribution, the latter being due to carotenoid tendency to accumulate in regions with additional sweat glands [1].

Carotenoids are naturally occurring and are found in many of our food products. Some of the most common sources are carrots, tomatoes, green vegetables, and food colouring. These include alpha- and beta-carotene, lutein, lycopene, beta-cryptoxanthin, and zeaxanthine [2]. The primary carotenoid involved in carotenaemia is beta-carotene, which is converted to Vitamin A through the actions of Beta-carotene 15,15'-dioxygenase [3]. However, elevated levels of carotenoids do not typically result in hypervitaminosis A [4], due to intrinsic inhibitory mechanisms, and Vitamin A toxicity secondary to elevated beta-carotene has not been widely reported [5]. Interestingly, we did see a slight elevation in Vitamin A levels of 1.47µmol/L.

Carotenaemia in infancy is typically of dietary origin. Use of pureed vegetables for feeding is known to increase the bioavailability of carotenoids, thus increasing the possibility of developing this condition [6, 7].

These changes are both benign and reversible, and in a case series by *Karthik et al*, they found there was a complete recovery in skin colour in several infants diagnosed with carotenaemia between the ages 6 to 11 months, without any dietary interventions [6]. This may be due to a natural progression in diet and would reassure many parents.

It should also be noted that although diet is the most common contributing factor in the majority of children, there are some who have an increased susceptibility to carotenaemia as a result of conditions such as diabetes mellitus, or hypothyroidism, the underlying mechanisms of which are thought to be related to a decreased conversion of carotene to its Vitamin A metabolite [8], in addition to hypercholesterolaemia, which increases the binding site availability for carotenoids [7].

This case in-particular is a good example of how a diet consisting primarily of vegetables rich in carotenoids can lead to dietary related, or primary carotenaemia. It emphasises the importance of a detailed feeding history and being aware of the typical dermatological distribution of this condition, to avoid unnecessary investigations and anxiety. As was the case with those children followed up by *Karthik et al* [6], our patient showed a spontaneous resolution in skin colour at 18 months, without the need for significant dietary interventions. It is likely that as the diet varies it would contain less carotene rich sources, leading to an improvement in skin tone.

**Declaration of Conflicts of Interest:**
The authors of this paper have no conflicts of interest to declare.

**Patient Consent:** Received.

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# Genomic Evidence of SARS-CoV-2 Reinfection in Ireland

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**Abstract**

***Presentation***
A 40-year-old healthcare worker (HCW) presented with cough, headache, sore throat, fatigue and myalgia seven months after primary infection with laboratory-confirmed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Symptoms were milder and recovery was faster on the second episode.

***Diagnosis***
Reinfection with phylogenetically distinct SARS-CoV-2 was confirmed by whole-genome sequencing (WGS).

***Treatment***
Management involved symptomatic treatment and self-isolation.

***Discussion***
The incidence of SARS-CoV-2 reinfection is not well characterised. Infection control precautions may still be required in healthcare facilities, even in previously infected and possibly in vaccinated individuals while SARS-CoV-2 remains in circulation. Further research on the nature and duration of immunity is required to inform public health and infection control policy.

## Introduction

SARS-CoV-2 reinfection has been reported in a number of countries since June 2020. Hall *et a*l report a reinfection incidence density in UK healthcare workers (HCWs) of 3.3 per 100,000 person days.[1] To our knowledge, this is the first report of reinfection from Ireland.

## Case Report

A 40 year-old female HCW presented with fever, headache, sore throat, shortness of breath and dysgeusia in April 2020. Her past medical history included mild asthma, with no known immunocompromise. Real-time reverse transcription polymerase chain reaction (qRT-PCR) analysis of a nasopharyngeal sample detected SARS-CoV-2 RNA (Table 1). While never hospitalised, she was unfit for work for four weeks due to significant headaches and persistent fatigue lasting four months. She reported no further sequelae. One of two household contacts also developed COVID-19.

Seven months later, she represented with cough, headache, sore throat, fatigue and myalgia. Symptoms were milder and she experienced a quicker recovery, remaining off work for the two-week period of self-isolation. She reports a post viral wheeze controlled with low dose inhaler. Of note, she had an asymptomatic screening test (nasopharyngeal swab qRT-PCR) 15 days prior to this episode in which SARS-CoV-2 RNA was not detected (Table 1).[2] SARS-CoV-2 was again detected by qRT-PCR in nasopharyngeal specimens, while other respiratory pathogens were not detected on further molecular analysis (Table 1). Viral RNA from both presentations was referred to the National Virus Reference Laboratory (NVRL) for WGS using the ARTIC v3 sequencing protocol.[3] Sequence data were acquired using the MinION platform (Oxford Nanopore Technologies, ONT). Raw sequences were assembled with the artic-ncov2019 pipeline and lineage identification was according to the PANGOLIN nomenclature.[4,5] Maximum-likelihood phylogenetic trees were built with RAxML (Figure 1). Nucleotide differences between the specimens and the Wuhan reference sequence identified by pairwise comparison locate both samples in differentiable lineages with high confidence.

***Table 1.*** *Nasopharyngeal qRT-PCR results of a Healthcare Worker with SARS-CoV-2 Reinfection.*

| | Specimen Date | Test Platform | SARS-CoV-2 Result |
|---|---|---|---|
| | 19/03/2020 | Altona RealStar® SARS-CoV-2 RT-PCR Kit 1.0 (Roche | Not detected |
| Episode 1 | 04/04/2020$ | Altona RealStar® SARS-CoV-2 RT-PCR Kit 1.0 (Roche | **Detected** |
| | 29/10/2020 | CerTest VIASURE SARS-CoV-2 (Roche Flow System) | Not detected |
| Episode 2 | 16/11/2020 | CerTest VIASURE SARS-CoV-2, Flu & RSV (Roche Flow | **Detected*** |
| | 16/11/2020 | ePlex RP2 (GenMark Diagnostics, Inc) | **Detected^** |
| | 18/11/2020$ | CerTest VIASURE SARS-CoV-2 (Roche Flow System) | **Detected** |

***** *Flu A, Flu B and RSV not detected*

*^ Adenovirus, Coronavirus (229E, HKU1, NL63, OC43), MERS Coronavirus, Human Bocavirus, Human Metapneumovirus, Human Rhinovirus/Enterovirus, Influenza A, Influenza A H1, Influenza A H1-2009, Influenza A H3, Influenza B, Parainfluenza 1, Parainfluenza 2, Parainfluenza 3, Parainfluenza 4, Respiratory Syncytial Virus A, Respiratory Syncytial Virus B, Bordetella pertussis, Legionella pneumophila and Mycoplasma pneumonia not detected*
*$- specimens referred for whole genome sequencing*

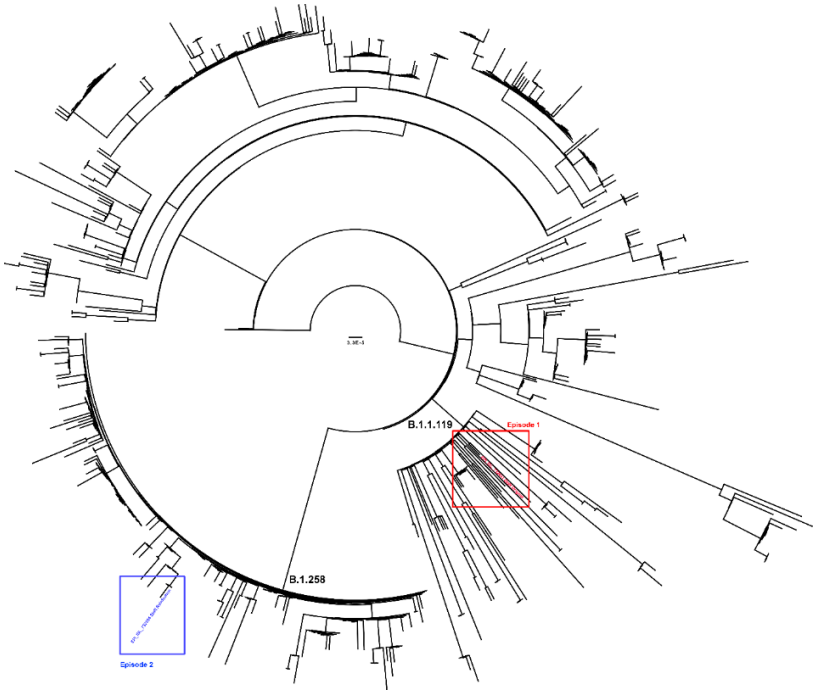


***Figure 1:*** *Maximum likelihood phylogenetic tree drawn with RAxML, indicating where samples from Episode 1 (Red outline: Lineage B.1.1.119) and Episode 2 (Blue outline: Lineage B.1.258.2) fall in relation to other Irish SARS-CoV-2 sequences (n=628) and the Wuhan SARS-CoV-2 reference (MN908947). Sequences corresponding to this case are publicly available in the Global Initiative on Sharing All Influenza Data (GISAID) database and can be found with accession IDs: EPI_ISL_732441, EPI_ISL_732384.*

## Discussion

To our knowledge, this is the first reported case of SARS-CoV-2 reinfection in Ireland. The consequences of SARS-CoV-2 reinfection are significant in HCWs due to the impact on service delivery and cross-infection to other HCWs and patients. The race to protect HCWs, prevent further deaths and to return to normal social and economic activity by establishing herd immunity through vaccination has begun worldwide. COVID-19 vaccines have shown efficacy rates of 70-95% in clinical trials; however, the effectiveness in populations overall and the durability of immunity is yet to be evaluated.[6] Lasting immunity to SARS-CoV-2 infection may prove not be universal in those previously infected or vaccinated. Preliminary data from a UK study of HCWs suggests that SARS-CoV-2 infection is associated with an 83% lower risk of reinfection, with the median protective effect lasting up to five months from primary infection.[1] While new variants with increased infectivity are being described; their potential for reinfection is as yet unknown.[7]

A number of publications of asymptomatic or pauci symptomatic reinfection in HCWs suggest that these individuals could potentially act as sources of cross-infection.[8,9] It is also widely accepted that pre-symptomatic transmission occurs. Despite awareness of and vigilance for symptoms, transmission may occur in the pre-symptomatic phase if appropriate precautions are not maintained.[10] This would suggest that current droplet, and where necessary, airborne precautions may need to be continued in healthcare facilities while SARS-CoV-2 remains in circulation. Further study into the level and duration of immunity conferred by both infection with, and vaccination against, SARS-CoV-2 is required to inform future vaccination campaigns and infection prevention and control policy.

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# Counting Tombstones is a Fallacy: Re-thinking Quality Indicators for Our Patients

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**Abstract**

Improving the quality of care is the goal of all clinicians. The international use of outcome data such as mortality rates is meant to improve quality. I will argue that the use of such data is flawed and will not necessarily identify the outliers in quality. To improve quality for our patients we must redesign the paradigm.

## Introduction

Two major reports were published by the National Office of Clinical Audit (NOCA). These reports on hospital mortality (National Audit of Hospital Mortality) and stroke care (Irish National Audit of Stroke) will be pored over by managerial teams within the hospital service. The question to be asked - will anything change in hospitals?

The goal of monitoring clinical performance is to learn and improve. If providers regularly monitor performance and design interventions to improve, the result will be that the clinical team will deliver a quality service. Evidence exists that safety and quality within a hospital service can be improved. More than 30 years ago, Donabedian proposed measurement of the quality of health care through observation of it's structure, processes and outcomes [1].

The Institute of Medicine (IOM) has defined health care quality in the USA as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge"[2]. This definition incorporates two of Donabedian three elements in a broad approach to measurement of health care.

However, the use of data to make external judgements requires two conditions to be met. There is a moral premise that by using aggregated comparative data to make judgements this action should be fair, ie the data truly reflects underlying differences in quality. The management principle builds on this since, unfair comparisons provoke inappropriate responses.

**Outcome Data**

The use of outcome data is popular, it can be easily measured and is thought to be a measure of the quality of care. This notion can be traced back to Ernest Codman's end results idea[3]. This debate about the adequacy of case mix adjustment dates back to Florence Nightingale's publication of league tables for mortality in the 19th Century English hospitals[4].

Outcome data can be patient rated (satisfaction and quality of life) or recorded by an external party (morbidity and mortality). The use of outcomes to compare quality of care implies that the variation due to other causes can be accounted for, such that any residual variation truly indicates quality of care variation.

**Outcome Measurements**

Measuring mortality is a clearly defined end point in a patient's care. Standardised mortality ratio (SMR) is the observed number of deaths divided by the expected number of deaths in a hospital for a particular diagnosis and time period, adjusted for patient characteristics which are known to impact upon mortality.

Variation between the expected value and a result that is unlikely to have risen from random variation provides a "signal" to a hospital that their SMR is above what is expected. However, for each hospital the rate of in-hospital mortality (M) can be divided into two components

$M = U + V$

Where U denotes the mortality rate arising from deaths that could not have been avoided even under optimal care and V denotes the mortality rate arising from deaths due to suboptimal care. The burden of harm from preventable problems in care is substantial. Estimates of preventable deaths range from 3 to 6% in international studies[5,6]. Avoidable deaths has been defined as "those with at least a 50% probability of avoidability in the view of trained medical reviewers". Most preventable deaths occurred in elderly frail patients with multiple comorbidities judged to have less than 1 year of life left[7]. Hogan and colleagues subsequently demonstrated that in an examination of 34 acute hospitals in the UK, they identified that 3.6% of deaths were preventable. However, they were unable to demonstrate any association between avoidable deaths and the hospital SMR[8].

While the concept of avoidable deaths is helpful in raising interest in the scale and burden of healthcare related harm. We must be careful about using preventable deaths as a comparative measure of the quality between hospitals. Measures not robust and fair may over-estimate the size of the problem and the risks to patients by inducing unjustified levels of anxiety and fear. Secondly, they may lead to a stigmatising effect on a clinical team. Conversely under reporting may lead to complacency and a failure to acknowledge on-going risks to patients.

**Correlating Quality of Clinical Care with Outcomes**

In several studies researchers have found no correlation with adjusted outcomes and quality of care [9-11]. Thomas and Hofer reviewed 18 articles about the relation between outcome and clinical process and quality. They concluded that outcome has some correlation with quality but that it is a weak relationship. So that most hospitals in the highest 5% for mortality (Outliers) will not be among the 5% providing the poorest quality of care. Secondly, the 5% providing the poorest quality of care will not reside among the outliers[12].

The question is – "is it unrealistic to use outcome data to compare quality with the confidence necessary to performance management"? The answer sadly is yes! Outcome data is neither sensitive nor a specific marker for quality of care. Therefore, sanction and reward should not be applied to the "worst" 5% of providers on outcome, because they will not be the 5% with the worst quality.

Several measurable structural and institutional factors are associated with clinical outcomes. In stroke medicine, organised stroke care in a stroke unit is associated with better outcomes[13]. The benefit of a stroke unit is seen across all severities of stroke and is applicable to all stroke patients. However, as correctly pointed out by the Irish National Audit of Stroke, not all stroke patients got stroke unit care and / or spent the majority of their time in the stroke unit. However, those patients who got admitted to a Stroke Unit were more likely to have an early swallow screen and to have had an assessment of mood done.

Measuring clinical processes, therefore, offers advantages over outcome-based monitoring. Clinical process measures should be based upon agreed measures. They will guide efforts to improve performance because they are a direct measure of performance based upon adherence to established clinical standards.

The advantages of monitoring clinical processes in contrast to outcome monitoring are that it focuses on violation of agreed standards. Therefore, a failure is a failure and not an indirect / inaccurate measure. Secondly, the process can be measured close to the point of delivery of care. The target is inherent in the measurement made and finally it can be applied to all hospitals. In contrast the NAHM only provided data on 17 out of 27 (63%) hospitals providing acute stroke care. In other words, we have no data on 1 in 3 Irish hospitals.

While monitoring clinical process measures requires access to information which although would be more expensive in the short term it will be more cost effective than outcome monitoring. Mant and Hicks estimated that plausible differences in quality of care might result in a 10% difference in mortality across hospitals. Therefore, one would have to assess 3619 patients from each hospital to provide a reasonable chance of detecting this. However, only 48 cases would be needed to be assessed in each hospital to detect the corresponding difference in adherence to quality standards[14].

**Conclusion**

Robert McNamara (1916-2007) was the US Secretary of Defence during the presidencies of Kennedy and Johnson. He applied the same rigorous systematic analysis to the Pentagon that had worked so well in industry. He believed that if the Viet Cong causalities exceeded the numbers of US dead, the war would eventually be won. Unfortunately, the data was flawed, and history recorded a different outcome. However, McNamara's name became linked with the American failure in Vietnam and in 1972, the sociologist, Daniel Yankelovich coined the term McNamara's fallacy[15].

The first step is to measure whatever can easily be measured. This is OK as far as it goes. The second step is to disregard that which can't be measured or to give it an arbitrary quantitative value. This is artificial and misleading. The third step is to presume that what can't be measured easily really isn't important. This is blindness. The fourth step is to say that which can't be easily measured really doesn't exist. This is suicide.

Medicine is messy, imprecise and uncertain. While based upon science, it is a human activity and humans are prone to systematic cognitive bias. Given the messiness it is easier to measure whatever can be measured easily – mortality and ignore the rest. Hence, we learn to repeat McNamara's fallacy but more importantly fail to improve clinical care for our patients.

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# Online Paediatric Clinical Examinations in the COVID-19 Era: An Acceptable Alternative

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**Abstract**

The SARS-CoV-2 pandemic has necessitated significant adaptation to medical education. A significant proportion of teaching has moved online, and innovative approaches have been required in all areas, including assessment. Provision of the clinical examination has presented a particular challenge. This year it was considered impractical and unsafe to carry out clinical examinations in person due to the SARS-CoV-2 pandemic. Therefore, in our institution, clinical examinations in paediatrics were moved online. Prior to summative assessment, teaching was provided using a similar format to the examination in order to improve assessment literacy. The summative clinical assessment was held using Zoom software and included history-taking, knowledge of paediatric clinical examination and communication. Retrospective analysis showed a significant correlation between students' performance in the online clinical examination, other methods of assessment and their overall grade. In the absence of a traditional clinical examination, this method appears to be an acceptable alternative.

Significant adaptations to medical education have been required since the beginning of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic. In March 2020, teaching for the vast majority of students, in our institution and beyond, moved online. This necessitated innovative approaches to teaching and assessment[1-3]. The provision of the clinical examination, in particular, presented a challenge to medical schools and a variety of online formats have been used[4-7.]

In recent years, students in Paediatrics in Trinity College Dublin (TCD) have completed a summative clinical assessment at the end of the academic year, in addition to a written Clinical Data Interpretation Examination (CDIE) and Multiple-Choice Question (MCQ) examination.

Clinical skills assessment involved directly observed standardised-patient histories and clinical examinations of children in both inpatient and outpatient settings. This year it was considered impractical and unsafe to carry out these clinical examinations in person due to the SARS-CoV-2 pandemic. Firstly, many children with chronic illness were considered high risk if infected with SARS-CoV-2. Secondly, social distancing was challenging to implement considering the numbers of students, staff and patients required. The clinical examinations were therefore conducted entirely online.

Prior to summative assessment, teaching was provided using a similar format to the examination in order to improve assessment literacy. Essential clinical teaching was continued online in an alternative format to traditional bedside tutorials to ensure the students' clinical exposure could be focused on patient contact. Small-group online tutorials were facilitated, using clinical vignettes, with the clinical tutor acting as the patient's parent in an online simulated setting. The tutor also facilitated discussion regarding examination findings, diagnoses and management plans.

This format translated to the summative end of year examinations. Twenty clinical scenarios, aligned with the learning outcomes for the module, were devised. Zoom software (Zoom Video Communications, Inc, San Jose, California) was employed. Following discussions, simulated run-throughs of the examination and allowing for unforeseen circumstances it was decided that approximately 40 students per day could be examined over 4 days. Students and examiners were divided into 6 "pods" per day, each facilitated on Zoom by one member of academic staff.

At the student's allocated examination time, they were admitted to a Zoom "Breakout Room" where their examiners were waiting. Each student was assessed in two scenarios by two examiners. In the course of the first scenario, the student demonstrated their history-taking skills by obtaining a focussed history from one of the examiners. Their ability to assimilate the important points from the encounter was assessed by requiring them to summarise the history. Based on the information they had obtained, the student was asked to formulate and prioritise a list of differential diagnoses, with justification for their decisions.

A second examiner chose a different scenario to assess the student's knowledge of clinical examination. They were asked to describe how they would examine a child based on this scenario. This included detail of various examination skills, paediatric-specific adjustments to examination technique and relevant clinical signs which they might expect to see. Skills in devising suitable investigation and management plans based on the clinical scenario were also examined. Patient-counselling skills were evaluated by asking the student to explain the diagnosis, investigation or management plan in child and family-friendly language. This required the student to have knowledge of a broad range of paediatric topics while at the same time assessing their communication skills. Professionalism was assessed throughout the encounter. Examiners consulted with each other to agree on the student's mark using a detailed rubric. Written feedback was recorded for each student. At the end of each day, an examiners' meeting was held, where each student's results were discussed, and any issues were resolved.

This meeting provided an opportunity to view the student's examination result in the context of their previous written assessments and to gather informal feedback from examiners on the format of the examination.

Retrospective analyses of examination results were performed using GraphPad Prism (GraphPad Software, Inc, California). Correlations between a student's various grades were calculated with Pearson's correlation coefficient. There was a significant correlation between a student's performance in the online clinical examination and the CDIE ($r=0.3935$; 95% CI=0.2595-0.5126; p,0.0001), MCQ ($r=0.4055$, 95% CI=0.2729-0.5231; p,0.0001) and overall marks in their summative assessment ($r=0.7268$; 95% CI=0.6479 to 0.7903; $p<0.0001$).

Advantages of this method included the ability to ensure social distancing, a rapid turn-around time between students, lack of reliance on patient attendance for examination, and reduced variability between the cases presented to students. The main disadvantages of this system were the inability to directly assess the development of psychomotor skills required for clinical examination and the students' ability to adapt their examination to the particular needs of a given child. In conclusion, in the absence of the ability to carry out a traditional clinical examination, this method appears to be an acceptable alternative.

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The authors declare they have no conflicts of interest.

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# Telephone Consultation in the Covid-19 Era: An Occupational Health Perspective

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**Abstract**

With the advent of the Covid-19 pandemic and resulting exponentially increased workload for occupational and other health departments worldwide; telemedicine has been brought to the fore at rapid pace. Healthcare and the management of services have seen a drive to innovate and reinvent the way we conduct our communication with colleagues and patients alike. It is imperative that healthcare professionals (occupational health physicians included), continue to uphold standards and maintain the utmost in professional levels of communication to preserve the doctor patient relationship in these challenging times. Occupational health in particular is responsible for the health and wellbeing of so many staff, most notably the hard working, -and most at risk- health care staff.

## Introduction

Communication has always underpinned the very fabric of medicine through the doctor patient relationship; in a world of evolving technology, the use of the telephone in medicine has grown considerably in the last number of decades. Indeed, the very first reported telephone call by Alexander Graham Bell to his assistant in 1876- "Come here, Mr Watson, I want you" was a call for medical attention after Bell reportedly spilled sulphuric battery acid on his clothes. As far back as 1879, the Lancet reported the use of the telephone in aiding a doctor (who did not wish to leave his home at midnight) speak to an anxious mother and assess her baby for croup[1]. Upon hearing the baby cough via telephone, the doctor was satisfied that croup was not causative and the mother was reassured. The telephone has become indispensable as a means of communication in medicine which can be seen throughout history and indeed today as the Sars CoV 2 pandemic remains. There are still challenges associated with the use of the telephone in medicine and the legal implications of same have not been thoroughly tested. While telephone consultations can be beneficial and efficient, there are also pitfalls to be aware of in this context.

**Telemedicine and Sars CoV 2**

Healthcare professionals across the different medical specialties have newly instituted the use of telephone triage over the last year to ensure the safety of staff and patients in preventing transmission of Sars CoV 2. We now recognise, as per the WHO[2], transmission can occur through respiratory droplets or fomites; further research is required to ascertain whether airborne spread is possible outside of aerosol generating procedures. The days of patients waiting in a GP practice waiting room side by side, or busy outpatient clinic waiting areas teeming with patients and staff abreast have ceased. Management of healthcare has shifted, and this is likely to continue in some capacity into the future as the benefits of pressure driven change come to light; indeed, while we may continue to hope for a return to some level of 'normalcy', the reality is that - even with a selection of vaccines being administered worldwide, COVID-19 is likely to be with us and impact our lives for a considerable time to come. Maintenance of usual levels of service is crucial otherwise we are left with a growing 'care debt' of deferred medical treatments etc., which further strains healthcare service[3]. A recent study in an Orthopaedic clinic showed that both patient and clinician were satisfied with this new means of telephone consultation[4]. Conversely, another study in San Francisco looked at the 'readiness' of older adults regarding telemedicine; they found that for many of those with dementia, hearing impairment or social isolation, telemedicine posed a significant challenge[5]. Healthcare staff and patients worldwide have been compelled to embrace radical changes in their day-to-day practice.

**Evidence Base for Telephone Consultation**

Telephone triage and consultation was introduced to an Occupational health department prior to the pandemic in a recent study[6] and identifies potential for growth in efficiency of delivery in healthcare services. Triage of patients seeking appointments with their General practitioner in the UK has been widely carried out, but a solid evidence base is still moderately lacking. One study (again prior to the pandemic) showed that up to half of consultations could be successfully carried out on the telephone alone but there was significant variation in the effect of this new triage system amongst different general practices[7]. Remote consulting was introduced more broadly in the UK National health service (NHS) in response to the COVID-19 pandemic and the addition of video consultation was also used[8]. Both advantageous and disadvantageous factors were noted from this study, some clinicians found it less satisfying and raised concerns over possibly missing physical signs[8]. Others noted that telephone consultation was particularly suited to the follow up reviews of chronic conditions; nurses were able to carry out training on wound care and injectable medications with ease[8]. Telemedicine is also now being employed in the management of COVID-19 patients post pneumonia. An Irish study introduced telephone consultation 8-12 weeks post discharge for COVID-19 patients[9] as a means of monitoring symptoms and recovery as part of a hybrid approach to follow up. Patients were triaged in multi-disciplinary meeting as to whether they would be followed up in person or via the physician associate run virtual clinic[9]. It would appear telephone consultation has its place in a variety of diverse prospective settings in medicine to varying degrees.

**Advantages and Disadvantages of Telephone Consultation**

The potential benefits of telephone consultation in the context of covid-19 are apparent, most obviously in reducing potential transmission to healthcare staff or indeed potential nosocomial transmission from staff to patients in those asymptomatic or pre-symptoms onset. In more general terms, patients are not required to travel for an appointment, the difficulty for which is not to be underestimated depending on co-morbidities etc. Access to transport for those living in more remote or rural areas is also a factor. Satisfaction appears to be high thus far among patients undergoing this form of consultation[4, 6]. While it can be quicker and more efficient for clinicians, many are still concerned about the risks of potentially missing a serious condition[10]. It can also be difficult to properly establish rapport with a patient with the comparative anonymity of telephone consultation. Body language is such an integral part of the doctor patient interaction giving a myriad of non-verbal cues. Many researchers and academics have tried to attribute a number or percentage to what body language contributes to communication: from Dr Mehrabian's projected 93%[11] of information being non-verbal; it is arguably something not quantifiable[12] or not easily so in any case. As mentioned earlier, older adults are a group that can be least catered for with telephone consultation as they may be less familiar with technology, having hearing impairment[6] or difficulty communicating[5]. Privacy and confidentiality are also an issue warranting attention.

Telephone consultations have also allowed healthcare workers to continue working remotely when they might be self-isolating or suffer from a medical condition placing them in a higher risk group. It is an adaptation that allows certain people to remain in the workplace where they might otherwise simply remain on sick leave. With healthcare facilities globally straining to keep their staffing levels to par in the midst of this pandemic, maximisation of the workforce has never been so critical.

**Ethics and Legal implications**

As briefly mentioned, many clinicians are concerned regarding the risks of telephone consultation and the potential to miss clinical signs. The Medical Protection Society (MPS) has issued some guidance, advising that it is preferable to carry out remote consultation on those already known to the clinician[13] as well as reiterating the importance of correct identification of both clinician and patient. The NHS have also provided a similar guidance document[14] regarding virtual consultations. In the absence of any randomised control trials comparing face-to-face versus telephone consultation, a robust evidence base is unfortunately wanting. The Irish Medical Council published a guide for doctors in telemedicine but also importantly included a separate booklet for patients[15]. Clinicians are exposed to the same degree of liability whether consulting in person or on the phone; only time, review, and audit of the now broadly used means of telephone consultation will reveal its comparative malpractice incidence. The three-stage test in determining negligence applies regardless of the method of consultation; there must be a duty of care which has been established and then breached, and as a direct result of this breach- damage or harm has occurred. It is incumbent on the clinician to ensure they are satisfied with their own assessment via telephone, while being mindful of its limitations. All guidance documents mentioned expressly highlight that clinicians do not hesitate to arrange an in-person assessment if they feel it is warranted[13, 14, 15].

## Conclusion

Telephone consultation has been implemented internationally to facilitate safer provision of health care services and prevent further transmission of Sars CoV 2. It has many benefits but there are also numerous potential pitfalls that clinicians need to be aware of. Ideally specific training should be undertaken, national guidance followed appropriately, and patients must also be well informed.

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# Perspectives of Interstitial Lung Disease Healthcare Professionals during COVID-19

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**Abstract**

We examined the impact of COVID-19 on the daily lives, mental wellbeing, training and support needs of healthcare professionals (HCPs) working in interstitial lung disease (ILD), and implications for ILD patient care. We invited ILD HCPs to participate in a quantitative survey, following which respondents (n=49) self-selected to participate in structured telephone interviews (n=9). Worry (43%, n=21) and frustration (43%, n=21) were the most commonly reported emotions by survey respondents. Interviewees reported significant impacts on their daily lives and mental wellbeing. Few of the interviewees had received self-care (n=1, 11%) or mental healthcare training (n=2, 22%). Wellbeing supports were available, but interviewees reported deprioritising self-care. Interviewees reported concern about the impact of appointment cancellations on ILD patients. Virtual clinics were considered useful, but interviewees reported some limitations. COVID-19 profoundly impacted the daily lives and mental wellbeing of ILD HCPs and affected ILD care delivery, with implications for occupational health, HCP training and ILD patient services.

## Introduction

Irish Lung Fibrosis Association (ILFA), a patient organisation founded to support patients and families affected by Interstitial Lung Disease (ILD), conceived and supported research which aimed to gain a deeper understanding of the impact of the COVID-19 pandemic on ILD patients, their caregivers and healthcare professionals (HCPs) working in the ILD therapeutic area. The findings and clinical implications of this research as it relates to patients and caregivers will be published separately.[1] Here we focus on research conducted with HCPs.

Specialist care for ILD patients is delivered by respiratory multidisciplinary care teams at 8 clinical centres across Ireland.[2] It is these same teams that provide "frontline" care to patients hospitalised due to COVID-19. This research examined the impact of COVID-19 on the daily lives, mental wellbeing and future outlook and training and support needs of ILD HCPs, as well as the consequences for ILD patient care.

## Methods

HCPs working in the field of ILD who are registered with ILFA were invited to participate in an online survey via an email from ILFA to its stakeholders and postings on ILFA's social media. Those who had completed the survey could self-select to participate in an in-depth structured telephone interview. Interviews were conducted by independent market research professionals and subsequently transcribed. The full survey questionnaire and interview guide used for this research can be accessed via the ILFA website.[3]

## Results

A total of 49 HCPs participated in the online survey, which was conducted from April 16th to May 5th, 2020. Nine HCPs, comprising 3 respiratory nurses, 4 doctors and 2 allied healthcare professionals, participated in structured in-depth telephone interviews, conducted from April 28th to May 20th, 2020.

### *Worry in Relation to COVID-19*

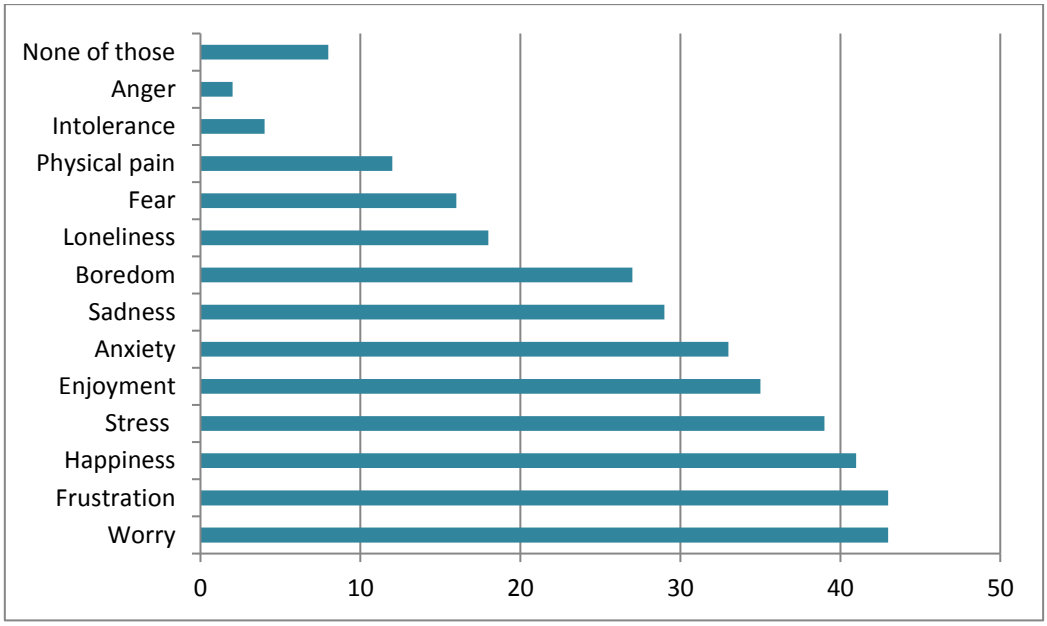
There was a high degree of variability in HCPs worry in relation to COVID-19. On a scale of 1 (not at all worried) to 10 (extremely worried) 6% (n =3) of HCPs were extremely worried. The average worry rating was 6.5. The most common sources of worry in relation to COVID-19 were the health of family and friends (65%, n=32, of respondents indicated "quite a lot" or a "great deal" of worry), contracting COVID-19 (47%, n=23) and the economy (45%, n=22).

### *Impact on Daily Life*

Interviews indicated that COVID-19 caused significant upheaval to HCP's daily lives, including longer working hours, changes to work schedule and/or roles. It was evident that many of these work practice changes were achieved because of the goodwill and personal commitment of healthcare staff. HCPs reported taking extensive measures to limit their exposure to others, including physical distancing from other household members. Less than half (41%, n=20) of respondents were sleeping well and 39% (n=19) reported worse sleep quality since the COVID-19 situation.

*Emotional Wellbeing, Self-Care and Available Supports*

Worry (43%, n=21) and frustration (43%, n=21) were the most commonly reported emotions experienced "a lot" on the day preceding the survey (figure 1).




*^Percentage of HCPs who reported experiencing each feeling "a lot" on the preceding day of the survey*

***Figure 1: Healthcare Professionals Emotions^***

HCPs interviewed reported multiple stresses due to COVID-19 and noted similar experiences of colleagues. These included managing significant uncertainty, juggling extreme work schedules with family responsibilities, fear of contracting COVID-19 and concerns for their existing (non-COVID) patients. Childcare was a significant practical issue and was identified as an unmet need. It was evident that the emotional demands of providing care to COVID-19 patients and their families were significant: "*I'm not prepared for this at all. It should have come with a warning that this is going to have an emotional impact…. with the no visiting and all that kind of stuff, I found that really, really hard"* and *"Healthcare workers will be affected mentally. Nurses on my ward cry every day because people are so sick, it's so stressful".*

HCPs interviewed were aware of healthcare staff supports for mental wellbeing provided by the Health Service Executive, including a stress and resilience course and an employee assistance programme. A number indicated that they did not have the time to avail of such support. Just one HCP had received advice on self-care as part of their professional training. Others were aware self-care training was available but admitted it was not a priority: *"I think we are very bad at that. Usually self-care is at the bottom of the pyramid of things that need to be done."* Others found the best support came from colleagues.

*Training and Support Requirements*

Two of the nine interviewees had received training on providing mental healthcare. There were suggestions for training on stress management and coping strategies, including cognitive behavioural therapy, both for self-care and patient care. There were also telemedicine training requirements, including technology use and telephone triaging.

With regard to support provided by ILFA, more communication, information or online meetings (41%, n=20), support to advance telemonitoring/telehealth (12%, 6) and advocating and campaigning for patients (8%, n=4) were the three most commonly identified areas of need.

*Impact of COVID-19 on Healthcare Delivery and Use of Telemedicine for ILD Patients*

Interviewees were concerned about the impact of cancelled appointments and tests on ILD patients. Some found virtual clinics useful for continuity of care but also noted limitations: *"Body language, facial expression, these are all very subtle cues that we pick up the traits of understanding a situation."* There were reservations about the use of telemedicine in certain cohorts including elderly patients, new patients, those unfamiliar with technology and for end-of-life conversations. This was mainly due to limitations of telephone communication, although it was recognised this could be improved through use of video consultations. For other patients, HCPs cited the significant advantages of virtual clinics in patient convenience, maintaining patient routines, avoiding unnecessary travel, and better use of resources. It was largely considered that virtual and face-to-face clinics could be complementary and may co-exist in the future: *"It will never absolutely replace a clinic appointment and the dynamic is different……. But a proportion of what I would do with an outpatient clinic, it could certainly be done remotely."*

*ILFA Advocacy for ILD Patients*

In relation to ILFA's advocacy work, HCPs prioritised advocating for a clinical care pathway for lung fibrosis (average importance ranking of 2.3 on a 5-point scale, where 1 = most important) over access or awareness issues.

*Long Term Implications of COVID-19*

A number of HCPs expressed concern for the longer-term impacts on their mental health and that of colleagues: "*Staff may have post-traumatic stress disorder"* and *"There should be a debriefing or occupational health course put in place".* Others noted the long-term health implications for COVID and non COVID patients, changes in healthcare delivery and societal impacts on mental health and children's education.

## Discussion

This research indicates that providing care to patients during the COVID-19 pandemic had profound effects on HCPs' daily lives and emotional wellbeing. This is consistent with findings from a meta-analysis which showed that healthcare staff delivering frontline patient care in emerging virus outbreaks, including COVID-19, had greater levels of acute and post-traumatic stress and psychological distress than controls.[4] Our research revealed unmet needs for HCPs in the frontline of the COVID-19 patient care, including practical supports (e.g. childcare) and mental health training. Whilst HCPs were aware of available psychological supports, the tendency was to prioritise patient care over self-care. These findings have significant implications for occupational health services and HCP training. Based on findings from other pandemics, it has been suggested HCP psychological training should be based on models of adaptation and resilience, as a way of "future proofing" staff to cope with such situations as they arise.[5,6]

COVID-19 impacted HCPs' ability to provide ILD patient care. Whilst telemedicine was considered to have benefits in enabling continuity of care there were concerns regarding its feasibility for certain ILD patient cohorts, predominantly due to limitations of telephone versus face-to-face communication. Investment in video consultation technology, with appropriate training for both HCPs and patients, may improve the feasibility of virtual clinics for more ILD patient cohorts.[7] Although studies are needed on the long-term effects of replacing face-to-face consultations[8], data indicates telemedicine is generally well accepted by patients with chronic respiratory conditions, including ILD.[1,8-12] The use of home spirometry to enable continuity of ILD patient care was not reported in this research, but available evidence shows this approach is both feasible and valuable.[10-14]

Whilst some studies have found significant variability with home reported spirometry measures[15], it has been suggested this is due to insufficient patient instruction and/or technical problems, masked by blinding in trial settings.[8] Other studies have shown good correlation with clinic spirometry, particularly when attention is given to technique, with home spirometry associated with improvements in patient reported well-being and better predictability of disease progression than less regular clinic measurement.[10-14] With UK survey data showing almost 50% of patients with idiopathic pulmonary fibrosis believe the cancellation of appointments due to COVID-19 has impacted their health[16], virtual care may be more favourably received than HCPs expect.

ILFA wish to acknowledge the professional dedication and personal commitment of HCPs working with ILD patients during this unprecedented crisis. ILFA will continue to provide supports and training to HCPs so they may provide the best possible care for ILD patients and their families.

**Declaration of Conflicts of Interest:**

The authors have no conflicts of interest to declare.

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# Facilitative Mediation as an Alternative to High Costs in Medical Negligence Cases

Dear Editor,

General practitioners in Ireland have been the gatekeepers of Irish healthcare over the last 100 years. Indeed, most people's contact with the health service is through their GP. GPs in Ireland are responsible for more than 20 million consultations annually[1] but what happens when there is conflict or disagreement between patient and doctor. How is it solved?

Complaints can be reported to the medical council or to a solicitor through the civil process. However, complaints that go beyond the interface of GP and patient rarely end up in satisfaction for either party.

The civil route may also end up in both parties not being satisfied and there being no change in perceived behaviour which is often quoted as a reason to bring a case in the first instance[1].

Doctors find the complaints procedures emotionally difficult[2]. Suicide rates amongst doctors increase when there is a complaint. The rate of depression amongst doctors increases by 17 per cent while they are going through present complaints processes[3].

There are other issues with the fora chosen for complaints against doctors to be heard. They are lengthy and expensive.

Facilitative mediation offers an alternative. It is a flexible, voluntary and a confidential process. The parties retain control of the outcome. It will not help all complaints but if introduced early via the mediation act it may offer solutions to both parties and may even strengthen the relationship between patient and doctor.

Mediation is effective as an alternative dispute resolution process for a number of reasons. The mediator adds a new dynamic coated in neutrality to a conflicted relationship. The mediator will help the doctor and patient present their cases more effectively to the other side. The mediator can help the parties work through their deadlock. The soft skills of emotional intelligence are high in the mediator's weaponry and an important component of the dispute resolution process where there is a broken relationship between doctor and patient.

Research carried shows that it works[2] and that it works in a timely fashion. It is also cost effective[4].

The use of mediation in these disputes was included in the programme for government but needs buy in from all stakeholders.

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# Wasp Venom Immunotherapy: A 5-Year Case Follow Up

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Wasp Venom immunotherapy is used for preventing severe allergic reactions to wasp stings in people who had a sting reaction. Adults who have experienced an anaphylactic reaction have a 30-60% chance of recurrent reaction. Venom immunotherapy reduces the chance of severe anaphylaxis by 90%.[1]

We present the case of a 54-year-old professional florist, amateur triathlete, gardener and outdoor yoga instructor. She was referred by her GP in 2014 regarding her allergy to wasp sting that was contributing to her anxiety. She had suffered multiple severe allergic reactions in the previous four years requiring epinephrine injection, and on three occasions was hospitalised. She had no past medical history though she reported frequent chest infections as a child and was wheezy in adulthood. Blood tests revealed a high wasp venom specific IgE and she was subsequently diagnosed with asthma as evidenced by mild obstructive airflow pattern on Pulmonary function test and a positive methacholine challenge test. The risks and benefits of venom immunotherapy were discussed. Her profession, her enthusiasm for outdoor activities, and the severity and frequency of her reactions were considered, and she opted for venom immunotherapy. When her asthma was well controlled, we proceeded with subcutaneous wasp venom immunotherapy. During the initial phase, an increasing dose of the venom immunotherapy was given until the maximum tolerated dose was reached. She then continued a maintenance dose every 6 weeks for 5 years under the consultant supervision. She initially experienced nausea and some local swelling at the injection site, but these minor reactions gradually resolved as therapy continued. She has had two wasp stings since completing treatment in 2020, with mild local swelling and no systemic symptoms. Wasp venom specific IgE was rechecked and showed a marked reduction from 8.21 kU/L in 2015 to 3.66 kU/L in 2020 (normal range: 0-0.35kU/L).

About 15% of the Irish population have complex allergies requiring specialist care.[2] Systemic allergic reaction to wasp sting can be life threatening, and in some severe cases can be unresponsive to epinephrine. The aim of immunotherapy in allergy is to modulate the immune response to a culprit allergen.[3] This desensitisation mechanism showed a positive clinical and immunological response in our patient.

A literature search of 11 observational studies found systemic adverse reactions occurred only in 8/289 (2.8%) patients treated with wasp venom immunotherapy.[4] The National Institute for Health and Care Excellence (NICE) guidelines in the UK recommend wasp venom immunotherapy as an option for the treatment of IgE-mediated wasp venom allergy in people who have had a severe systemic reaction to wasp venom, or a moderate systemic reaction wasp venom and who have one or more of the following: a raised baseline serum tryptase, a high risk of future stings or anxiety about future stings. Treatment should be initiated and monitored in a specialist centre.[5]

By inducing an immunological tolerance to wasp venom, we can conclude that our patient now has a better quality of life when compared to 5 years ago.

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# Improving Surgical Consent

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Dear Editor,

Consent forms a basic principle on which surgical practice relies, and its use in patient care is both a clinical skill and departmental process which can be improved[1]. There is a legal and ethical obligation on health professionals to obtain valid informed consent before any surgical procedure. Failings in this area may result in patient dissatisfaction, as well as surgical error and more and more are becoming the scrutinised subject of legal claims. The need for consent is recognised in Irish and international law and the RCSI Code of Practice for Surgeons 2018[2] states that the onus is on doctors to familiarise themselves with the HSE National Consent Policy 2019[3] and ensure that your practice complies with the provisions of that policy.

In University Hospital Waterford, we carried out a closed loop audit of surgical consent practice in the orthopaedic department, with a view to evaluating our performance around surgical consent against national guidelines[2,3]. Our goal was to identify deficiencies in our practice and introduce and promote new strategies for achieving and maintaining national consent standards.

For the initial cycle of our audit, we critically reviewed 40 consecutive orthopaedic trauma consent forms from March 2020 against HSE and RCSI guidelines. Information collected included procedure details (operation name and laterality of procedure), clinician's/patient's details (printed name, signature, and date), adequacy of procedure-specific complications listed as well as legibility of forms.

Results from the initial audit were then disseminated to the department at our research meeting reinforcing the deficiencies highlighted. A few practical and simple measures initiated from this meeting included staff re-education about the importance of avoiding abbreviations and ensuring clear legible writing when filling out consent forms to ensure we are compliant with national standards. We also introduced a new surgical consent form in the department in July 2020 over a 1-month pilot period. This was developed in collaboration with the consultants, with the hope of improving in key areas highlighted from cycle 1 and improve our departmental consent standards.

Our cycle was then completed when we re-audited 40 of the new consent forms over 1 month. Results were compared with cycle 1 and again, presented at our departmental meeting. In cycle 2, 100% of consent forms had adequate documentation of risks, up from 50% in cycle 1. 15% had abbreviated form of procedure on consent form, down from 35%. 95% of forms were easily legible, which was up from 50%. Correct patient identification (written or labelled) was present on all consent forms across both cycles.

Through the process of an audit cycle, we saw improvement across all areas of surgical consent in our department with a pilot introduction of new consent form as well as simple staff education and emphasis on consent standards. Achieving high standards in the surgical consent process can lead to less surgical error and more informed and satisfied patients. This highlights the benefit of regular auditing of surgical practice and we believe it can be directly transferable to other surgical departments across the country.

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# Awareness of the Presence and Role of Physician Associates in the Irish Healthcare System

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To the Editor,

Since the graduation of the first Physician Associates (PA) from the Royal College of Surgeons Ireland in 2018, PAs are integrating into the Irish Health System. The majority are currently employed in surgical specialities. Our Department of Colorectal Surgery has recently employed the first Physician Associate in the South East of Ireland. We aimed to determine the level of knowledge surrounding the role of PAs in our local surgical community. We created a brief, anonymous five question survey which was distributed at Surgical Grand Rounds at University Hospital Waterford (UHW).

A total of 35 responses were obtained (25=NCHDs/Consultants, 9=Students, 1=Not Provided). 40% (n=14) correctly identified that PA stands for Physician Associate. 37.1% (n=13) correctly answered that PAs complete six years of post-secondary education. Of these, 2 appropriately specified the two years Masters nature of the qualification. Only two respondents correctly stated that there are between 20-30 PAs working in Ireland. 45.7% (n=16) identified the correct number of PAs currently working at UHW. Our last question was open ended and asked, 'What is the role of the PA?'. The majority (80%) of respondents correctly identified the role of the PA to include ward-based patient care. Seven specifically mentioned prescribing, however two incorrectly answered that PAs can prescribe.

Our results show that the majority of surgeons & surgical trainees are aware of the basic role of the PA. Knowledge of the finer details of the professional responsibilities of PAs are lacking. We have identified the need for increased awareness of the presence and specific roles of the PA in the Irish surgical community.

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# A Change in Practice from Performing Susceptibility Testing on Enterococcus Faecalis Isolates in Urine Cultures

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Dear Editor,

Enterococci are gram-positive cocci which are part of normal gut flora. They commonly cause urinary tract infections. The species *Enterococcus faecalis* (80-90%) and *Enterococcus faecium* (5-10%) are the most important in clinical practice. Ampicillin is the agent of choice for treatment of most *E. faecalis* infections and acquired resistant to ampicillin in *E. faecalis* is rare[1].

Urine samples submitted to the Department of Medical Microbiology in Galway University Hospital (GUH) from hospital inpatients and from General Practice are subjected to quantitative culture on bioMérieux CHROMID CPS Elite agar. After overnight incubation, isolates that are grown in pure culture at >10,000 colony-forming units per ml are identified via MALDI-TOF (matrix-assisted laser desorption/ionization time-of-flight) mass spectrometry. Susceptibility testing is performed on these isolates by the EUCAST (European Committee on Antimicrobial Susceptibility Testing) disk diffusion method. Final results are generally authorised and reported 48 hours after receipt of samples in the laboratory.

In 2019, *E. faecalis* was cultured from 1,162 urine samples. Susceptibility testing was performed and interpreted by the EUCAST disk diffusion method on all 1,162 isolates. All (100%) isolates were susceptible to ampicillin, 1,159 (99.7%) were susceptible to nitrofurantoin, and 1,086 (93.5%) were susceptible to ciprofloxacin. Based on the evidence that susceptibility is predictable for nitrofurantoin, which is the first-line agent for treatment of uncomplicated urinary tract infections on Antibiotic Prescribing - HSE.ie, and for ampicillin, the laboratory stopped performing routine susceptibility testing on *E. faecalis* from urine isolates in early 2020. Isolates are reported with a comment advising that the isolate is predictably susceptible to these agents. Urine isolates are retained in the laboratory for one week, so that susceptibility testing can be performed if specifically requested. This practice is an extension of existing practice with respect to *Staphylococcus saprophyticus, Streptococcus agalactiae* (Group B streptococcus) and *Streptococcus pyogenes* (Group A streptococcus) which are also reported with an interpretive comment without routine susceptibility testing except if associated with invasive infection. Annual surveillance susceptibility testing is performed on selected isolates to ensure with confidence that this practice is appropriate.

Susceptibility testing of clinical isolates should be performed when it adds value or is reasonably likely to add value. It should not be performed as a ritual. The principle of reporting isolates with predictable susceptibility is well established. The extension of this approach to *E. faecalis* in the microbiology laboratory in GUH makes final results available to guide treatment 24 hours earlier than was possible with routine susceptibility testing. The change described also reduces the environmental impact of the laboratory service (reduced use of materials including disposable plastics) and reduces consumable costs and workload. The saving in medical scientist time (estimated at 116-232 hours per year) is particularly important at present given the intense pressure to support diagnostic testing for COVID-19.

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# Maternal Morbidity and Mortality Reporting

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Dear Editor,

Maternal Morbidity and Mortality reporting standards in the Republic of Ireland are unparalleled internationally, and we must ensure that this trend is maintained and supported by healthcare professionals, the healthcare system and Oireachtas Éireann.

Since its' establishment in 2007, the National Perinatal Epidemiology Centre, based in University College Cork has been providing a perinatal epidemiological monitoring service, with the aim of translating epidemiological data and evidence-based practise into improved clinical services for women and babies.[1]

Recent reports have looked at rolling triennial data to allow continuous longitudinal comparison of rates here nationally, and also contribute to international data published by the National Perinatal Epidemiology Unit in the MBRRACE-UK reports.[2] However, looking further internationally, there are inconsistencies with and untimely reporting of similar information from other countries with developed obstetric services. For example, in the United States, the Centers for Disease Control and Prevention reports differing parameters than their European counterparts, and most recent publications are for 2014, over 6 years ago. Additionally, maternal mortality reporting in the United States had been paused for ten years due to concerns regarding inaccurate reporting. In Australia, there are comprehensive maternal mortality reporting systems, yet maternal morbidity reporting is inconsistent between states and does not allow for comparison nationally or internationally. Closer to home, from a European perspective, the Euro-Peristat was last published with 2015 data, also noting differences in reporting between countries which can limit the applicability of findings and thus recommendations.

The Sustainable Development Goals of the World Health Organisation[3] encompass an aim to reduce maternal mortality ratio to fewer than 70 maternal deaths per 100,000 and aim for national reductions of 2/3 from 2010 rates.

There must be a consistency in the reporting of these ratios, as well as expansion of these to include maternal morbidity reporting, given that rates of morbidity are increasing internationally, with reasonably static levels of maternal mortality in developed countries.

In order to maintain the high quality and standard of reporting here in Ireland to inform us nationally but allow us to contribute nationally, we must ensure that there is maternal morbidity and mortality reporting from within the healthcare services, not just limited to our maternity hospitals, but also morbidities and mortalities that occur in the community and acute hospital settings. Funding, strategic support and political support must be provided to ensure our contributions can continue to make us one of the internationally leading countries in the publication of this data, but also the provision of solutions to improve rates.

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# Internationalisation and the Opportunity to Enhance Specialist Training in Ireland

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Dear Sir,

I read with interest Dr Finn's letter, which highlighted the role played by medical schools in the internationalisation of higher education programmes[1]. Medical schools are indeed leaders on this front, not simply in their recruitment of international students, but in their endorsement of medical students to partake in the ERASMUS programme. Post-graduate training bodies should take note of the significance of internationalisation and the importance of creating links with international counterparts.

Without wanting to focus on the much-maligned consequences of permanent medical migration[2, 3], I comment instead on the pursuit of the post-specialist training fellowship. Many doctors who complete specialist training here in Ireland cast the eye outwards to seek clinical or research fellowships overseas. Having finished my specialist training in anaesthesia last July, opportunities beckon, and I will be taking up a clinical fellowship in France later this year.

An international fellowship provides an opportunity for doctors to work in health care settings with systems, services and resources very different to our own - some better, some far worse - and bring experience, perspective and skills back to the health service here. It may also be a chance to fulfil personal objectives or to pursue long-held humanitarian goals. Indeed, the Global Strategy for Human Resources for Health acknowledges an array of benefits of international medical migration[4].

It's common practice to pursue an international fellowship upon completion of specialist training. Some would argue that it's prompted by an outdated professional bias towards international experience[2], but I find myself motivated by a personal preference to uproot temporarily and challenge my linguistic skills (perhaps spurred on by a desire to finally follow in the steps of my sister who spent a semester at the Université de Montpellier as a third-year medical student).

Whatever the conscious or subconscious motivation, the paths to the U.K., North America, Australia and New Zealand are well-trodden by specialist doctors upon completion of their training; Europe, perhaps less so. It's no secret that Irish trainees compete successfully internationally on the basis of a highly educated and talented workforce, thanks in part to connections with diaspora and alumni across the world, but organising fellowships on your own can be a tricky, time-consuming, and sometimes fruitless endeavour.

While training bodies provide high-quality post-graduate training, they should enable its trainees to actively transcend potential training limits. Perhaps they could be persuaded to endorse more short-term transnational training posts or to play a bigger role in establishing post-training international fellowships through partnerships with institutions across the world, with the added benefit of the potential to successfully recruit equivalent foreign post-training specialists to our shores.

So, bravo to the medical schools supporting the ERASMUS programme and pursing the creation of links between medical schools across Europe. Maybe the prevailing conditions of transnational education programmes will set a trend for enhancing in-scheme international training opportunities and a more robust organising of post-specialist training fellowship pursuits.

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