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ROYAL ACADEMY OF MEDICINE IN IRELAND

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Abstracts from the Irish Thoracic Society Annual Scientific Meeting 2021
19th November 2021

(Virtual)

Disclosure Statement

All content was reviewed and selected by the Irish Thoracic Society Annual Scientific Meeting Faculty which held full responsibility for the abstract selections.

The operational costs of the Irish Thoracic Society Annual Scientific Meeting 2021 are funded with the support of a number of commercial bodies through unrestricted educational grants.

Irish Thoracic Society Annual Scientific Meeting
19 November 2021
Outline Programme

Friday 19th November 2021 – Online	
08.00 – 09.00	**Moderated Poster Review – Chairs: Dr Aidan O'Brien, Dr Michael Henry**
	1. ILD & Miscellaneous
09.00 – 09.30	**Guest Lecture I – Diffuse Cystic Lung Disease** **Dr Cormac McCarthy, Consultant Respiratory Physician, St Vincent's University Hospital Dublin** **Chairs: Dr Michael Henry; Dr David Curran**
09.45 – 10.45	**Moderated Poster Review - Chairs: Dr Katherine Finan; Dr Martin Kelly**
	2. Lung Cancer and Bronchoscopy/ Cystic Fibrosis and Pulmonary Infections
10.45 – 11.15	**Guest Lecture II – Joint ITS ERS Guest Lecture: Update in Pulmonary Rehabilitation** **Professor Thierry Troosters, Professor in Rehabilitation Sciences, KU Leuven** **Chairs: Ms Siobhan Healy; Dr John Kiely**
11.30 – 12.00	**Guest Lecture III - Gut Microbiome: Our Inner Friends with Benefits** **Professor John Cryan, Professor & Chair, Dept. of Anatomy & Neuroscience, University College Cork.** **Chairs: Dr Oisin O'Connell; Professor Barry Plant**
12.00 – 13.00	**Moderated Poster Review - Chairs: Dr Breda Cushen, Dr Silke Ryan**
	3. COPD/Asthma & Sleep
14.00 – 14.45	**Moderated Poster Review – Chairs: Dr Emer Kelly; Dr Katherine Finan**
	4. Covid-19
14.45 – 15.30	**Guest Lecture IV – Implementation of Lung Cancer Screening: Prime Time!** **Professor Harry de Koning, Professor of Public Health & Screening Evaluation, Erasmus University Medical Centre, Rotterdam** **Chairs: Dr Marcus Kennedy; Professor Terry O'Connor**
15.45 – 17.25	**5. Oral Presentations - Chairs: Dr Marcus Kennedy; Dr Desmond Murphy**
17.25 – 18.15	**Guest Lecture V – Bronchoscopic Interventions for COPD and Chronic Bronchitis** **Professor Dirk-Jan Slebos, Professor of Interventional Pulmonology, University Medical Centre Groningen, Netherlands** **Chair: Dr Liam Doherty; Dr Breda Cushen**

IRISH THORACIC SOCIETY POSTER REVIEW AND DISCUSSION

1. ILD

1.1 An Evaluation of 116 patients with Idiopathic Pulmonary Fibrosis (IPF) commenced on anti-fibrotic treatment therapies (Pirfenidone and Nintedanib) from Jan 2019 to June 2021

Bowen BR and Henry MT

Interstitial Lung Disease Service, Cork University Hospital, Cork

There are two approved anti- fibrotic treatments for IPF, pirfenidone (P) and nintedanib (N) but some patients need to stop or switch medications due to side effects. In large studies, both treatments slow the progression of IPF by 50 per cent based on lung function measurement. The aim of this study was to evaluate the medication treatments and side effects on our cohort of patients with IPF over a two and a half year period. Consecutive patients with mild/moderate IPF (FEV1 > 50% predicted, DLCO > 35% predicted) prescribed pirfenidone or nintedanib at the ILD clinic in Cork University Hospital were analysed.116 patients commenced on either treatment from January 2019 to June 2021 were assessed.

N = 116	No. Prescribed	Switched to other anti-fibrotic	Reason for switch		Full dose tolerated	Reduced dose
Pirfenidone	45 (38%)	10 (22.2%)	Six (13.3%) due to nausea, vomiting, indigestion, generally unwell, loss of appetite, lethargy, wanting to go out in the sun	Four (8.8%) due to decline in lung function	43 (95.5%)	2 (4.4%)
Nintedanib	71 (61%)	9 (12.6%)	Seven (9.8%) due to severe nausea, vomiting, stomach issues, diarrhoea, severe itching.	Two (2.8%) due to raised LFT's	55 (77.5%)	16 (22.5%)

With education, awareness and a patient centred approach, potential dose adjustment, monitoring and symptom management is crucial to maintain adherence to the therapies.

1.2 RB-ILD: More common than we thought?

Conor Cruickshank[1], Michaela Donaghy[2], Eoin Murtagh[3], Paul Minnis[3]

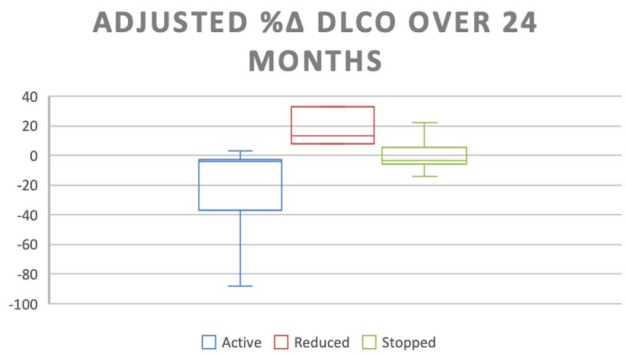
Interstitial Lung Disease Service, Antrim Area Hospital, Bush Road

Respiratory bronchiolitis-associated interstitial lung disease (RB-ILD) is a rare, inflammatory pulmonary disorder that occurs almost exclusively in current or former heavy smokers. A previous epidemiological study has reported the incidence of 0.04 per 100,000.1 The natural history is unknown, specifically whether interventions result in radiological or clinical improvement and what the long-term sequelae may be of this condition.

We reviewed all patients attending ILD clinic (712) over the last 18 months and identified 23 (3.2%) with RB-ILD satisfying clinic-radiological descriptors in addition to pathology where available. The crude incidence was estimated at 4.86 per 100,000. The average age at presentation was 56.1 years (35–77) having accrued 40.2 pack years and demonstrated a slight female predominance (12/23). All but one patient reported gradual onset of exertional dyspnoea, symptomatic wheeze and or persistent cough. In all cases high resolution computed tomography (HRCT) described centrilobular micronodules, ground-glass opacities, and peribronchiolar thickening. Additional emphysema was seen in 6/23. 11 patients underwent bronchoscopy for confirmatory pathology.

21 patients had serial data and were followed up for a median of 38.7 months (IQR 14.2–58.3). During this time 7 stop smoking, 6 reduced consumption and the rest continued actively smoking. Radiological improvement was seen in 2 patients both of which had stopped smoking. Adjusted DLCO percentage change was calculated for a 24-month period with patients characterised into "active", "reduced" and "stopped" tobacco use cohorts (Fig. 1). There was a small signal in terms of the relationship of ESR with DLCO when adjusted for co-existent emphysema.

A higher incidence than expected within the Northern Trust was identified. Active tobacco use was associated, not surprisingly to a greater percentage decline in DLCO over 24 months. Ongoing follow up of this cohort will be useful in identifying possible long-term sequelae particularly in terms of relationship to other interstitial pneumonias.



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1.3 Type II alveolar epithelial cell dysfunction associates with altered iron levels after bleomycin treatment

Ziling Huang[2,3], Sarah Kenny[1*], Suzanne M. Cloonan[1,2]

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**presenter*

Idiopathic Pulmonary Fibrosis (IPF) is a form of interstitial lung disease (ILD), which is characterized by progressive dyspnea and a decline in lung function. The exact cause of IPF is unknown, however, a prevailing theory is that recurrent microinjuries to alveolar type II (AEC2) cells results in an altered dysfunctional phenotype, which drives the pathogenesis of the disease. In conjunction with this, iron has also been suggested to play a role in the development of IPF, with recent studies showing alterations of iron levels in the lungs of individuals with IPF. This study aimed to investigate whether iron is altered in in vivo and in vitro experimental models of IPF. Here, we show that iron levels decline in AEC2 cells isolated from experimental IPF models. These reduced intracellular iron levels were associated with AEC2 cell dysfunction and altered expression levels of cell senescence markers. Furthermore, restoration of iron in AEC2 cells was also shown to prevent bleomycin-induced mortality and injury in vivo. These findings highlight the potential role iron dyshomeostasis plays in driving disease pathogenesis and presents the manipulation of iron levels through iron supplementation as an interesting potential therapeutic target.

1.4 Mode of Presentation, Diagnosis and Prevalence of Lymphangioleiomyomatosis in an Irish population

Evelyn Lynn[1], Marissa O'Callaghan[1], Lindsay Browne[1], Michael P. Keane[1,2], Cormac McCarthy[y1,2]

[1]*Department of Respiratory Medicine, St. Vincent's University Hospital, Elm Park, Dublin 4, Ireland*
[2]*School of Medicine, University College Dublin, Dublin 4, Ireland*

1.5 Computed Tomography morphometric analysis of patients with Idiopathic Inflammatory Myopathy related Interstitial Lung Disease correlates with Forced Vital Capacity

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[2]*Department of Respiratory Medicine, Cork University Hospital / University College Cork*
[3]*School of Medicine, University College Cork*

Sarcopenia is a prognostic indicator in COPD and IPF. Identification of sarcopenic patients may enable intervention to improve prognosis. Interstitial lung disease (ILD) is the most common non-musculoskeletal manifestation of patients with Idiopathic Inflammatory Myopathies (IIMs). This study investigated muscle mass in IIM, and its relationship to ILD disease severity.
IIM patients with ILD attending Cork University Hospital were identified. Morphomic analysis of muscle mass on CT thorax was performed using CoreSlicer, a web-based tool which enables semi-automated segmentation of muscle and fat. Bilateral Erector Spinae Muscle (ESM) and Pectoralis Muscle (PM) cross-sectional areas (CSA) were calculated. All morphomic data were correlated with lung function including forced vital capacity (FVC).
Data from 31 patients (16 male, mean age 69.8 years) were analysed. No relationship was established between change in morphomics between diagnostic (first) and second CT scans and change in PFTs over the same interval.
There were significant correlations between baseline and follow-up PM CSA, ESM CSA and FVC ($p=0.002$ $r=0.384$, $p=0.013$, $r=0.318$ respectively) when treated as separate data points. A negative relationship between the patients' albumin levels and their visceral fat at T12 was also found ($p=0.022$, $r=0.0215$).
ESM CSA and PM CSA may be an important parameter in patients with IIM related ILD due to their significant correlations with FVC.

1.6 Hypercalcaemia in patients with sarcoidosis in the South of Ireland

JL O'Sullivan, HI Ibrahim, LJ Walsh, TM O'Connor

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Sarcoidosis is a multisystem granulomatous disorder whose prevalence is high in the South of Ireland. Hypercalcaemia has been reported in 10–20% of patients with sarcoidosis at presentation. Increased intestinal calcium absorption induced by high serum calcitriol concentrations is the primary cause and heavy exposure to sunlight is a common precipitant. We sought to determine the prevalence of hypercalcemia in our patients with sarcoidosis.
We reviewed the data of 317 patients with a tissue-proven diagnosis of sarcoidosis who attended Mercy University Hospital, Cork, Ireland from 2005–2021.
Median age was 53y (20-94y), serum calcium was 2.41 mmol/L (1.92–3.1 mmol/L) and serum ACE was 56 IU/L (5–249 IU/L). Hypercalcaemia was present in 6.8% of patients (18/263) at the time of diagnosis, moderate hypercalcaemia (>3 mmol/L) was present in 0.8% of patients (2/263). Higher serum calcium was associated with younger age ($p=0.0229$), but no correlations with stage of sarcoidosis, serum ACE, lymphocyte count or vitamin D were seen. There were no differences in serum calcium according to month of diagnosis using non-parametric analysis of variance ($p=0.2836$).
Despite a high background prevalence of sarcoidosis in the South of Ireland, the prevalence of hypercalcaemia at the time of diagnosis was lower than internationally reported. Moderate or clinically significant hypercalcaemia was rare and seasonal variation had no influence on the level of serum calcium. The temperate climate in our region may explain the lack of seasonal variation in serum calcium in patients with sarcoidosis.

1.7 A single center audit of access to healthcare and disease monitoring in patients diagnosed with Idiopathic pulmonary fibrosis

Liam Carey[1,2], Siadbh Comerford[1], Helen Mulryan[1,2], Sinead Walsh[1,2], Anthony O Regan[1,2,3]

[1]*University Hospital Galway*
[2]*National University of Ireland Galway*
[3]*Royal College of Physicians Ireland*

Idiopathic pulmonary fibrosis (IPF) is a devastating condition that carries a prognosis worse than that of many cancers1. The aim of this audit was to quantify reduced access to healthcare in IPF during the COIVD pandemic. This was a single center review of the care patients with IPF received in the year 2020 in comparison to the year prior 2019.
There was no significant difference in the average planned interval follow up between 2019 and 2020 ($P=0.316$). The actual interval follow up was on average 4 months longer in 2020 than in the year

preceding (P=0.007). Patients were on average seen once less per year (P=0.003). When seen in 2020, they were more likely to be seen virtually (P<0.001). In 2020, patients were less likely to receive pulmonary function tests (P=0.001) and 6 min walks tests (P=0.042) than in 2019. On average, patients received less serum aminotransferase monitoring in 2020 with 2.8 (CI 1.693, 3.886) being performed in comparison to 4.4 (CI 2.5, 6.3) (P=0.48).
In conclusion, structured timely follow up is essential for IPF. We have demonstrated the effect of COVID 19 on these pathways. The effect on disease outcome will require monitoring going forward.

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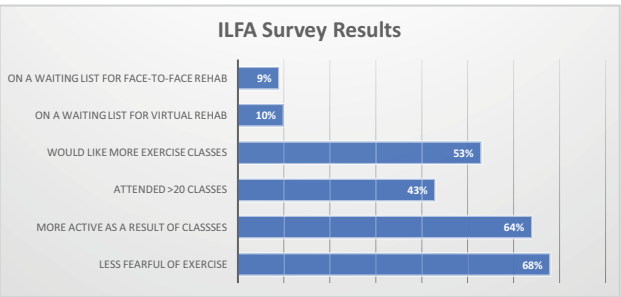
1.8 Survey of idiopathic pulmonary fibrosis (IPF) patients who participated in online group exercise classes to facilitate physical activity during Covid-19 pandemic

Gordon Cagney[1], Niamh Julian[1], Paula Ryan[2], Aidan O'Brien[2], Brian Casserly[2], Gemma O'Dowd[3], Nicola Cassidy[3], Danny Sheahan[4]

[1]HSE, Department of Physiotherapy, University Hospital Limerick (UHL)
[2]HSE, Department of Respiratory Medicine, University Hospital Limerick (UHL)
[3]Irish Lung Fibrosis Association (ILFA), Dublin
[4]Invisio Ltd, Co Wicklow

During the COVID-19 pandemic respiratory patients were cocooning at home with limited access to group exercise classes. In particular, IPF patients are fearful of undertaking exercise independently. To prevent deconditioning of this cohort, virtually run exercise classes were organised as part of a collaboration between UHL and ILFA.
The physiotherapist-led weekly exercise classes commenced in May 2020. Participants were invited to complete an online survey in May 2021 to assess the impact of the virtual classes and attitudes towards physical activity.
53 participants responded to the survey, 83% were aged 61+. All respondents were diagnosed with IPF, 6% being post-transplant recipients and 36% using oxygen all the time or most of the time. Only 11% of the respondents were on a public waiting list for either face-to-face or virtual pulmonary rehabilitation. A rating of 'excellent' was awarded by 73% of respondents for help in overcoming any anxiety about exercising online. Of the respondents, 64% reported being more active and 68% reported being less fearful about doing exercise since starting the online classes. See Table 1.
Overall online exercise classes have provided substantial physical and emotional benefits to IPF patients. The survey highlights the lack of pulmonary rehab availability to IPF patients.



1.9 The Irish Lung Fibrosis Association's Multi-Stakeholder World Café on Pulmonary Fibrosis Services in Ireland During Covid-19 and Beyond

[1]Nicola Cassidy, [2]Eoin Judge, [1]Gemma O'Dowd, [3]Tony Shone, [4]Anne-Marie Russell

[1]Irish Lung Fibrosis Association
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The Irish Lung Fibrosis Association (ILFA) hosted a virtual World Café forum to identify key stakeholders' experiences of healthcare services for pulmonary fibrosis during COVID-19 and priorities for future care. Eight groups of mixed patients, caregivers, healthcare professionals and industry partners discussed (1) Diagnostics, (2) Healthcare Supports, (3) Psychological Support, (4) Integrated Care. Rotating group discussions were facilitated and recorded by the eight leaders. The forum was anonymously evaluated.
Seventy-two people participated. Discussions revealed most patients experience significant delays in diagnosis; paucity of access to dietetic advice, palliative care, social support, and psychological services for patients and caregivers, and lack of integrated care across hospital and community-based services. The lack of education and emotional support at diagnosis causes distress for patients and families. Post COVID-19, a blend of face-to-face and virtual care, considering patient preference, could improve future healthcare access. Fifty-three participants (74%) completed the post-event survey. 96% agreed/strongly agreed that the World Cafe was helpful and 92% agreed/strongly agreed that they were able to get their views across during the event.
The findings of the World Café indicate that a National Clinical Programme for pulmonary fibrosis is required to improve diagnosis and ensure equity of access for healthcare supports.

1.10 Lung fibrosis patients identify deficiencies in vital healthcare support services

Cassidy N[1], Fox L[1,2], Brown L[1,3], Galvin L[1], Gemma O'Dowd[1], Danny Sheahan[4], O'Reilly KMA[1,2,5]

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[3]St Vincent's University Hospital, Dublin, Ireland
[4]Invisio Ltd. Wicklow, Ireland
[5]School of Medicine, University College Dublin, Ireland

The Irish Lung Fibrosis Association (ILFA) conducted an online survey from 19 July-02 August 2021 to determine the healthcare support needs and experiences of lung fibrosis patients.
Ninety-nine lung fibrosis and 13 post-transplant patients responded (53% male). 58% had a clinical nurse specialist (92% transplant recipients). 38% had been referred to a physiotherapist-led pulmonary rehabilitation programme, 25% to a dietitian and other services included social worker (9%), occupational therapist (8%), palliative care (6%), clinical psychologist (6%) and speech therapist (3%). Forty-five percent of patients had not been referred to any service. Post-transplant patients were more likely to be referred to a dietitian (69%), social worker (31%) and clinical psychologist (38%). For all services, most referrals happened more than 12-months after diagnosis. Patients' felt they would have benefitted from referral to the following specialties at the time of diagnosis- physiotherapist-led pulmonary rehabilitation programme (65%), dietitian (51%), clinical psychologist (45%). Specialties of benefit to patients currently are physiotherapy (53%), clinical psychology (48%) and dietetics (47%). The following are seen as

future needs -physiotherapy (85%), clinical psychology (67%), dietetics (67%), palliative care (65%) and occupational therapy (56%). This suggests that essential support services are lacking for lung fibrosis patients.

1.11 SCLERODERMA-RELATED ILD REVIEW

Dr Dominic Doyle, Dr Michael Henry

Cork University Hospital

CUH (Cork University Hospital) is a tertiary referral centre with a joint Respiratory/Rheumatology outpatient service. We have a large cohort of ILD (Interstitial Lung Disease) patients, and wanted to examine treatment outcomes in our scleroderma subset. Scleroderma is a prime cause of CTD-ILD (Connective Tissue Disease-associated ILD). Furthermore, ILD is the main cause of death in scleroderma.
We used our electronic health record to collect data on 10 randomly selected patients with scleroderma-related ILD. Data collected were: Age, Sex, Pre-treatment PFTs, Medication, Post-treatment PFTs (generally at 1 year), CT changes and Co-morbidities.
The mean age was 56. 6 out of 10 patients were female. 5 patients had documented Raynaud's phenomenon, 2 had pulmonary hypertension and 2 had gastro-oesophageal reflux. The mean pre-treatment FVC was 88% and DLCO was 69%. 5 patients were on treatment with CellCept, 2 with Rituximab, 2 with Nintedanib and 1 with Myfortic. 9 patients had stable post-treatment PFTs apart from 1 patient treated with Nintedanib who had a 30% drop in DLCO over 12 months. The mean post-treatment FVC was 90% and DLCO was 62%. 6 patients had stable CT appearances and 1 had minimal progression.
There are no conflicts of interest.

1.12 A Decade of Sarcoidosis in the Midwest

N. Logan, P. O'Regan, E. McMonagle, L. Casserly, A. O'Brien

University Hospital Limerick, Limerick, Ireland

The aim of this study was to assess the demographics, initial presentation, clinical course (including extra-pulmonary organ involvement) and outcomes of sarcoid patients in the Midwest over a 10 year period. Retrospective data analysis was performed on patients with either a clinical or histopathological diagnosis of sarcoid from a hospital database in University Hospital Limerick. Data collected on 213 patients revealed; 56% were male with a mean age 52 (range 24–91). On current available data, 165 were born in Ireland, 8 in the United Kingdom, 7 in Poland, 2 in Pakistan and 2 in Africa. Of note, a significant cohort of patients had their initial presentation with a service other than respiratory medicine, with only 30% initially presenting to the Department of Respiratory Medicine and 5% initially presenting to the surgical service with cervical and axillary lymphadenopathy and subsequent biopsy confirming sarcoidosis. Sarcoidosis is a disease with significant geographical and racial heterogeneity. We hope that our data from the Midwest will add to the available literature characterising this complex multi-organ disease.

1.13 Compliance with ATS/ERS guidelines for lung fibrosis reporting in CT thorax in University Hospital Kerry, and demographic distribution of pulmonary fibrosis in Kerry Group

A.Nabri, M.I.Khan, U.Khan, H.Arshad

Respiratory Department, University Hospital Kerry

Introduction: Audit is aimed to assess reporting practices of CT thorax in lung fibrosis based on ATS/ERS guidelines in University-Hospital-Kerry.

Method: Retrospective data collected from 01/11/2020 to 28/04/2021. Total 281 CT Thorax reports were surveyed. Total number of CT Thorax which reported fibrosis was 60.CT thorax reporting of lung fibrosis should be done according to one of one the following four categories.
UIP
Probable UIP
Indeterminate for UIP
Alternative diagnosis.
Results: Most of time fibrosis was reported as 'fibrotic changes' & 'fibrotic scarring' and none were reported as per ATS/ERS guidelines. Demographic distribution as below:

Age Group	Male	Female	Total
more than 80 years	5(8.3%)	10(16.6%)	15(25%)
60 -79 years	19(31.6)	17(28.3%)	36(60%)
40–59 years	5(8.3%)	4(6.6%)	9(15%)
Total	29(48.3%)	31(51.6%)	60

Discussion/ Conclusion: Lung fibrosis on CT thorax should be reported as per ATS/ERS guidelines as UIP pattern, probable UIP pattern, indeterminate for UIP pattern, and alternative diagnosis. This would consequently help with further management options.
85% patients with pulmonary fibrosis were above 60 years of age.
Recommendations: Guidelines recommendation sent to local radiology group. Re audit is planned after 6 months with second cycle to look for improvement and presentation of ATS/ERS guidelines regarding reporting pulmonary fibrosis.

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1.14 The correlation of ILD MDT diagnosis with explant histopathology in transplant recipients

Donal O'Malley, Marissa O'Callaghan, Lindsay Brown, Aurelie Fabre, Michael P Keane, Cormac McCarthy

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Interstitial lung disease (ILD) patients are a patient cohort increasingly requiring lung transplant, with current emphasis on identifying treatment options using multi-disciplinary team (MDT) discussion. We compared explanted histopathology of 14 patients with ILD with their pre-referral diagnosis to determine diagnostic accuracy of our referral pathway.
A list of all patients with an ILD diagnosis referred for lung transplant from SVUH between 2010–2020 was obtained from a clinical database. Pre-transplant referral diagnosis was determined by clinical assessment, radiological imaging, lung biopsy and/or MDT discussion. Histopathological assessment of explanted tissue was performed with pathologist blinded to the pre-referral diagnosis.
In 71% (n = 10) of cases pre-transplant diagnosis fully correlated with explant histology. 14% (n = 2) of cases partially correlated and 14% (n = 2) did not correlate with any pre-referral findings, with only one of these four discussed at MDT. 86% correlation was seen in cases discussed at MDT, with biopsy facilitating pre-transplant diagnosis in difficult cases.
The relatively high number of cases (almost 30%) that did not fully correlate with explant histopathology and improved figures seen with MDT discussion supports this pathway to enhance pre-transplant

diagnostic accuracy. The possibility of progression of ILD phenotype over time encourages continued MDT discussion of cases awaiting transplant.

1.15 The impact of virtual pulmonary rehabilitation programme on physical activity on people with idiopathic pulmonary fibrosis: a feasibility study

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Department of Physiotherapy, Mater Misericordiae Hospital, Dublin
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Department of Respiratory Medicine, Mater Misericordiae Hospital, Dublin

Lower levels of physical activity (PA) are associated with increased mortality in idiopathic pulmonary fibrosis (IPF) (Nishiyama et al. 2018). The aim of this study was to explore the impact the impact of a virtual pulmonary rehabilitation (VPR) programme on PA levels in people with IPF.
Patients referred to an interstitial lung disease specific PR programme were screened for eligibility. Baseline (BL) and post intervention (PI) outcome measures were collected: PA (Actigraph GT3x+), exercise capacity (either 6 min walk test (6MWT) or 1-min sit to stand (STS)) and health-related quality of life (HRQoL) (Kings Brief Interstitial Lung Disease (K-BILD)). The K-BILD total score ranges from 0–100, with 100 representing the best possible health.
To date 37 patients were invited to participate and 13 participants were recruited, results are available for 11 participants. Results are reported as mean (standard deviation). Age 73(11) years, 7 males;4 females. FEV1 2.3(0.3)L/min, FVC 2.9 (0.5) L/min. K-BILD: BL 53(8), PI 55(9), 6MWT (n=5): BL 362(127)m, PI 425(136)m, 1-min STS (n=6): BL 17(3), PI 22(6). Moderate-to-vigorous PA (MVPA): BL 18(20) minutes, PI 26(32), step count: BL 3561 (2984), PI 4473 (4110). VPR can result in increased PA in people with IPF.

References

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1.16 Interstitial Lung Disease Acute Exacerbation Audit within the COVID-19 Pandemic

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[1]Department of Respiratory Medicine Beaumont Hospital, Dublin

Interstitial lung disease(ILD) is a chronic progressive respiratory condition which impairs lung function and may place patients at risk of severe COVID-19 (SARS-CoV-2) infection.
A study conducted during the first wave of the COVID-19 pandemic showed a mortality rate of 49% for patients with pre-existing ILD who contracted COVID -19.
We conducted a single centre retrospective study of all patients admitted to Beaumont hospital during the period October 2020 to March 2021 with ILD exacerbation. We looked at their baseline demographics, pre admission therapy, as well as the cause of exacerbation and the mortality rate.
10 patients were identified who were admitted during this period. Seven (70%) were male with a mean age of 72. (Standard deviation). Nine patients (90%) were treated with antibiotics during their admission while only two (20%) of these had a confirmed isolated pathogen. There was a 30% all -cause mortality rate in the group study net, with one of these having tested positive for COVID -19 prior to their death. The audit demonstrates a similarly high mortality rate for patients requiring admission to hospital with an exacerbation of ILD.

1.17 Investigating mucosal associated invariant T (MAIT) cells in lymphangioleiomyomatosis (LAM)

Siobhán Boyle[1], Andrew Hogan[2], Amina Jouida[3], Michael P. Keane[1,4], Cormac McCarthy[1,4]

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1.18 Three dimensional characterisation of the fibroblastic foci and fibrosis in cryoprobe lung biopsies in idiopathic pulmonary fibrosis

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1. Cork University Hospital Cork
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Idiopathic pulmonary fibrosis (IPF) is a chronic fibrosing interstitial lung disease of unknown aetiology that may results from several sources of alveolar injury in genetically predisposed individuals. In the majority of cases, IPF is diagnosed by high resolution computed tomography, where the classic pattern of usual interstitial pneumonia (UIP), and those with probable UIP. Indeterminate cases of UIP may progress to a form sur lung biopsy. The median survival is 3 to 5 years from diagnosis. The hallmark histopathological feature is the fibroblastic foci (FF), which represents active fibroproliferation.
Micro-CT allows non-destructive imaging of tissue 3D microarchitecture, down to spatial resolutions, in the order of 1 to 10 µm. We performed micro-CT analysis of acquired cryoprobe assisted transbronchial biopsies of patients with IPF pre and post treatment with pirfenidone. The interval time between biopsies was 6 months. Initial work correlated micro-CT of whole paraffin-embedded samples of UIP tissue with the histological sections. We aim to quantify the level of fibrosis and morphology of the FF present in the biopsies, pre and post treatment.

1.19 A review of antifibrotic drug therapy in patients with Idiopathic Pulmonary Fibrosis (IPF) in St James's Hospital

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Idiopathic pulmonary fibrosis (IPF) is a chronic, progressive fibrosing lung disease with high mortality1. Two antifibrotic (AF) drugs Pirfenidone and Nintedanib have been licenced in Idiopathic Pulmonary Fibrosis (IPF) for use in Ireland since 2015, with the aim of slowing disease progression. However, they are associated with side-effects which can affect quality of life and result in discontinuation.
We performed a retrospective analysis of all patients with IPF commenced on antifibrotics our centre between 2017 and 2019, to determine reasons for treatment discontinuation and most common side effects.
Twenty-eight patients (mean age 73 years 39.2% female) were included with 43% (n=12) commenced on Nintedanib and 57% (n=16) commenced on Pirfenidone. During this 2-year period, 25% (n=7) had

treatment stopped (2 diarrhoea, 2 nausea & vomiting, 1 skin reaction 1 died), 21.4% (n = 6) had their treatment switched and 53.6% (n = 15) did not require a change to treatment. 66% (n = 4) of those patients that required a switch of their treatment reported nausea and vomiting. Side effects are common with antifibrotic treatment, further research will ascertain whether nursing interventions may reduce this rate.

[1]Raghu G, Rochwerg B, Zhang Y, Garcia CA, Azuma A, Behr J, et al.; American Thoracic Society; European Respiratory society; Japanese Respiratory Society; Latin American Thoracic Association. An official ATS/ERS/JRS/ALAT clinical practice guideline: treatment of idiopathic pulmonary fibrosis. An update of the 2011 clinical practice guideline. Am J Respir Crit Care Med 2015;192:e3–e19. [Published erratum appears in Am J Respir Crit Care Med 192:644.][1]

1.20 PCP prophylaxis in patients with interstitial lung disease (ILD) on steroids and/or other immunosuppressive medication

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1. https://doi.org/10.1002/14651858.CD005590.pub3

Infection with pneumocystis jirovecii is a significant cause of morbidity and mortality in immunocompromised patients. The most common manifestation is Pneumocystis pneumonia (PCP). (1) There are no international guidelines guiding PCP prophylaxis in patients with interstitial lung disease (ILD) requiring immunosuppressive therapy. However, prophylaxis is widely recommended in clinical practice.
The audit was a single-centre study looking at patients attending the specialist ILD clinic who were prescribed immunosuppressive therapy. Anonymous data was collected via the electronic healthcare record. Our data collection tool was pre-defined in conjunction with the rheumatology service.
19 patients were included. 8 patients had connective tissue disease-associated ILD (42%). 11 patients were prescribed dual immunosuppressive agents and five patients were prescribed triple therapy. 84% of patients were prescribed prednisolone (n = 16). 3 of the 19 patients were prescribed PCP prophylaxis (15.7%) and in all cases, co-trimoxazole was the drug of choice. The dose given varied across all three patients. PCP prophylaxis prescribing was exceptionally low. In the absence of international guidance, we created a simple prescribing flowsheet for PCP prophylaxis. This will help guide physicians which patients should be considered for PCP prophylaxis and the appropriate doses. We will follow up with a re-audit of our practice.

2. Miscellaneous

2.1 Accessory Muscles Support Respiratory System Performance in Young Dystrophin-Deficient mdx Mice

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Respiratory impairment is a feature of Duchenne muscular dystrophy (DMD), a genetic neuromuscular disorder. Peak inspiratory pressure-generating capacity is preserved in young dystrophin-deficient mdx mice, despite diaphragm muscle weakness and reduced electromyogram (EMG) activity[a]. We hypothesise that accessory muscle compensation limits ventilatory deficit in early dystrophic disease. Four-month-old male wild-type (n = 30) and mdx (n = 29) mice were studied. In urethane (1.7 g/kg i.p.) anaesthetised mice, diaphragm and scalene EMG activities were recorded during baseline and sustained tracheal occlusion producing maximal respiratory muscle activation. Diaphragm and scalene muscle function were examined ex vivo. Data (mean ± SD) were statistically compared using two-way ANOVA with Bonferroni post-hoc test.
Peak diaphragm EMG activity in mdx mice was reduced compared with wild-type (25.8 ± 13.8 vs. 15.7 ± 7.4 mV.s; P = 0.0009). Moreover, mdx diaphragm force was considerably lower (significant force loss at 25-150 Hz). In comparison, peak scalene EMG activity was equivalent in wild-type and mdx mice (1.74 ± 1.45 vs. 1.48 ± 0.58 mV.s; P = 0.5767). Scalene muscle force-generating capacity was preserved in mdx mice.
The early decline in diaphragm performance (decreased activation and intrinsic weakness), suggests that compensation provided by accessory muscles is critical to the support of respiratory performance in mdx mice, which may have relevance to DMD.

References

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Funding: Eli Lilly, Science Foundation Ireland (19/FFP/6628), The Physiological Society & Duchenne Parent Project (Netherlands).

2.2 Cost Effectiveness of a Clinical Specialist Physiotherapist in Respiratory Pathways in Tallaght University Hospital (TUH)

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In 2019 and 2020 a physiotherapy post in respiratory pathways was approved in TUH. The average length of stay of COPD patients was reduced by 2.16 days and discharges were accelerated. A permanent Specialist Physiotherapist was appointed in 2021 to progress the role. The physiotherapist screened patients on admission and accelerated discharges. Data was collected for patients reviewed from 2019 to August 2021. Condition, length of stay, and discharge destination were recorded. Data was anonymised, stored on a password protected excel document, and analysed. Referral pathways to Peamount Healthcare Respiratory Unit (PHRU) and outpatient services were improved.
1287 patients were reviewed in 2019 and 2020 (n = 554, n = 733), compared with 398 in 2021. 852 discharges were accelerated in 2019 and 2020 (n = 356, n = 496), with 217 in 2021. Transfers to PHRU increased from 102 in 2019, to 135 in 2020, and 108 up to August 2021. Patients spent 1779 bed days in PHRU in 2020, equating to a cost saving of €907,290 for TUH. In 2021, PHRU transfers have saved 1837 acute bed days; a cost saving of €936,870.
The Specialist Physiotherapist in Respiratory Pathways is extremely cost effective, with over €2,502,060 saved in acute bed days for TUH since 2019.

2.3 The Quantitative Measurement of Active Neutrophil Elastase in Sputum using a Point of Care Test and Reader Device

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Sputum neutrophil elastase (NE) is a biomarker of disease severity in respiratory disorders; with point of care measurement being of interest to assist in patient triaging. NEATstik® is a lateral flow test for the qualitative detection of sputum NE; however, the need for a quantitative device has been highlighted. This study aims to improve the quantitative potential of NEATstik® using a CMOS reader.
NE calibrants and sputum samples (n = 19) were prepared in NEATstik dilution buffer. Sputum samples were initially diluted × 10, then serially diluted. NE calibrants and samples were transferred (70 µl) to a NEATstik device; with a CMOS reader used to measure signal intensity. Sputum sol was analysed on ProAxsis' NE Activity based Immunoassay.
CMOS readings revealed a matrix effect, with statistical analysis (Kruskal–Wallis; Dunn's Multiple Comparison Test) indicating that a further × 8 dilution is necessary for the quantitative measurement of active NE, in sputum, with NEATstik. Moreover, a significant correlation (spearman r value = 0.86) was observed between NE levels when measured on both platforms.
Improved accuracy in the quantitative determination of sputum NE may assist in the identification of key disease thresholds, enabling preemptive medical intervention, thereby improving the standard of care received by patients with respiratory disease.

Conflict of Interest: the presenting author is an employee of ProAxsis Ltd.

2.4 Characteristics of Sarcoid Associated Pulmonary Hypertension in Ireland

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Sarcoidosis is a multisystemic disease of uncertain aetiology, that can affect the pulmonary circulation and right heart. Sarcoid associated pulmonary hypertension (SAPH) is an important and under-recognised complication of sarcoidosis, which carries significant morbidity and mortality. This is the first study describing the characteristics of SAPH in the National Pulmonary Hypertension Unit (NPHU) in Ireland.
This retrospective single centre study identified cases of SAPH, confirmed by right heart catheterisation, diagnosed between 2010 and 2020. Nineteen cases of SAPH were identified in this period and baseline characteristics are highlighted in Table 1.
The nature of SAPH was multifactorial and included a sarcoid related pulmonary arterial vasculopathy, left heart disease, hypoxic lung disease due to interstitial lung disease and extrinsic pulmonary artery (PA) compression due to progressive massive fibrosis. At SAPH diagnosis, 13 (68%) patients were prescribed sarcoid directed therapy. Pulmonary hypertension specific therapy was prescribed in 14 cases (74%) and comprised of monotherapy in 10 (53%) and double combination therapy in 2 (21%) cases. One patient required PA stent insertion for extrinsic compression and 1 patient underwent double lung transplantation.
This study described the phenotypes of SAPH in the NPHU and characterises the clinical and treatment characteristics of this cohort.
Table 1

Table 1 Highlights the characteristics of patients with sarcoid associated pulmonary hypertension in this study.

Baseline characteristics	
Patients, n	19
Sex: male n(%)	13(68)
Age (years) at SAPH diagnosis: mean ± SD	54 ± 12
Interval (months) between sarcoid diagnosis and SAPH: mean ± SD	184 ± 177
WHO functional class (FC), (n) I/II/III/IV	0/4/14/1
BNP (ng/L): mean ± SD	266 ± 419
6-min walk distance (meters): mean ± SD	312 ± 82
Risk stratification (ESC/ERS): n(%)	
Low risk	1 (5)
Intermediate risk	12 (63)
High risk	6 (32)
Right heart catheterization	
mRAP (mmHg)	6.7 ± 5.8
mPAP (mmHg)	39 ± 12
PAWP (mmHg)	12.5 ± 7
CO (L/min)	4.9 ± 1.5
PVR (WU)	6.9 ± 5.2
Pulmonary function tests	
FEV1 (%)	50 ± 18
FVC (%)	71 ± 24
FEV1/FVC	64 ± 14
DLCO	38 ± 16

SAPH Sarcoid associated pulmonary hypertension, *SD* Standard deviation, *WHO* world health organisation, *BNP* B-type natriuretic peptide, *mRAP* mean right atrial pressure, *mPAP* mean pulmonary artery pressure, *PAWP* pulmonary artery wedge pressure, *CO* cardiac output, *PVR* pulmonary vascular resistance, *FEV1* forced expiratory volume in 1 s, *FVC* forced vital capacity, *DLCO* diffusing capacity for carbon monoxide

2.5 Initial experience of Virtual Pulmonary Rehabilitation in a District General Hospital

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The COVID-19 pandemic has significantly impacted the delivery of the face to face pulmonary rehabilitation (PR) programme in the Western Trust. As a result, a virtual PR programme was introduced in order to meet the needs of the service users
With the support of the Trust IT department, educational videos featuring the current PR team were recorded and made available to participants on the Trust You-tube site. During the interactive section of the 6 week programme, the participants undertake exercise at home and were monitored virtually by the PR team.
Between January and July 2021, 24 participants completed the virtual PR programme (14 Female and 10 Male) with age range from 44–80 years. Of the total number of patients (39) pre-assessed, 32 patients opted for the virtual programme with 24 (75%) of these patients completing the programme. Feedback was collected via questionnaires – of the 24 questionnaires sent out, 22 (92%) questionnaires were completed. 16 patients (73%) who completed feedback found the virtual PR programme to be beneficial or very beneficial.

There is no doubt that the virtual programme has a role to play for a certain cohort of patients who undergo pulmonary rehabilitation.

2.6 Transitioning between oral and parenteral prostacyclin therapy in two patients with idiopathic pulmonary arterial hypertension

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Current therapies for pulmonary arterial hypertension (PAH) target the nitric oxide, endothelin and prostacyclin pathways to promote pulmonary vasodilation and reduced right ventricular afterload and failure. Agents that utilise the latter pathway include the prostacyclin analogue epoprostenol, treprostinil, iloprost and selexipag, a selective prostacyclin (IP) receptor agonist. As more medications become available, transitioning between agents is increasingly performed. While clear guidelines exist for initiation of individual drugs, equivalent guidelines for transition between medications are often lacking.
We describe two cases of transition from oral selexipag to subcutaneous treprostinil in patients with idiopathic PAH. Following an average of 34.5 months on selexipag, the decision was made to transition to parenteral prostacyclin due to NYHA functional class III symptoms and intermediate risk features. The patients were admitted for in-hospital transitions, whereby treprostinil uptitrations could be guided by clinical response and prostacyclin-related side effects. Overall, these transitions were well tolerated, taking place over an average of 11 days. Regarding long-term outcomes, Patient 1 experienced a progressive decline in symptoms and was listed for double lung transplantation, but died 2 years following this transition. Patient 2 remains stable with NYHA FC III symptoms, 4 years later.
Our patient-centred approach, guided by prostacyclin side-effects, was both safe and well-tolerated, providing an example of a safe method of transitioning from oral selexipag to subcutaneous treprostinil.

Figure 1
Figure 1 illustrates simultaneous up titration of subcutaneous treprostinil (red line) and down titration of oral selexipag (blue line) with complete discontinuation of oral selexipag by day 10 in Patient 1 and by day 12 in Patient 2. Titrations were not made on weekends, which accounts for temporary plateaus in titrations.

2.7 Smoking cessation in Irish written guidelines Audit

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Smoking is an important modifiable risk factor for communicable, non communicable disease and cancer. It is still prevalent despite the huge investments in smoking cessation including global campaigns. The prevalence of smoking in Ireland in 2019 is 19.4% for male gender and 14.8% for female gender, with overall prevalence of 17.1% (1). there was a reduction of around 6% in overall prevalence compared to 2012 (1). However, around 2 out of 10 adults are still smoking in Ireland. Smoking cessation has a significant effect in reducing many diseases prevalence as well as improving their prognosis. Therefore, emphasising this effect and mentioning smoking cessation in the guidelines of disease related to smoking is crucial. a recent Audit published on global guidelines in mentioning smoking cessation showed that 49% of the guidelines mentioned smoking cessation (2). This audit looked at the percentage of Irish guidelines, which are written for conditions linked with smoking, mention smoking cessation. 67% of the screened guidelines mentioned smoking cessation. The target is reaching 100% is still not met which we think is crucial and necessary in preventing and managing these smoking related diseases.

References

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Ekezie W, Murray R, Agrawal S, Bogdanovica I, Britton J, Leonardi-Bee J (2020) Quality of smoking cessation advice in guidelines of tobacco-related diseases: An updated systematic review. Clinical Med 20(6):551–559

2.8 Audit of thoracic activity in level 1 trauma centre

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Lung cancer resection for primary bronchial carcinoma is considered as indicator of level of thoracic activity in tertiary referral centre. We analyse the total thoracic activity related to lung cancer resection in level one trauma centre.
The purpose of study intended to look at over all thoracic activity & resources requirement related to lung cancer resections, chest trauma & benign lung diseases.
Our results clearly demonstrate that lung cancer resection only consists of approximately 46% of total thoracic activity. Hence it does not represent a true thoracic activity & resources requirement in comparison to centres focusing only on lung cancer resection.
264 thoracic cases have been admitted under cardiothoracic care in cuh It includes chest trauma (37 cases), Lung Cancer-Primary & Secondary (123), Benign lung disease (decortication, pleurectomy, Talc pleuredesis, pleural biopsies, Lung volume reduction surgery)-65, Diaphragmatic plication (2), Mediastinal mass/cyst excision -13, Pneumothoraxes & empyema not requiring surgery-24.

2.9 An Audit on the Extra-Pulmonary Screening in Biopsy-Proven Sarcoidosis Patients in the Mater Misericordiae University Hospital

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The clinical presentation of sarcoidosis can vary from an asymptomatic state to multi-system involvement. Early detection and timely treatment for asymptomatic extra-pulmonary disease can reduce unnecessary consequences. For this reason, the American Thoracic Society (ATS) have guidelines for the screening of extra-pulmonary involvement at the time of diagnosis.
This audit aimed to assess local practice in the Mater Hospital of screening for extra-pulmonary involvement in the biopsy-proven pulmonary sarcoidosis patients against the ATS guideline[1]. A total of 69 patients were diagnosed over the course of the audit timeline from January 2015 to January 2020. 38 patients were excluded as they were

referred externally for biopsy but followed up outside Mater Hospital. Table 1 summarises the findings from the audit.

Baseline Investigations	Number Total, N	Percentage (%)
Laboratory (Total N = 31)	25	81
•Renal Function	25	81
•Calcium	25	81
•Full Blood Count	25	81
•ALP		
Ophthalmology Assessment	7	23
ECG	14	45
Serum ACE (not recommended)	18	58
Suspected cardiac involvement (n = 4)	12	300
-Transthoracic Echocardiography (TTE)	2	50
-Cardiac MRI		

Table 1

This audit suggested that our adherence to the ATS screening guideline was variable with none of investigations achieved 100% standard. The implementation of ocular and cardiac investigations was poor with either under or over-ordered. ACE levels were still being ordered despite not being in the recommendation.

In conclusion, an increased awareness of the recommended screening tests is warranted in order to detect occult extra-pulmonary involvement and to ensure hospital resources are utilised efficiently.

Conflict of Interest: None.

2.10 Current Physiotherapy knowledge of temporary Tracheostomies in St. Luke's General Hospital, Kilkenny

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To evaluate current on-call Physiotherapists knowledge of patients with temporary tracheostomies and the role as a profession we play in the management of patients with tracheostomies within the MDT in St. Luke's hospital Kilkenny from ICU to ward level.

This will include a validated questionnaire for all on-call physiotherapy staff of pre-existing knowledge.

Educational presentations with audio will be completed by senior respiratory physiotherapist at SLHK for intra-internet access for all staff to complete within a 1 month timeframe and will be re-audited with an additional validated and reliable questionnaire. Once all results have been submitted, an appropriate SPSS format will be used.

These results will be presented to the working Tracheostomy Group of SLHK which includes antitheses, surgeons, clinical facilitators, nurses and AHPs for review and adaptation for current hospital policy and practice.

Current physiotherapist knowledge and practice with patients who have tracheostomies in place may vary across professional levels and areas of experience. As a result, standards of care may differ greatly within physiotherapists. This gives reason for development in this area in order to provide best practice, maintain standards of practice and ultimately provide patients with evidence based care (Bonvento et al. 2017).

Using Physiotherapy as the example, the hope would be to generate change to practice across the MDT for overall improved care and reduced length of stay in an acute setting (Garrubba et al. 2009).

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2.11 A retrospective analysis of the current management and investigation of pleural effusions at the Royal Victoria Hospital Belfast from the 1st February 2020 to the 31st January 2021

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Previous data has suggested around 7.2% of patients admitted to hospital with community acquired pneumonia develop a complicated parapneumonic effusion or empyema. [1]

A retrospective analysis of patients diagnosed with parapneumonic effusion or empyema between 1st February 2020 and 31st January 2021 was performed assessing patient demographics, co-morbidities, microbiology, time-to-drain and outcomes.

Sixteen patients were identified (n = 11 males, mean age 57, mean length of stay 25.6 days); 12 were diagnosed as empyema, three as parapneumonic effusion (2 managed conservatively), one chylothorax. Median time to drain was 3 days (range 1–17); 7 patients required more than one drain. Of the 32 total drains, 15 were inserted by Interventional Radiology, 10 by Respiratory and 7 by Thoracics. Nine patients had positive microbiology and antibiotics rationalised accordingly. Nine patients had a pre-existing respiratory co-morbidity. The majority of patients had clinical and radiological resolution; 1 patient was subsequently diagnosed with a mesothelioma.

There is a variance in time to drain in patients with suspected empyema which may influence identification of pathogen and subsequent ability to rationalise antimicrobials. Reliance on the multidisciplinary team is highlighted as is the complexity and prolonged length of stay of these cases with the need for multiple interventions for some patients.

References

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2.12 Pulmonary function test ordering practices in the COVID-19 era – a clinical audit at Beaumont Hospital

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The PFT ordering process in Beaumont Hospital involves a paper-based referral and filing system. The paucity of clinical information required on the card precludes triaging of requests. We audited a random selection of PFT orders in 2020 to identify areas for quality improvement.

2751 PFT studies were performed during the audit period in 2020, compared to 4658 studies in 2019; a 41% reduction in activity. 281 (10.2%) were reviewed. 55 (19.6%) referrals did not request a specific test or detail a specific indication, leading to suboptimal testing.

These incomplete requests were more likely to come from non-respiratory referrers than from within the respiratory department (40% vs 11%). We also found that there was significant repetition of PFTs. Of those patients who previously had PFTs, 83.2% were returning within 2 years of their prior study. A significant proportion (49.8%) of tests were normal, comprising 33% of respiratory requests vs 55.4% of non-respiratory requests.
The impact of the COVID-19 pandemic has led to reduced capacity for PFTs, increased demand for testing, and significant growth in waiting times. The implementation of an electronic ordering system will permit triaging of requests, facilitate online access to results, and improve the efficiency of the PFT service.

2.13 A Clinical Audit on the Use of Respiratory Physiotherapy Outcome Measures on Inpatients in St. Luke's General Hospital

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The aim of this study was to audit on the use of respiratory physiotherapy outcome measures in St. Luke's Hospital against the European Region World Confederation for Physiotherapy (ERWCPT) Standards[1]. Charts of inpatients referred for respiratory physiotherapy were identified and audited. The initial audit was carried out in September 2019 (n = 18) and the repeat audit in October 2020 (n = 12).
Following the initial audit, an action plan was implemented that included a literature review, an education session for physiotherapists and a redesign of our Respiratory Physiotherapy Assessment Form.
In the initial audit, 5.5% of charts had respiratory physiotherapy outcome measures, however this improved to 83.3% in the repeat audit. The Modified Medical Research Council Dyspnoea Scale and the Breathlessness Cough and Sputum Scale were the two most common outcome measures used in the repeat audit (both in 75% of charts).
Outcome measures which have psychometric properties, rather than physiological measures like oxygen saturation, are more favourable in determining the effectiveness of physiotherapy treatment as their validity and reliability have been well-researched, they have minimal clinically important differences and can be patient-centred if using a patient-reported outcome measure. This project ensured that ERWCPT Standards were met with an emphasis on patient-centred care.

References
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2.14 Improving the assessment, prescription and follow up of inpatients newly commenced on home oxygen therapy in an acute hospital

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A local clinical audit demonstrated that the processes surrounding the provision of home oxygen to patients on discharge from hospitalisation was uncoordinated. This prompted a quality improvement (QI) project with the aim being to increase the adherence of staff to oxygen prescribing guidelines for all inpatients prescribed home oxygen from 0 to 100% over a 12-month period.
The project team used QI methodology which included stakeholder engagement, process mapping and development of a driver diagram to illustrate our 'theory of change' and to plan improvement activities. We used a number of Plan Do Study Act cycles to test and implement changes surrounding the assessment, prescription, education and follow up of inpatients commencing home oxygen therapy on discharge.
All home oxygen referrals were directed through a Respiratory Assessment Unit and a home oxygen care bundle (7 standards) was developed collaboratively with staff. The median number of oxygen standards met for each patient was 7 (range 6–7) by project completion and has been sustained in the months following the project (Fig. 1)
Use of quality improvement methodology led to standardisation of care for patients prescribed home oxygen on discharge from hospitalisation. The principles used will be used to inform similar QI initiatives for patients commencing home non-invasive ventilation.

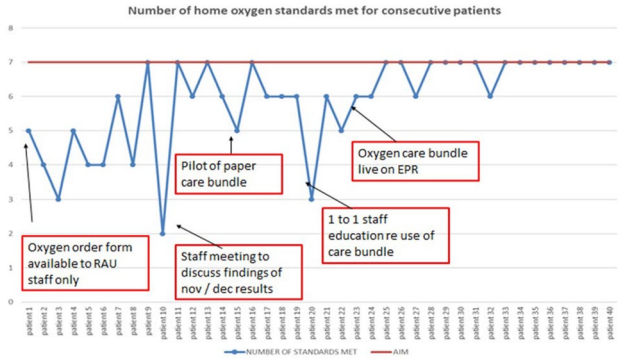

Fig. 1 – Run Chart demonstrating the number of standards relating to home oxygen ordering process being met in consecutive patients over 12 months

2.15 Impact On Hospital Length of Stay of A Respiratory Assessment Unit

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A dedicated Respiratory Assessment Unit (RAU) was opened in Beaumont Hospital in January 2021. The initial role of the RAU, which is composed of 9 single rooms, was management of COVID-19 inpatients. Its utilisation has evolved with the changing demands of the COVID-19 pandemic.
The RAU provides an opportunity to potentially decrease patient length of stay and facilitate ambulatory care of common respiratory conditions as well as facilitating access to more rapid diagnostic testing. We reviewed the records of 79 patients assessed in the RAU from July to August 2021.
49/79 patients (62%) were under the care of the respiratory team with the remaining 30 patients under another medical or surgical team. 16/79 (20%) patients were admitted directly to RAU from respiratory clinic electively or urgently. Total hospital length of stay was significantly less in this cohort compared to those admitted via ED or transferred from another inpatient ward and there were 2 (12.5%) same day discharges.
42/79 (53.2%) patients were admitted with a non-respiratory diagnosis and 19/79 (24.1%) underwent specialist respiratory intervention. 11/79 patients (13.9%) required use of non-invasive ventilation or high flow nasal cannula.

2.16 Improving Awareness of Monitoring and Education of Patients Prescribed Methotrexate in Respiratory Care

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Sligo University Hospital, SAOLTA University Healthcare Group

Methotrexate is a dihydrofolate reductase inhibitor used to treat a variety of autoimmune conditions. It has significant potential for adverse events. In respiratory medicine, BTS guidelines recommend its use to treat steroid dependent sarcoidosis. As use in a general respiratory clinic is rare, there can be a lack of formal monitoring systems in place. We reviewed patients receiving methotrexate treatment for sarcoidosis in SUH respiratory clinic between 2018 and 2021 and assessed their adherence to blood monitoring. We subsequently created a questionnaire and assessed their knowledge of important adverse events and precautions. Of the six patients we identified, five did not meet the Health Products Regulatory Authority (HPRA) recommended blood monitoring requirements of three-monthly complete blood count and liver function tests. Only four were aware of the requirement for blood monitoring. Four were not aware of issues surrounding fertility or restrictions on vaccinations. Only three patients were aware of the risk of liver damage, and only one was aware of potential myelosuppression. None were aware of significant interactions with other medications.
Adapting pre-existing patient information leaflets and blood monitoring booklets developed by the local rheumatology service, we will now introduce these for use in our patients, aiming to improve patient education and monitoring.

2.17 Is O2 too much of a Go To? An Audit of our Clinical Practice

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Oxygen is considered to be a drug, and as such should be prescribed. Across the UK only 57% of patients had a valid oxygen prescription.[1] The objective of this study was to audit current practices and evidence based knowledge among NCHDs, nursing staff and physiotherapists in St. Luke's General Hospital. The overall aim of this project was to prevent incorrect oxygenation and maintain oxygen prescription practice within best practice guidelines.
This is a mixed method study. 1) A chart audit took place (n = 98) Inclusion criteria: Medical patient receiving oxygen therapy and admitted > 24 h. 2) A survey was undertaken among medical professionals (n = 51)
It showed 52% of patients were receiving oxygen therapy without any form of written order, parameter or prescription. This percentage is higher than the UK.[1] Sixty-five percent of staff stated that all patients should have oxygen parameters charted. 85% of staff understood the necessary documentation that should be prescribed.
Oxygen prescription remains complex for a drug that is administered so frequently. It is associated with greater error than that seen with antibiotics. Education should stress more prudent prescription and use of oxygen as is can be detrimental to many of the patients who receive it.

2.18 Establishment of a Tertiary Care Respiratory Assessment Unit

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A purpose built Respiratory Assessment Unit (RAU) opened in Beaumont Hospital in January 2021 comprising of 9 single rooms.
The RAU provides early specialist input for a range of respiratory conditions via a multi-disciplinary team of respiratory doctors, nurses, ANPs, and physiotherapists. The RAU supports both scheduled and unscheduled inpatient and ambulatory care, including COVID-19 assessment and delivery of advanced respiratory supports.
Over 6 months, 280 patients' RAU admissions were evaluated, including 114 (40.7%) with COVID-19 pneumonia. Initially the RAU treated patients with COVID-19 presenting with acute respiratory failure and provided advanced respiratory supports, such as non-invasive ventilation. Early specialist respiratory input for patients presenting to ED supported inpatient and ambulatory pathways for COVID-19 care.
Of the total 280 patients, there were 232 (82.85%) patients transferred from ED, 25 (8.9%) elective admissions, 8 (2.85%) OPD admission, and 15 (5.35%) direct ED admissions.

2.19 An Integrated Respiratory Service—from paper to patient and beyond

Agnes Barry, Rosaleen Reilly, Stanley DW Miller

Meath Integrated Respiratory Service (MIRS), Our Lady's Hospital, Navan, Co Meath

Slaintecare funding for the Meath Integrated Respiratory Service (MIRS) commenced in March 2021. MIRS aims to provide both local chronic respiratory care and a reduction in acute hospital admissions for patients in County Meath. We describe development of the service. Initial weeks were spent identifying service requirements and creating an implementation timeline. Administrative and clinical accommodation, governance structures and equipment were agreed. Primary and secondary care stakeholders collaboratively identified service needs and challenges. Priority areas and benchmarking were identified through audit.
Documents describing model of care, policies, pathways, patient assessments, evaluation framework and reporting structure were developed. A single referral pathway was established. We promoted our service and delivered education to all healthcare professionals.
Service implementation occurred simultaneously in acute, home and outpatient settings. Our expertise allows for supportive discharge and admission avoidance. Pulmonary rehabilitation is delivered in virtual and face to face format. Regular multidisciplinary meetings allow for clinical supervision, shared expertise and learning. Key performance indicators (KPIs) are captured on our activity database.
MIRS now successfully provides Integrated Respiratory Care for Co. Meath. We have learned the benefit of careful planning, patience and persistence. We provide further advice for others initiating similar services highlighting barriers with suggested solutions.

2.20 A Survey On The Use Of Adult High Flow Nasal Oxygen in Cork University Hospital

Siobhán Healy[1], Annemarie Fitzgerald[1], Avril Hallahan[1], Maeve O'Grady[1], Desmond Murphy[1], Michael T Henry[1]

[1]*Cork University Hospital*

Usage of high flow nasal oxygen (HFNO) continues to expand. However there is limited information on usage in acute hospitals. This survey reviewed HFNO usage in Cork University Hospital (CUH).
CUH Airvos (HFNO device) were tracked by physiotherapists from March 2020 to March 2021. Information on machine usage, locations and settings was captured. A detailed patient (non-covid) database was completed for fourteen weeks from July to Oct 2020.
Airvos were tracked as being in use 3397 times. Table one shows the settings used. The average daily number of Airvos used was 13 (maximum 43). There were 124 patients on Airvo during the fourteen weeks. The respiratory ward had the highest number of patients; 46% of patients moved ward/room while on Airvo; median Airvo duration was 4 days and median length of hospital stay was 25 days. Physiotherapy was the discipline that most commonly set it up, initiated weaning and discontinued Airvo. Airvo outcome: 74% successfully

Table 2 Airvo settings

Airvo Settings		
	Settings	% Of total Airvos in use
Oxygen percentage	> 60% O2	11.7
	40–60% O2	47.17
	< 40% O2	41
Flow rate	> 50 Lpm	13.4
	30–50 Lpm	82.4
	< 30 Lpm	4.2

weaned, < 1% RIP, 14% palliation/comfort care. Hospital outcome: 75% discharged from CUH, 25% RIP in hospital (see Table 2).
Our data provides a snapshot of current acute HFNO use and outcomes and identifies some areas for improvement, e.g. implementing a guideline for intra-hospital transfer of patients on HFNO.

2.21 Attitudes and Dimensions Influencing Physical Activity in Pulmonary Hypertension Patients

Ciara McCormack[a*], Sarah Cullivan[b], Brona Kehoe[c], Noel McCaffrey[d], Sean Gaine[b], Brian McCullagh[b], Niall M. Moyna[a], Sarah J. Hardcastle[a,e]

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2.22 A composite tissue-engineered biomaterial scaffold with refined mechanical properties and vascularisation for tracheal regeneration

Tehreem Khalid [1,2,3], Mark Lemoine [2,3,5], Sally-Ann Cryan [1,2,3,4,5], Fergal J. O'Brien [2,3,4,5], Cian O'Leary[1,2,3]

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[2]*Tissue Engineering Research Group, RCSI, Dublin, Ireland*
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3. LUNG CANCER BRONCHOSCOPY

3.1 Real world Experience of Single Use Flexible Bronchoscopy over Six Months in a Tertiary Centre

Anne-Marie Sweeney[1]*, Grace Kavanagh[1]*, Patrick Coghlan[1], Hammad Danish[1], Fernando Gomez[1], Barry Plant[1], Michael Henry[1], Marcus Peter Kennedy[1]

[1]*Department of Respiratory Medicine, Cork University Hospital*
*=joint first authors

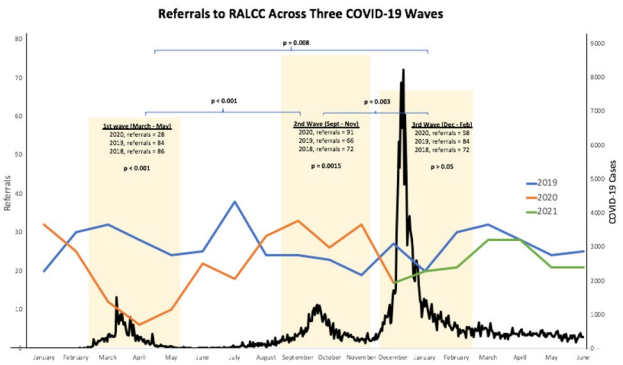
The development of single use flexible bronchoscopes (SUFBs) has accelerated in recent years, with the reduced risk of infectious transmission and reduced need for endoscopy staffing particularly advantageous in the COVID-19 pandemic era. We trialled the routine use of The Surgical Company Bronchoflex© SUFB in a tertiary bronchoscopy service.
139 procedures were performed by five consultants from January to July 2021. The majority were carried out for infection (45%) and malignancy (32%). Most were performed in the endoscopy suite, however 8 procedures took place in ICU, 6 at ward level and 3 in theatre as an adjunct to a rigid bronchoscope. The SUFBs were used across a range of procedures including bronchoalveolar lavage, brushings, endobronchial biopsy, transbronchial needle aspiration, argon plasma coagulation, cryobiopsy and stent placement.
85% of procedures were reported to have no complications related to the use of a SUFB with a user satisfaction score of above 4/5 in 89% of cases. Issues with image quality (6%) or suction (5%) meant the reversion to reusable bronchoscope in some cases.
Overall, the use of SUFBs has significant benefits in patient care with the ability to use the SUFB across a range of indications and procedures with high user satisfaction.

3.2 Lung Cancer Detection During COVID-19 Pandemic

D Halim[1], S Foley[1], A Asis[1], CR Cayabyab[1], C Higgins[1], F Colhon[1], D Burnei[1], RK Morgan[1], ME O'Brien[1]

[1]*Department of Respiratory Medicine, Beaumont Hospital, Dublin*

Lung cancer is the leading cause of cancer-related mortality worldwide and delayed diagnosis is associated with poor outcomes. The COVID-19 pandemic has caused a considerable amount of strain on all healthcare services internationally. Our aim is to establish the effects of COVID-19 pandemic to the lung cancer detection in Beaumont Hospital across the 3 waves.
We compared the number of lung cancer referrals and lung cancer diagnoses made via both the in-patient and out-patient pathways throughout COVID-19 pandemic compared to similar periods in two years preceding; 2019 and 2018. Each wave lasted approximately 3 months each.
The number of referral to Rapid Access Lung Cancer Clinic (RALCC) saw a significant reduction during the first wave, with significant increase during the second wave and non-significant change in the third wave when compared to previous years. The difference in the number of referral between 3 waves were all significant. Despite the variability in each wave, all referrals were seen in RALCC within the targeted 10 working days. Diagnosis of lung cancer from RALCC trended similarly to the number of the referrals. Total diagnoses remained comparable to previous years but with increased proportion of late stage diagnoses. Interestingly, inpatient diagnoses of lung cancer in 2020 almost doubled compared to previous years (n = 71 vs 44 & 40), of which 90% were in advanced stage.
These results demonstrated that lung cancer detection was delayed during the first wave of COVID-19 pandemic with compensatory increase in referral and late stage diagnosis in the second wave.



Graph shows the trend of lung cancer referrals during COVID-19 pandemic

3.3 Accuracy of Multidisciplinary Team Consensus for Lung Cancer Resection in the absence of pre-operative histology: A five-year experience

Jack Whooley, Rebecca Weedle, Alexandra White, Alan Soo

Department of Cardiothoracic Surgery, University Hospital Galway

Lung resection remains the cornerstone of treatment for non-small cell lung cancer (NSCLC). British Thoracic Society (BTS) guidelines recommends pursuing pre-operative diagnosis and staging as much as possible. In the absence of pre-operative histological diagnosis, surgical treatment can be offered in conjunction with multidisciplinary team (MDT) and patient consensus. We aimed to assess the accuracy of our thoracic MDT in recommending treatment for those with suspected NSCLC in patients who do not have a confirmed pre-operative histological diagnosis.
A retrospective review was performed of patients undergoing lung resection at the recommendation of the thoracic MDT for suspected NSCLC in our unit between May 2016 and August 2021. Patients with confirmed histological diagnosis were excluded from analysis.
227 patients underwent lung resection without pre-operative histology in the five-year period. 54.6% were female, mean age was 67.4 years. Overall, the positive predictive value of the MDT team consensus for lung malignancy in the absence of pre-operative histology was 89.4% (true positive n = 203/227.)
Performing lung resection in the absence of pre-operative histology is reasonable if done in conjunction with MDT consensus and appropriate patient counselling, in keeping with the British Thoracic Society Guidelines.

3.4 Vats Vs Thoracotomy for primary lung cancer, single surgeon audit

Daniyal Arshad, Muhammad Nadeem Anjum, Tanya Chandwani, Mr Kishore Doddakula

Cork University Hospital

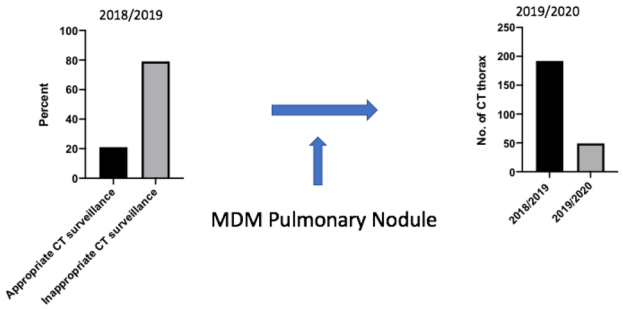
During the covid period, we evaluated all cancer resections undergone in a tertiary referral centre.
The purpose of study was to evaluate the rate preoperative histological diagnosis and its impact on postoperative recovery and resources requirement.
All patients following discussion in lung cancer Multi-disciplinary meeting subjected to pulmonary resection were included. Approximately 21% patients did not have preoperative histological diagnosis and required frozen section (Histopathology) prior to definite procedure e.g. completion lobectomies. The usual reasons for not having preoperative histological diagnosis are;
Emphysematous lungs (high risk of pneumothorax during CT guided biopsy).
Proximity of lesion to major vascular structures.
Technically difficult areas to biopsy(behind the scapulae, ribs)
Small nodules/Ground glass lesion.
Approximately 80% of the patients requiring thoracotomy were patients who needed completion lobectomy following VATs wedge resection as a follow up procedure. There is one day less hospital stay for VATs group. Systematic lymphadenectomy was performed in all resections.
Our study reveals lack of histology prior to surgery does impact on length of surgery and hospital stay. Furthermore it does carry a risk of patients requiring second procedure.

3.5 Dedicated Lung Nodule Services Reduces Need for Follow up Imaging

Walsh S, Cogan G, Counihan I, Quinn A, Hassan T

Our Lady of Lourdes Hospital Drogheda

The management of solitary lung nodules using the BTS guidelines 2015 can increase the detection rate of early-stage lung cancers and reducing unnecessary CT surveillance. To date, there is a lack of dedicated nodule services in Ireland. We audit the impact of a dedicated service in Our Lady of Lourdes Hospital.
CT surveillance for solitary lung nodules performed 15 months before and after the introduction of a dedicated nodule service were compared. Retrospective NIMIS review were used to capture nodules detected incidentally. The MDM nodule service was attended 6 weekly by a respiratory physician and radiologist with outcomes sent to the primary physicians including the rapid access clinic if deemed appropriate.
79% of CT surveillance were deemed inappropriate (either unnecessary or outside the interval window as per BTS Guidelines) before the service was introduced (Fig. 1). This reversed to over 80% of appropriate surveillance thereafter. The number of CT surveillance performed after was also reduced by 74% following the service (Fig. 1).



A dedicated nodule service is effective in reducing CT surveillance which might alleviate both unnecessary waste for the hospitals and anxiety to patients.

3.6 An Audit of Endobronchial Ultrasound Services for Detection of Lung Cancer in University Hospital Galway 2020

Neil Hyland[1], Dominic Doyle[1], David Breen[1]

University Hospital Galway

Endobronchial Ultrasound (EBUS) is an important method of detecting of lung malignancies. Efficient access to high quality EBUS services is important to reach targets set by the National Health Service (NHS) Lung Cancer Expert Group. This study was carried out as no such audit had previously been undertaken in University Hospital Galway.
A three-month period was examined from June to August 2020 with fifty patients included. Data was extracted from EBUS records and compared with Key Performance Indicators (KPIs) set by the NHS Lung Cancer Clinical Expert Group.
Results recorded were KPIs being met or not. The majority were met (13/17) including: Pathological results received within five days (> 85), total pathology pathway time under ten days (> 85%), pathological confirmation rate in advanced disease (> 90%) and adequate tissue for genetic marker testing (> 90%).
KPIs not met included: Procedure within seven days of referral (> 85%), complication rate (< 5%) and procedures with node stations inadequate (< 10%).

Conclusions: The major shortcoming was the timing of procedure from referral indicating limitations in access. The complication rates were slightly above the KPI standards, but just two out of fifty total and no major complications were seen. Repeat audit is crucial to examine changes in the intervening time.

3.7 Proteomic Analysis Of The Nanoparticle Biomolecular Corona Formed In The Plasma Of Lung Cancer Patients And Healthy Controls

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A challenge posed by lung cancer biomarker screening is that target proteins have low molecular weights and are too difficult to isolate by standard mass spectrometry (MS). Using nanoparticles (NPs) and the protein corona formed on their surface to isolate molecules of interest may be a more efficient way to detect low-abundance proteins related to malignancy. In this study, we characterize the corona of silica NPs incubated with human plasma from lung cancer patients and healthy volunteers.
Samples were analysed using dodecyl sulphate polyacrylamide gel electrophoresis and MS. The raw data was imported into MaxQuant for label-free quantification and then analysed using the softwares Perseus and Cytoscape.
Gel densitometry analysis revealed two significantly different protein bands between lung cancer and controls. MS analysis identified five significantly downregulated proteins in the lung cancer group. The most abundant proteins identified were apolipoprotein A-I, fibrinogen, albumin and proteins of the complement family.
The results of our analysis provide information on how the surface constitution of NPs may influence their interaction with the internal environment. The downregulation of several proteins in the cancer samples suggests an altered molecular make-up in malignancy and may contribute to the discovery of specific biomarkers for lung cancer screening.

3.8 Bronchoscopy Training using ALFIE™ (Airway Low-Fidelity including Endobronchial Ultrasound Bio-simulator) and Single Use Flexible Bronchoscopy

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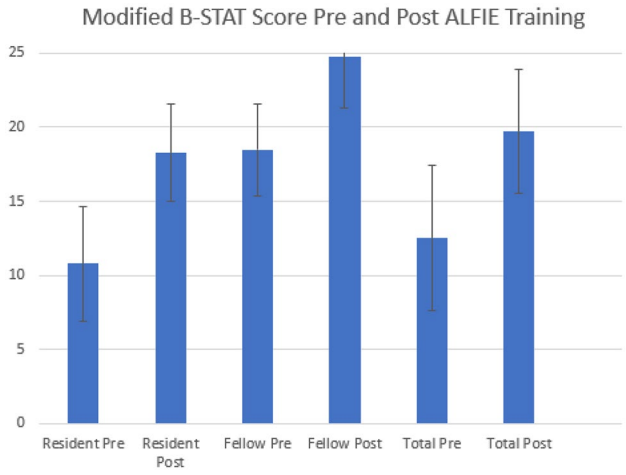
[1]Department of Respiratory Medicine, Cork University Hospital
[2]ASSERT Centre, University College Cork
[3]College of Medicine and Health, University College Cork

The COVID-19 pandemic has resulted in us having to reconsider our traditional teaching modalities and develop newer, dynamic methods of furthering medics' education.
Both high and low fidelity simulators in bronchoscopy including endobronchial guided transbronchial needle aspiration (EBUS-TBNA) are costly. We considered whether a combination of a low-cost bio-simulator made of recyclable (ALFIE™) and single use flexible bronchoscopy (SUFB) have the capability of differentiating novices from experts, and the ability to train novices in bronchoscopy?
Senior house officers (SHO) and Registrars were invited to training on ALFIE™ using a commercially available SUFB. Trainees were evaluated individually before and after training using a modified validated Bronchoscopy Skills and Tasks Assessment Tool (B-STAT) including the scope handling, endobronchial biopsy and brushing.
18 trainees were included (14 SHOs and 4 Registrars). Pre-training assessment of scope handling differentiated novices from experienced bronchoscopists ((p = 0.0025 (95% confidence intervals (CI) 3.12–12.17). Training of novices was associated with an improvement in scope handling and sampling (p = 0.0001 (95% CI 4.73–10.27)).



ALFIE™ and SUFB have the potential to create a low-cost platform for remote training in bronchoscopy. Even beyond the COVID-19 pandemic with a combination of virtual teaching software, this potentially provides a convenient training platform to train junior doctors remotely.

3.9 Is high dependancy unit mandatory for all lung resection

Daniyal Arshad, Muhammad Nadeem Anjum, Tanya Chandwani, Mr Kishore Doddakula

Cork University Hospital Cork

We evaluated all pulmonary cancer resection performed by single surgeon in cuh with no HDU (high dependency unit).
The purpose of study was to evaluate postoperative pain management & safety of patients undergoing lung resections in cardiothoracic ward in absence of high dependency unit & non availability of Intensive care beds
Postoperative pain in VATs group (approximately 81%) was managed with epidural/paravertebral catheter in the ward.
Patients undergoing thoracotomy (approximately 19%) were managed postoperatively in ICU (Intensive Care Unit)
There is one day less hospital stay for VATs group.
No significant difference in the lymph node station dissection between the two groups.
None of the patients in VATs (Video assisted thoracoscopy) group required ICU (Intensive Care Unit) admission.
Our study clearly demonstrates that with adequate postoperative pain management strategy in patients undergoing lung resection can be easily managed in the cardiothoracic ward.
Conflict of Interest: None.

3.10 Surgery vs. radiotherapy for the treatment of early-stage non-small cell lung cancer: A systematic review and meta-analysis of propensity matched studies

Sean Barrett[1,2], Darragh Rice[1], Patrick P Higgins[1], Christina Fleming[1,2], Donna Eaton[1]

[1]Mater Misercordiae University Hospital, Dublin, Ireland
[2]Royal College of Surgeons in Ireland, Dublin, Ireland

Lung cancer is the leading cause of cancer death worldwide. With the increasing popularity of lung cancer screening, the incidence of early-stage non-small cell lung cancers is on the rise. The current gold standard for management of early disease is surgery. Advances in radiotherapy techniques has led to an increase in the effectiveness of this treatment modality.
Our objectives were to extract 5- and 3- year survival and recurrence rates from propensity matched studies and synthesise data as a meta-analysis.
A search of Pubmed, Embase, and Scopus, was performed up to April 2021. We included retrospective propensity score matched studies for quantitative analysis. The study adhered to PRISMA guidelines. Statistical analysis was performed using Revman software.
22 studies were included. There were statistically significant superior outcomes in the surgical group for 5- year [RR 1.47 (95% CI 1.28–1.68) p < 0.001] and 3-year overall survival [RR 1.24 (95% CI 1.10–1.40) p < 0.001]. Findings persisted on subgroup analysis of lobectomy and sublobar resection versus radiotherapy.
Best current evidence in the form of a meta-analysis of retrospective propensity matched studies demonstrates that surgery remains the gold standard of treatment for early-stage NSCLC.

Outcome	Studies	Participants	Method	Result
5-year overall survival	14	11374	Risk Ratio (M-H, Random, 95% CI)	[RR 1.47 (95% CI 1.28-1.68) p<0.001]
5-year cancer specific survival	7	926	Risk Ratio (M-H, Random, 95% CI)	[RR 1.09 (95% CI 0.93-1.27) p<0.001]
5-year local recurrence	3	492	Risk Ratio (M-H, Random, 95% CI)	[RR 0.61 (95% CI 0.15-2.44) p=0.003]
5-year distant recurrence	2	252	Risk Ratio (M-H, Random, 95% CI)	[RR 0.79 (95% CI 0.53-1.18) p=0.2]
3-year overall survival	11	14399	Risk Ratio (M-H, Random, 95% CI)	[RR 1.24 (95% CI 1.10-1.40) p<0.001]
3-year cancer specific survival	5	448	Risk Ratio (M-H, Random, 95% CI)	[RR 1.08 (95% CI 0.95-1.24) p=0.02]
3-year local recurrence	4	374	Risk Ratio (M-H, Random, 95% CI)	[RR 1.00 (95% CI 0.34-2.91) p<0.001]

Table 1. Summary of Outcomes

3.11 Early stage lung cancer presents incidentally. Is it time for a national lung cancer screening program?

Ruaidhri J. Keane[1], Grainne Cogan[1], Ian Counihan[1]

[1]Respiratory Department, Our Lady of Lourdes Hospital, Drogheda, Co. Louth, Ireland

Lung cancer is the most common cause of death from cancer worldwide. The overall survival rate remains poor as most patients are diagnosed at an advanced stage[1]. Lung cancer screening (LCS) has been implemented in the USA and China following the National Lung Screening Trial which showed significant reduction in lung cancer mortality with CT screening[2]. A large European trial, NELSON trial, published similar results[3].
The aim of this retrospective, single centre study was to evaluate the percentage of people with early-stage non-small cell lung cancer (NSCLC) who underwent radical treatment that were incidentally diagnosed to explore the benefits of a possible screening program.
43 patients diagnosed with stage I/II NSCLC who underwent radical treatment were identified in a Level-4 hospital in Ireland from 2018 to the end of 2020. 56% (n = 24) of these patients had an incidental diagnosis with a mean age of 67.75 years, 95% CI [64.4–71.1]. 92% (n = 22) had a history of smoking and 54% were male. During the same period, 68% (n = 121) of patients diagnosed with stage III/IV NSCLC (n = 178), mean age 68.9 years, received anti-cancer treatment.
This study supports the urgent exploration of the feasibility of LCS in an Irish population.

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3.12 Is Robotic Lobectomy Cheaper? A Micro-cost Analysis

Dr Ben Shanahan MD MRCS[1,2], Ms Usha S Kreaden MSc[3], Professor Jan Sorensen MSc MA[2], Professor Karen C Redmond MD FRCS (C-Th)[1]

1. Mater Misericordiae University Hospital, Dublin, Ireland
2. Royal College of Surgeons in Ireland, Dublin, Ireland
3. Intuitive Surgical Inc., Sunnyvale Ca, USA

3.13 10-YEAR RETROSPECTIVE DATA ON NON-SMALL CELL LUNG CANCER (NSCLC): NO IMPROVEMENT IN EARLY DETECTION

Sherdya Worthy Tio, Aileen O'Mahony, Patrick Coghlan, David Curran, Terence M. O'Connor

Department of Respiratory Medicine, Mercy University Hospital, Cork, Ireland

We analyzed data over a 10-year period (2010–2020) of patients with lung cancer diagnosed in the Mercy University Hospital (MUH) to determine whether there is improvement in early detection of non-small cell lung cancer (NSCLC).
NSCLC remains the most common type of lung cancer presentation in MUH, accounting for 602 (59%) of 1027 cases. The sex ratio was 1.5 male to female, but mean age at diagnosis was comparable at 66 years. The majority of NSCLC were diagnosed at later stages—272 (45%) at Stage 4 and 144 (24%) at Stage 3. The remaining 55 (9%), 95 (16%) and 36 (6%) were Stage 2, Stage 1 and unknown respectively.

Looking in more depth at those diagnosed in Stage 4, the percentage of patients diagnosed at late stage remained constant throughout the 10-year interval, varying from 40%—60%.
Data collected from our institution were consistent with national data from 2012–2014, which showed most lung cancer was diagnosed at Stage 4 (40%) and Stage 3 (25%). These results reflect that the last five years did not show significant improvements in detecting NSCLC at an earlier stage. These data support the case for lung cancer screening in Ireland.

3.14 A review of complications post CT guided lung biopsies in the Mid-Western Lung Cancer Centre

Kashif Rana[1], Gillian Bennett[1], Blessing Okpaje[1], Shahram Shahsavari[1], Adam Farrell[1], Paul Hession[2], A O'Brien[1]

[1]*Department of Respiratory Medicine, University Hospital Limerick, Limerick*
[2]*Department of Radiology, University Hospital Limerick, Limerick*

Percutaneous CT-guided transthoracic needle biopsy is used to classify pulmonary lesions difficult to reach by bronchoscopy. The most common complications are pneumothorax (0–61%), chest drain insertion (3.3–15%), intrapulmonary haemorrhage (5–16.9%) and haemoptysis (1.25–5%). Other adverse events, including systemic air embolism, needle tract seeding, and death have a much lower incidence (< 1% of cases). An erect chest x-ray(cxr) is sufficient to detect the majority of post biopsy pneumothoraces.
We retrospectively reviewed the incidence of complications post CT guided lung biopsies performed from 2019 until 2020 in the Mid-Western lung cancer centre, University Hospital Limerick(UHL). We investigated patients age, gender, post biopsy incidence of pneumothoraces, pneumothoraces requiring chest drain/admission, haemoptysis and haemorrhage.
34.6%(28/81) of patients had pneumothoraces on cxrs performed two hours post biopsies. Out of those 28.6%(8/28) patients required chest drain insertion and 71.4%(20/28) of patients were managed conservatively. 11.1%(9/81) had a haemorrhage and 4.9%(4/81) reported haemoptysis post procedure. Only 14 patients were admitted due to complications of pneumothoraces and haemorrhage. There were no cases of systemic air embolism, needle tract seeding or death.
The complication rate post CT guided lung biopsies in UHL is similar to those reported in international published literature.

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3.15 Audit of Satisfaction levels amongst patients who had thoracic surgery during the first surge of Covid 19

Ms Mary Kingston RANP, Mr Gerard Fitzmaurice MSc, FRCSI (CTh), Mr Archie Gonzales

Clinical Information Officer Cardiothoracic Surgery, St James's Hospital, Dublin and Mr Richard Shanahan CMN III, Blackrock Clinic, Dublin

In response to the unprecedented challenges during the first surge of the Covid-19 pandemic, the Health Service Executive (HSE) secured beds in the private hospital system. As a consequence, and to maintain thoracic surgical oncology, the thoracic surgical service at our institution relocated to the Blackrock Clinic from March 25th to June 30th 2020.
A retrospective satisfaction audit was conducted on ninety three patients who had thoracic surgery during that period. Of the eig hty nine patients who received a telephone call, 59 patients agreed to participate in the audit.
88% of participants agreed (A) or strongly agreed (SA) that the communication from the hospital prior to admission was good. 99% of participants (A or SA) that the facilities were excellent. Participants reported a high level of satisfaction with the communication received from the multidisciplinary team (96% A or SA). 98% (A or SA) that all precautions were taken to prevent them from getting Covid-19 infection during their hospital stay and 97% (A or SA) with the statement "I felt safe while in hospital".
The theme of "Acceptance" emerged from responses to the no visitor policy.
Our findings reassuringly demonstrate that patients felt safe during an unprecedented time for the Irish health service and that their experience reflected our own.

3.16 Meeting Quality Standards in Endobronchial Ultrasound

Dr Naoise Smyth, Dr Martin Kelly, Dr Ciaran King

Altnagelvin Area Hospital, Derry, County Derry

Endobronchial ultrasound (EBUS) plays a key role in the diagnosis and staging of suspected lung cancer. We reviewed EBUS data from April–October 2020, comparing results with the British Thoracic Society's "Quality Standards for Flexible Bronchoscopy in Adults".[1]
Using the Northern Ireland Electronic Care Record (NIECR) we reviewed the following areas for all procedures carried out during this study: the sedation given during EBUS; the use of staging computed tomography (CT) prior to EBUS; sensitivity of EBUS; and the occurrence of complications.
In terms of sedation we used on average less than the usual maximum dose of midazolam (3.28 mg versus 3.5-7 mg) but more than the usual maximum dose of fentanyl (64.15mcg versus 50mcg).
All patients (n = 53) had appropriate CT imaging prior to EBUS (target 100%).
85% of samples were diagnostic (target > 88%).
Complications occurred in 3.7% of cases (target < 1%) and included sedation reversal.
Our results suggest that exceeding the advised maximum dose of sedatives can lead directly to complications such as the need for reversal agents, meaning that missing one target leads to missing others. While we are meeting some of our targets there is still progress to be made in other areas.
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3.17 Single Use Flexible Bronchoscopy: An ex-vivo comparison of all commercially available scopes

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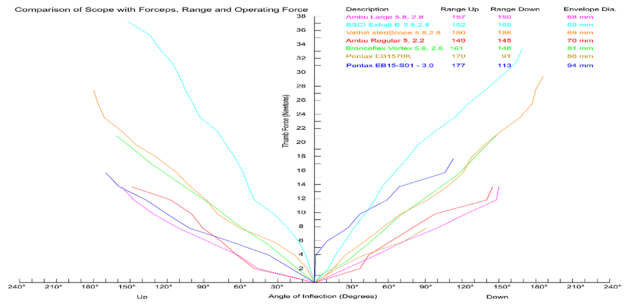
The development of single use flexible bronchoscopes (SUFB) has proceeded with pace over the last 2 years. Concerns regarding infection related to standard bronchoscopes with subsequent COVID-19 pandemic accelerated global uptake with multiple companies releasing SUFB. There has been no ex-vivo comparison of SUFBs to date.
We obtained samples of all commercially available SUFBs (TSC Broncoflex©, Boston Scientific©, Ambu©, Vathin© and Pentax© prototype). We compared technical metrics using a custom-built bench toolkit engineered to allow standardised. Angulation was analysed by a force meter to ascertain the effort needed to fully flex the scopes while empty and while accessed by both a forceps and cytology brush.



The Boston Scientific Exalt© SUFB had the tightest consistent turning envelope at 64-69 mm, this resulted in the highest maximal thumb force required (13-37 N). The Ambu© SUFB had the best performance in terms of force (11.8–13.7 N) to angulation (150—190°). The SUFB from Vathin© and Broncoflex© provided a compromise, with increased angulation (180–209°, 148–215°) but at the cost of higher thumb force compared to Ambu© (15.7 N-29.4 N, 10.24 N-24.23 N).
This research helps to inform the practical usability of each bronchoscope when deciding which SUFB is best for the physicians intended end use. Further research should look at perceived qualitative assessment of SUFB by clinicians.

3.18 ALFIE: Airway Low Fidelity Including Endobronchial Ultrasound Bio-simulator

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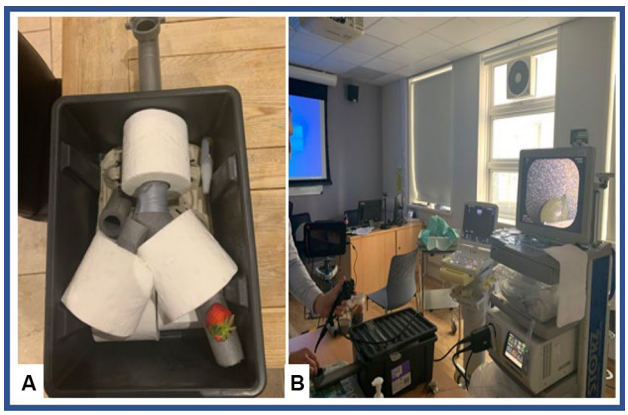
The COVID-19 pandemic has prioritised the role of simulation-based training. Both high and low fidelity simulators in bronchoscopy including endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA) are costly. The purpose of this research was to develop a low fidelity bio-simulator from predominately recyclable household materials and to demonstrate its utility in EBUS-TBNA skills training.
The ALFIE (Airway Low Fidelity Including EBUS) bio-simulator was developed from household and plumbing materials with organic materials (fruit) used as pseudo-peri-bronchial lymph nodes. Residents (novices) and fellows (advanced trainees) were tested using a modified validated EBUS-TBNA scoring tool before and after training on the bio-simulator. EBUS scope handling score, EBUS-TBNA score and a combined EBUS score were calculated.
19 trainees (11 residents, 8 fellows) were included. Pre-training assessment of EBUS scope handling differentiated novices from experienced bronchoscopists ($p=0.0005$ (95% confidence intervals 1.3–2.95)). Novice EBUS scope handling scores improved after training ($p=0.0011$ (95% confidence intervals 0.41–1.22)). Significant improvements in EBUS-TBNA score ($p=0.0011$ ($n=7$, 95% confidence intervals 0.35–5.09)) and total EBUS score ($p=0.0472$ (95% confidence intervals 0.03–1.4.65)) were identified in fellows after training.
Assessment of scope handling on ALFIE differentiated novices from more experienced bronchoscopists. Trainees' bronchoscopy skills improved with training on ALFIE bio-simulator.



3.19 Pre-Clinical Testing of Single Use Flexible Bronchoscopes: Clinician Preference based on Physical Characteristics and Level of Experience

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Single use flexible bronchoscopes (SUFBs) have come to the forefront in the COVID-19 pandemic due to the need to minimise risk of infectious transmission as well as carry out bedside procedures for critically unwell patients. Multiple companies have released SUFBs with varying technical metrics.
39 participants including physicians, surgeons and anaesthetists with a range of expertise from first time endoscopists to consultants took part in a trial of all available SUFBs (The Surgical Company (TSC) Broncoflex©, Boston Scientific©, Ambu©, Vathin©, Pentax© prototype scope). Likert scales were used for evaluation of scope parameters including ergonomics, comfort and ease of technical procedures. Participant parameters were collected including height, gender and hand size.
TSC Broncoflex© was the preferred bronchoscope with an average score of 45.4/55 including 82.1% for ergonomics and 83% for usage. Female participants ($n=12$) preferred Pentax (48.5/55) while male participants preferred TSC (44.3/55). Participants with small ($n=10$) or medium ($n=23$) glove size preferred Pentax (48.5/55; 45.3/55); those with large glove size ($n=5$) ranked Vathin and TSC highest (44.4/55, 44/55). Doctors with > 10 years experience preferred Pentax ($p=0.04$); less experienced groups preferred TSC.
In conclusion, gender, hand size and previous experience influenced scope preference. These factors should be considered in future scope development.

Conflict of Interest: None.

3.20 Assessment of user satisfaction and experience of three commercially available Single Use Bronchoscopes in a clinical setting

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Single use Flexible bronchoscopes (SUFBs) are an alternative to reusable flexible bronchoscopes with the reduced endoscopy capacity and increased infection control considerations during the covid-19 pandemic. SUFBs minimize infectious transmission and can be used during bedside procedures. Multiple SUFB brands are available.
With institutional ethical approval, we prospectively gathered data on one new (Boston Scientific©) and two established (AMBU© and Vathin©) SUFBs to assess clinician satisfaction between June–August 2021. Patient gender, procedure performed, indication, location, SUFB used, complications, and overall user satisfaction were assessed.
Twenty-two procedures were examined (12 Boston Scientific©, 5 AMBU©, 5 Vathin©). Eleven patients were male. Twenty-one procedures were performed in endoscopy, and 1 on the ward. All included airway assessment, 68% BAL, and 5% endotracheal biopsy. There were no complications with the Boston Scientific© scope. There was poor image quality in all (n = 5) AMBU© procedures (only scope without High-Definition Camera). There was dissatisfaction with suction in all (n = 5) Vathin© procedures (persistent suction without activation by scope). Using a satisfaction scale (1–5), mean score for Boston Scientific©, AMBU©, and Vathin© were 5, 2.8, and 2.8 respectively.
Real-world data on SUFBs use in a clinical setting should be considered when selecting brands available within a hospital group.

4. CF & INFECTIONS

4.1 Impact of Elexacaftor/Tezacaftor/Ivacaftor on airway inflammation and clinical outcomes in Patients with Cystic Fibrosis

Michelle Casey[1,2], Claudie Gabillard-Lefort[1], Orla Kerr[2], Elaine Marron[2], Anne-Marie Lyons[2], Lydia Cullen[2], Alexandra Murphy[2], Cedric Gunaratnam[1,2], Emer P. Reeves[1] & Noel G. McElvaney[1,2]

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Current advances in therapeutics for Cystic Fibrosis(CF) include genotype-specific therapies, focused on restoring the defective CFTR protein expression and functionality, the most recent of which is Elexacaftor/Tezacaftor/Ivacaftor(Elex/tez/Iva). The clinical benefits have been well demonstrated, with little known regarding their impact on other aspects of CF pathophysiology in particular airway inflammation.
We aimed to assess the impact of Elex/Tez/Iva on airway inflammatory markers in sputum samples of patients with CF (PWCF) collected pre-Elex/Tez/Iva and 3 months post.
We evaluated 14 paired samples from PWCF, Sputum samples were processed via the TETRIS method. We measured differential cell count by light microscopy, ATP via bioluminescence, cytokines via ELISA and active neutrophil elastase(NE) via FRET assay.
We observed a mean increase in FEV1 of 13.57% ($p < 0.001$) and in body weight of 4.14 kg ($p < 0.001$) and a reduction in CF ABLE score ($p = 0.0058$). This clinical improvement was associated with a decrease in sputum ATP level($p < 0.0001$),neutrophil count($p = 0.0043$), IL-8($p = 0.039$), IL-1β($p = 0.0023$), TNF-R1($p = 0.044$) and NE ($p = 0.0023$).
Our study demonstrates a significant impact on CF airway inflammatory markers at 3 months post treatment with an improvement in clinical parameters in keeping with published literature. We aim to further explore whether this impact of Elex/Tez/Iva is maintained at 6 months follow-up.
We would like to acknowledge the US Cystic Fibrosis Foundation grant # REEVES21G0 as our funding source.

4.2 Pre-Activated Umbilical Cord Derived Mesenchymal Stromal Cells Enhance the Restoration of Local and Systemic Immune Homeostasis During Transitionary Phase Pulmonary Sepsis

Declan Byrnes[1,2], Claire H. Masterson[1,2], Hector Gonzalez[1,2], Sean D. McCarthy[1,2], Daniel P. O'Toole[1,2], John G. Laffey[1,2,3]

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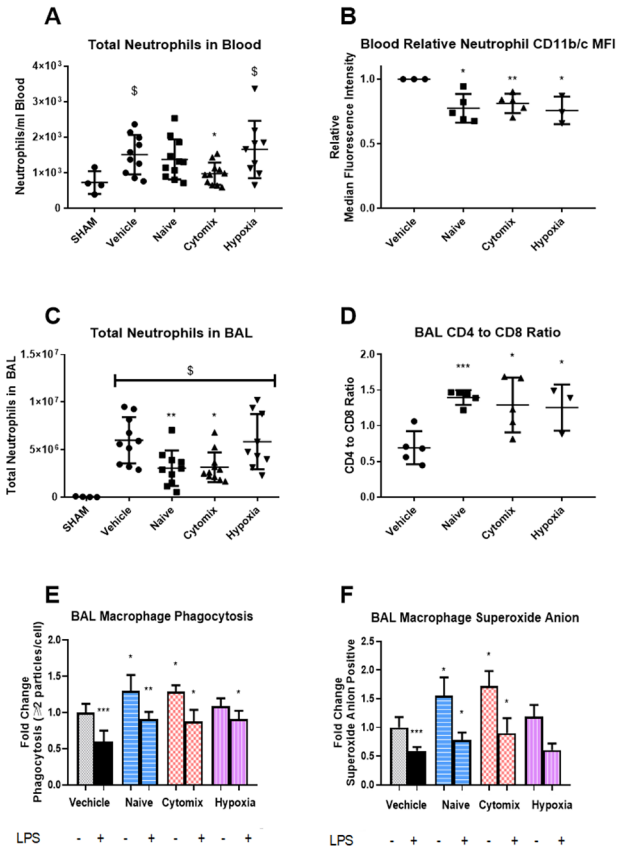
Sepsis is defined as a dysregulated host response to a, typically bacterial induced, infection, with three identifiable phases: early, transitionary, and late sepsis. Patients who survive the early phase enter the transitionary phase where they either return to immune homeostasis or enter late sepsis, characterised by immunosuppression. This is where 70% of sepsis related deaths occur. We wish to target the transitionary phase and promote immune homeostasis.
Previously our lab group have shown mesenchymal stromal cells (MSCs) to be effective in treating bacterial pneumonia in early phase sepsis[1] and we aimed to develop an in vivo prolonged sepsis model to investigate if Naïve and Pre-activated MSCs restore immune cell homeostasis. We established an in vivo model of 3 day prolonged sepsis by intratracheal administration of *K.pneumoniae* cultures to rodents. MSCs were administered systemically after 1 h and immune cell profiles of blood and BAL analysed after three days.
MSCs were able to restore immune homeostasis (Fig. 1) by returning circulating neutrophils to control levels (A) and reducing their activation markers (B)
Indicating a good prognosis for 28-day mortality. within the alveolar airspace
MSCs reduced neutrophil infiltration (C) increased CD4 to CD8 T cell ratios (D)
And enhanced macrophage function (E&F)
Devaney J, Horie S, Masterson C, Elliman S, Barry F, O'Brien T et al. Human mesenchymal stromal cells decrease the severity of acute lung injury induced by E. coli in the rat. Thorax. 2015;70(7):625–635.



4.3 Differential gene expression in the immunometabolic response of human macrophages in tuberculosis and HIV infection

Kevin Brown, Mary O' Sullivan, Seónadh O' Leary, Joseph Keane

Department of Clinical Medicine, Trinity Translational Medicine Institute, St. James' Hospital, Trinity College Dublin, Dublin, Ireland

4.4 Primed Human Bone Marrow Mesenchymal Stromal Cells as a Therapeutic Strategy for Klebsiella Pneumonia

Claire H. Masterson[1,2], Declan Byrnes[1,2], Hector Gonzalez[1,2], Sean D. McCarthy[1,2], Daniel P. O'Toole[1,2], John G. Laffey[1,2,3]

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4.5 PREDICTORS FOR CHOICE OF DIRECTLY OBSERVED THERAPY IN PATIENTS WITH TUBERCULOSIS IN THE SOUTH OF IRELAND

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University College Cork; Mercy University Hospital, Cork

Directly Observed Therapy (DOT) is implemented in certain tuberculosis (TB) patients to ensure treatment compliance. This study aims to identify the factors contributing towards the decision to implement DOT in the management of TB patients in Cork.
A retrospective dataset analysis of TB patients treated in the Mercy University Hospital TB Outpatient clinic between January 2016 and August 2020 was conducted. Statistical analysis was performed using GraphPad InStat.
Of 165 patients with active TB, 58 (35%) were managed with DOT. Patients who underwent DOT were more likely to be male (R = 0.2410, P = 0.0018), acid fast bacilli positive on a respiratory specimen (R = 0.2497, P = 0.0034), to have cavitary disease (R = 0.2468, P = 0.0014), longer treatment duration (R = 0.2009, P = 0.0131), to have been admitted to hospital prior to DOT (R = 0.2364, P = 0.0022), to have had a prolonged hospital stay (R = 0.2560, P = 0.0009), to have had psychological problems prior to diagnosis (R = 0.1666, P = 0.0324) and to be a current or ex-smoker (R = 0.1767, P = 0.0241).
In conclusion, biological, psychological, and social factors can influence the probability of patient compliance and inform the need for DOT. These factors should be taken into consideration when evaluating a patient for poor adherence to therapy.

4.6 Dexamethasone Reduces Metabolic Function and Subsequent Activation of Human Macrophages to Mycobacterium tuberculosis

Dr Lorraine Thong[1,2], Dr Donal Cox[1], Prof. Joseph Keane[1,2]

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Corticosteroids are ubiquitous in the field of respiratory medicine due to their potent anti-inflammatory and immune-modulating properties. More recently in the COVID-19 pandemic, corticosteroids are one of the only effective treatments for patients with COVID-19, particularly in individuals requiring respiratory support. *Mycobacterium tuberculosis* (Mtb) is the causative agent for tuberculosis (TB). Furthermore, the emergence of extreme multidrug resistant Mtb drives the need for improved host-directed therapies. Host-directed therapies aim to improve immune responses of patients rather than classical therapies like antibiotics. The most efficient strategies to achieve new host-directed therapies is by repurposing drugs. At present, corticosteroids, such as dexamethasone, are the only approved adjunctive treatment for Mtb with neurological or cardiological involvement. Despite the clinically proven effect of corticosteroids on TB patient survival, the exact mechanism of action underlying this benefit is poorly understood. Human AM were purified from bronchoalveolar lavage. MDM were obtained from blood of healthy individuals. Dexamethasone treated human macrophages were infected with Mtb. Macrophages were then assessed for cytokine secretion, metabolic gene expression and metabolic flux at multiple timepoints. Dexamethasone significantly reduced secretion of IL-1β, IL-10, IL-6, IL-8 and TNF-α following infection. Moreover, dexamethasone reduced the expression of metabolic genes and glycolysis in macrophages.

4.7 Real -World Safety and tolerability of Elexacaftor/Tezacaftor/Ivacaftor in the treatment of Cystic Fibrosis: A single centre experience

Michelle Casey[1,2], Claudie Gabillard-Lefort[1], Orla Kerr[2], Elaine Marron[2], Anne-Marie Lyons[2], Ciara Reddy[2], Cedric Gunaratnam[1,2], Emer P. Reeves[1] & Noel G. McElvaney[1,2]

Table 3 Adverse events reported 3 months post-Kaftrio in PWCF. Total number of PWCF included: 30, N = number of patients (%)

Adverse events	PWCF N (%)
Gastrointestinal cramps	15 (50%)
Sleep disturbance	12 (40%)
Anxiety	9 (30%)
Testicular pain/swelling	7 (23.3%)
Vaginal discharge	6 (20%)
Deranged liver function tests	4 (13%)
Mucus plugging	3 (10%)
Headache	3 (10%)
Worsening Acne	2 (7%)
Rash	2(7%)

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Cystic fibrosis transmembrane conductance regulator (CFTR) modulator therapies, including the most recent combination Elexacaftor/Tezacaftor/Ivacaftor(Elex/Tez/Iva) are generally well tolerated; however, real-world studies of previous combinations indicate the frequency of adverse events(AEs) and discontinuation may be greater than that observed in clinical trials.
We prospectively assessed the safety, tolerability, and clinical efficacy of Elex/Tez/Iva in patients with Cystic Fibrosis(PWCF) at 3monthly periods post initiation of treatment.
A total of 55 patients have been initiated on therapy to date, with 6-month follow-up data available for 30 patients across a spectrum of disease severity. The most common AEs reported are listed in Table 3, with no patient discontinuing treatment and treatment interruption required for 3(10%) patients.
In our experience most AEs have been mild and of short duration. Interestingly, we describe adverse events not reported in the original studies, such as the neurocognitive side effects and gender specific side effects of testicular swelling/discomfort in men and increased vaginal discharge in women. As the number of PWCF commencing CFTR modulator therapy increases, it is essential CF teams are aware of all potential AEs and that systematic approaches for prevention and/or management of AEs are developed.

4.8 Physical activity and sedentary behaviour in adults with Cystic Fibrosis—association with aerobic capacity, lung function, sleep, well-being, and quality of life: An observational study

Curran, M.[1,2,3], Tierney, AC.[1,3,4,5], Button, B.[6,7], Collins, L.[2], Kennedy, L.[2], McDonnell, C.[2], Sheikhi, A.[3], Jurascheck, A.[1], Casserly, B.[2], Cahalan, R.[1,3]

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4.9 Extrapulmonary disease burden and impact of cystic fibrosis (CF) on productivity in people with CF (pwCF) aged≥12 years not treated with CF transmembrane conductance regulator modulators (CFTRm): interim analysis (IA) of the HUBBLE study

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HUBBLE is an ongoing, prospective, longitudinal, observational study to assess the impact of CF and CFTRm therapy on patient-reported outcomes (PROs). We report results from a cross-sectional IA evaluating extrapulmonary disease burden and CF impact on work/school productivity in pwCF not treated with CFTRm.
This IA included pwCF in Ireland, the UK, and Germany aged≥12 years not receiving CFTRm with *F508del*/*F508del*, *F508del*/minimal function (MF), or *F508del*/uncharacterized (second allele not *F508del*, gating, MF, or residual function) *CFTR* genotypes. PRO measures administered included questions on sinonasal symptoms, CF abdominal symptoms (CFAbd-Score), and the Work Productivity/Activity Impairment Questionnaire plus Classroom Impairment. Data were collected through participants' internet-enabled devices (10/2020–04/2021).

Table 4 Impact of CF on Extrapulmonary Symptoms

Patients reporting sinus or nasal symptoms, n (%)[a]	N = 34[b]
Mucus in your throat or needing to clear your throat	26 (76.5)
Blocked or stuffy nose or ear	22 (64.7)
Runny nose	12 (35.3)
Pain around the eyes or forehead	12 (35.3)
Thick or green/yellow nasal discharge	5 (14.7)
Other	1 (2.9)
CFAbd-Scores, mean (SD)[a,c]	N = 49
Total score	30.7 (16.2)
Impairment of quality-of-life domain	30.9 (21.5)
Pain symptoms domain	35.0 (20.6)
Disorder of bowel movement domain	33.6 (16.0)
Disorders of eating and appetite domain	19.6 (16.7)
Gastroesophageal reflux symptoms domain	29.4 (22.3)

[a] All symptoms were self reported. [b] In 35 pwCF experiencing sinus or nasal symptoms, 1 had missing information. [c] CFAbd-Score range: 0–100; higher scores indicate worse symptoms. As a reference, healthy people without CF have a mean (SE) total CFAbd-Score of 8.0 (0.7), reported in (1).

Fifty pwCF (32.0% male; mean [SD] age at registration, 29.2 [9.8] years; mean [SD] percentage of predicted forced expiratory volume in 1 s, 74.9 [25.4]) were included. Sinonasal symptoms (Table) were experienced by 70% (n = 35) of pwCF; 62% of pwCF experienced moderately or very bothersome symptoms. Total mean (SD) CFAbd-Score was 30.7 (16.2) (Table 4). Average productivity loss was 46.1% (n = 15) and 33.0% (n = 11) in pwCF who were working and attending school, respectively.
Overall, evidence suggests substantial extrapulmonary disease burden and negative productivity impact in pwCF not treated with CFTRm.
1. Jaudszus A, et al. *Patient*. 2019;12(4):419–428. https://doi.org/10.1007/s40271-019-00361-2.
Sponsor: Vertex Pharmaceuticals Incorporated.
Disclosures: All authors received editorial support from ArticulateScience LLC, which received funding from Vertex Pharmaceuticals Incorporated. JSE reports a grant from the European Commission. JGM reports funds for the current study and a grant for an investigator-initiated trial outside the submitted work from Vertex Pharmaceuticals Incorporated. JA reports compensation for serving on the steering committee for the current study from Vertex Pharmaceuticals Incorporated. SBC, AS, SC, SL, and ML report no additional potential conflicts of interest. VG, EAS, JL, JY, TT, FDI, and HK are employees of Vertex Pharmaceuticals and may own stock or stock options in the company.

4.10 Incidence of venous thromboembolism (VTE) in a designated adult cystic fibrosis service between 2010 and 2020

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Traditionally the use of VTE prophylaxis in CF is limited and controversial with many patients declining it.[1] VTE prophylaxis is not routinely practiced in our service.
Aim: To establish the incidence of VTE in a designated adult Cystic Fibrosis service over 10 years.
Methods: A retrospective medical chart, electronic hospital information and radiology imaging system review was performed on all adult patients attending our service between 2010–2020.
Results: 200 individual patients attended (n = 22 post transplantation). The VTE cumulative incidence was 2% in total (Subgroup analysis: 1% pre-transplant and 9% post-transplant). 61 radiological investigations were performed to assess for VTE. Positive cases: CTPA 1 of 49 and US Doppler 4 of 12. The clinical characteristics of positive case are summarized in Table 5.
Discussion: The overall cumulative incidence of VTE and use of VTE is prophylaxis is low in our population however higher in our post transplantation group suggesting definite need of use of VTE prophylaxis in this subgroup. The diagnostic positivity rate of PE with CTPA was low (2%). Interestingly the positive case was on a CFTR modulator. Large registry prospective analysis is needed in this area to determine a standardized approach.
Murray TS, Metzger NL, Chesson MM, Walker SD. Refusal of venous thromboembolism prophylaxis and incidence of thrombosis in patients with cystic fibrosis. Pulm Res Respir Med Open J. 2017; 4(2): 42–47. https://doi.org/10.17140/PRRMOJ-4-138

4.11 Omitted

4.12 Assessing clinical challenges and user experience with patients and staff during the first six months of the Covid-19 pandemic in a previously telehealth-naïve centre (TECC Study)

David Morrissy[1,3], Tamara Vagg[2,3], Mairead McCarthy[1], James Dorgan[1], Claire Fleming[1], Ciara Howlett[1], Joseph A Eustace[1,3], Barry J. Plant[1,3]

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Due to the Covid-19 pandemic, the CF MultiDisciplinary Team (MDT) designed a telehealth service to replicate traditional clinics virtually, as a default service. Portable medical devices for objective data capture, and access to a teleconference platform was provided to patients. To evaluate the telehealth service, a retrospective chart review was performed on consenting patients. Usability and Acceptance data was also collected from both patients and staff via the: System Usability Scale (SUS), TeleHealth Usability Questionnaire (TUQ), IT Familiarity, and our own quality-survey.
Preliminary data was collected from 52 patients (p) and 11 staff (s). The SUS received a median score of 90 (p) and 87.5 (s) out of 100. The TUQ received a total score of 6.52 (p) and 6.1 (s) out of 7, with Ease of Use as the highest rated category (median 7, range 3.6–7) and Reliability as the lowest (median 5.33, range 2–7). The IT Familiarity questionnaire demonstrates that both cohorts have the skills necessary to conduct telehealth clinics. Qualitative data collected shows that while patients and staff experiences are positive, a good WiFi connection is imperative. Likewise traditional face-to-face care remains important and cannot be replaced.

Table 5 The clinical characteristics of positive cases

Gender/ Age-years	Genotype	VTE prophylaxis	Diagnosis / year	ppFEV1	CFTR modulator
F / 30*	ΔF508/ΔF508	No	Indwelling central venous catheter associated DVT / 2017	47	No
M / 21 **	ΔF508/ΔF508	No	Pulmonary Embolism (PE) / 2020	30	Yes
M / 35*	ΔF508/ΔF508	Yes	Recurrent DVT +	35	No
F / 26	ΔF508/ΔF508	No	Indwelling central venous catheter associated DVT / 2012	22	No

+recurrent DVT (Right axillary thrombus post PICC, Right below knee dvt post angiogram)

*Post transplant

**On Elexacaftor/Tezacaftor/Ivacaftor

4.13 Who's talking about CF? A comparison of CF internet posts during 2015 and 2019

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This research investigates who is talking about CF online, and how this discussion has changed over time. Google Alerts was enlisted to generate and record alerts for the term "Cystic Fibrosis" and related terms for six months in 2015 and 2019. One month data was also recorded for Asthma, COPD and Lung Fibrosis for comparison.
In 2015 there were 3518 CF related terms, this increased to 5214 in 2019. There was an increase in blocked articles (144 to 540) due to GDPR regulations. For both years, the USA generated the highest number of alerts (56%). In 2015, News (58%) was the most common category, however this changed to Financial/Marketing (35%) in 2019. In 2015 Asthma received the highest mean number of alerts per day (31.7), followed by CF (16.1), then COPD (14.6), and Lung Fibrosis (5.1). However, in 2019 CF was the highest with 19.5, followed by Asthma (11.5), COPD (10.3), and Lung Fibrosis (7.4).
CF related internet postings are changing. CF is now more commonly reported on than other lung conditions with an emphasis on investment opportunities, while content from the general public has decreased (or is private).

4.14 Non-Invasive Ventilation (NIV) Pre and Post 'Kaftrio®' at Beaumont Hospital Cystic Fibrosis (CF) Centre

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NIV is an accepted tool as a bridge to transplantation in people with CF (PWCF) with severe lung disease. Limited data exists for the effects of Kaftrio® in this group.
The aim of this study was to examine the effects of 'Kaftrio®' in a small group of NIV dependent adults with severe CF.
Patient demographics and NIV data, including respiratory rate (RR), tidal volume (VT), minute ventilation (MV) and minutes of usage, for 4 patients were examined in the 3 months before and after initiation of 'Kaftrio®'.
Statistically significant changes in FEV1% ($p=0.0437$), FVC% ($p=0.0119$), RR ($p=0.0137$) and MV ($p=0.0420$) were found. One patient discontinued use of NIV and oxygen (02), and 2 patients reduced their 02 requirements from 3L02 to 2L02 at night. Improvements in VT, minutes of usage, CF-ABLE score, BMI and weight were also found, however, they were not statistically significant.
This small study has demonstrated improvements in work of breathing and quality of life for PWCF with severe lung disease within months of starting Kaftrio®. We plan to monitor NIV data more closely and complete more frequent investigations in order for therapy to be adjusted and/or discontinued in an objective and timely manner.

4.15 Submaximal Exercise Testing in People with Cystic Fibrosis (PWCF) Pre and Post 'Kaftrio®' at Beaumont Hospital Cystic Fibrosis (CF) Centre

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In the absence of cardiopulmonary exercise testing facilities, the submaximal Modified Shuttle Walk Test (MSWT) is used in Beaumont Hospital for PWCF to assess exercise capacity annually[1 2] and to monitor other clinical interventions, e.g. response to new modulator therapies. [1]
Baseline MSWT data was captured and 10 PWCF (mean FEV1 = 62.4%) were retested within six months of starting 'Kaftrio®'. Pre and post 'Kaftrio®' MSWT results were compared and analysed. Within six months of starting 'Kaftrio®' statistically significant improvements were noted in FEV1% ($p=0.0084$), weight ($p<0.0001$), resting oxygen saturation levels ($p=0.0176$) and MSWT distance ($p=0.0112$), with a mean increase of 100 m. There was no significant difference in resting heart rate and BORG scores remain unchanged.
4 additional patients (mean FEV1 = 74.75%) completed the MSWT prior to starting 'Kaftrio®'. This ceiling effect could be highlighted further as patients with milder disease transition to 'Kaftrio®', thus potentially limiting the value of MSWT in the modulator era.
These results highlight the benefit of exercise testing in assessing clinical response to modulator therapies. Furthermore these results emphasise the need for maximal exercise testing when assessing clinical response in PWCF with milder disease.
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4.16 Pseudomonas resistance in bronchiectasis physiotherapy patients

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Pseudomonas infection is associated with worsening FEV1 and increased hospitalisations in patients with bronchiectasis. Antimicrobial resistance worldwide contributes to this problem, and patients receiving multiple courses of antibiotics are particularly at risk. The aim of this study is to identify multi-drug resistance rates in the cohort of patients with difficult to clear secretions who were referred to the respiratory physiotherapy department for chest clearance techniques over a 3 year period.
Seventy four patients (43 female, average age 67) with confirmed bronchiectasis were identified. Eighteen patients (24%) had at least 1 growth of Pseudomonas in the last three years. Of these, 6 patients (33%) had resistant pseudomonas, requiring combination antibiotic therapy for outpatient treatment. These patients were older, with a higher number of previous exacerbations, and lower FEV1. These patients also required more frequent visits for chest physiotherapy.
Pseudomonas rates in this cohort are similar to pseudomonas rates seen in the overall bronchiectasis population. The resistance rates of 33% are concerning, but are in line with resistance levels seen elsewhere.

Appropriate antimicrobial stewardship, exacerbation prevention strategies, and appropriate vaccinations are required to reduce the risks of development of pseudomonas resistance in these patients.

4.17 Novel iPS-derived MSCs have antibacterial properties against pneumonia relevant pathogens

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Mesenchymal stromal cells (MSCs) have demonstrated benefit in pathogenic ARDS models and are in clinical trials, but allogeneic MSCs have several manufacturing and consistency disadvantages. Recently, an iPS-derived MSCs (iMSCs) has been developed by a novel mRNA method generating mutation-free, clinically viable cells, with similar characteristics to naturally occurring MSCs. We wished to study this cell's cytokine production in response to injury microenvironment related stimuli and the antibiotic properties of its conditioned media (CM) against bacterial pneumonia pathogens.
For cytokine production, bone marrow (BM-MSCs) and iMSCs were stimulated for 24 h with cytokines or lipopolysaccharide, and secreted soluble factors quantified by ELISA. For antibiotic properties, known colony forming units of *Escherichia coli*, *Staphylococcus aureus*, and *Klebsiella pneumoniae* clinical isolates were added to CM and bacterial proliferation assessed spectrophotometrically.
iMSCs showed similar cytokine production patterns in response to different stimulus as BM-MSCS. iMSC-derived CM exhibited the same inhibitory effect as BM-MSC CM on the growth of the different bacterial clinical isolates. These results demonstrate that iMSCs retain the immunomodulatory and antibacterial properties of MSCs and are a promising therapeutic candidate to advance to preclinical and clinical trials for ARDS and other lung diseases.

4.18 Risk Factors and Markers of Severity in Hospital Acquired Pneumonia

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Hospital-acquired pneumonia (HAP) is a nosocomial infection occurring in hospital patients > 72 h post admission. Studies on hospital pneumonia tend to focus on ventilator associated infections meaning that HAP is a neglected area of research. HAP is an avoidable cause of morbidity and mortality with a concomitant impact on health economics.
A clinical audit took place in the Beacon Hospital in order to identify potential risk factors and markers of severity.
The Hospital database was searched for key terms consistent with a diagnosis of HAP. 915 patients were identified. These records were individually reviewed for clinical criteria consistent with HAP. 70 patients aged (Mean (SD)) 69.9 (13.4) years fit the criteria.
Risk factors for HAP included proton-pump inhibitor use on admission (56%), cardiothoracic surgery (31%), low haemoglobin levels on admission (59%) and presence of active cancer (33%). Adverse outcomes were more common in those with elevated white cell count and C-reactive protein levels, as well as low albumin ($p = 0.04$) or haemoglobin levels ($p = 0.04$ *ANOVA*).
This audit indicates that HAP is a significant clinical problem. Several risk factors and routine blood tests may allow earlier identification of at-risk patients improving both morbidity and mortality.

4.19 An Audit on the Outpatient Management of Active Pulmonary Tuberculosis (TB) in Mater Misericordiae University Hospital

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TB is a treatable condition requiring prolonged course of antimicrobials. A comprehensive outpatient management is paramount to ensure completion and prevent the emergence of Multi-Drug Resistant (MDR) TB. This audit is aimed to establish our institution's current practice against the standard outlined by the European Union Standard TB Care (ESTC, 2017).
We collated data of patients diagnosed with active Pulmonary TB who had completed follow up in our institution from 2017 to 2020. A total of 40 patients were included in the audit. The main standards of comparison include Drug Sensitivity Testing (DST) and choice of antimicrobial treatment, HIV testing, and the documentation of treatment tolerance i.e. liver profiles and medications side effects.
This audit shows that our institution achieved 100% for DST and antimicrobial treatment option. However, HIV testing and documentation of treatment tolerance were completed in only 50% and 95% of the patients respectively.
In conclusion, this audit shows that our institution has yet to achieve the standard care of the active Pulmonary TB outpatient management. A proforma is being developed to improve our service provision to comply with the standards.

4.20 Use Of Video Observed Therapy As An Alternative To Directly Observed Therapy In Drug Resistant TB

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Video observed therapy (VOT) is a novel alternative to Directly observed therapy (DOT) to assist compliance with Tuberculosis (TB) treatment. Mobile phone technology can be used in which patient's video themselves taking their medicines. It is time stamped and sent to their healthcare provider.
Herein, we describe a patient with a Rifampicin resistant TB who was initially started on conventional DOT. He had 76/133 (57%) doses observed by DOT. Since the rate of failure to observe with DOT was unacceptable he was transferred to VOT. Using VOT 138/180 (76%) doses were observed. This case highlights an increase in the observed doses using VOT by comparison to DOT. We are currently examining compliance, cost and patient satisfaction in a larger study.

5. COPD ASTHMA

5.1 Preliminary results from a multi-centre trial evaluating the clinical and cost-effectiveness of lung volume reduction surgery

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Lung Volume Reduction (LVR) is a surgical technique to palliative dyspnoea by reducing residual volume (RV) for patients with advanced emphysema that have failed optimal medical therapy. It can be carried out via bronchoscopic lobar reduction with endobronchial

valves (EBV) or keyhole surgery (VATS or robotic assisted thoracic surgery;RATS) with resection of hypo-perfused tissue.
As part of a clinical trial evaluating the cost-effectiveness and clinical outcomes of LVR for a multi-centre cohort of patients with end-stage emphysema; we present the initial results of 20 patients. Workup includes smoking cessation, pulmonary rehabilitation, PFTs, VQ scan, high resolution CT-thorax non-contrast to generate a STRATX report evaluating interlobar fissures, 6-min-walk test, pre-operative assessment and quality of life(QOL) questionnaires (EQ-5D-5L and SGRQ). The mean age of this patient cohort is 66.7 (49–80), their mean FEV1 28.05 (16–43) and mean residual volume 206.8(147–290). 3 patients underwent VATS LVRS, 1 RATS and 16 had EBV.
Preliminary results from patients who have completed 3 months follow-up show a mean increase in FEV1 to 32.75(28 – 47) and mean decrease in RV to 170.5(145 – 201). Patient reported QOL scores increased from 43(20–70) to 60(35–95) (EQ-5D-5L).
LVR is an effective treatment for dyspnoea with improvement in clinical and patient reported parameters.

5.2 A study to assess the impact of airway virus on asthma control in non-exacerbating patients

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Changes to the composition of the pulmonary microbiome e.g., through viral infection have the potential to impact asthma severity. However, little is known about the lung virome and the role viruses play in non-exacerbating asthmatics.
We aim to assess if viral colonisation in non-exacerbating asthmatics influenced their asthma control as measured by the Asthma Control Questionnaire (ACQ-7) score and if viral colonisation differed by severity of disease as per GINA classification.
Patients were recruited from the asthma clinic in Cork University Hospital. A bronchoscopy with bronchoalveolar lavage was carried out and viral analysis was conducted. We also measured a cell differential and cytokine levels in the samples.
46 samples were obtained of which 10.8% were virus positive. Most patients in this study were classed as severe asthmatics. There was a higher mean ACQ-7 and lower FEV_1 in the virus positive group. Oral steroid use was significantly higher in those with severe asthma who were virus positive.
Our results suggests that in non-exacerbating asthmatics, viral colonisation results in poorer asthma control, a significantly higher dose of oral steroids and lower FEV_1. Elevated airway levels of several cytokines were also observed in the airways of patients who were virus positive.

5.3 The accuracy of HIPE coded data in patients with acute exacerbations of COPD: a quality improvement project

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The number of cases of patients admitted to Irish hospitals with Chronic Obstructive Pulmonary Disease (COPD) as their principal diagnosis has increased over the last 10 years from 10,996 in 2010 to 16,184 in 2019 (1).
A retrospective chart review was carried out on 22 patients who died in 2019 with a HIPE coded admission diagnosis of an acute exacerbation of COPD (AECOPD). Data were collected and a comparison was made between the admitting diagnosis as documented by the NCHD, and the admitting diagnosis as documented by the consultant.
In 50% of cases (11/22) the consultant diagnosis was not of an AECOPD. In 6/11 of these cases, while the admitting NCHD had initially documented the diagnosis as an AECOPD, on consultant review an alternative diagnosis was documented (e.g., pneumonia). In the other 5/11 cases, COPD was not mentioned as the reason for admission, yet was HIPE coded as such. Interestingly, in 4 of these 5 cases the patient had a diagnosis of type two respiratory failure.
We conclude that reliance on the admitting NCHD documentation for HIPE coding may lead to incorrect data capture. The lack of an objective marker of a COPD exacerbation means patients are erroneously labelled and treated as an exacerbation when alternate coexistent pathology is responsible.

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5.4 Cigarette smoke alters macrophage mitochondrial iron handling in COPD

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Chronic obstructive pulmonary disease (COPD) is an inflammatory disease characterised by emphysema and chronic bronchitis. Cigarette smoke (CS) inhalation constitutes the primary risk factor for COPD progression and dysregulates numerous pathways essential to lung-resident alveolar macrophage (AM) and circulating bone marrow-derived macrophage (BMDM) function. Aberrant iron metabolism is one such hallmark: AMs are the primary lung resident iron-positive cells, with numerous iron-related proteins elevated in patient bronchoalveolar lavage fluid. Interestingly, CS also causes mitochondrial dysfunction in macrophages, which are the primary iron storage sites in the cell. CS-induced mitochondrial dysregulation blunts phagocytic and inflammatory function in AMs and BMDMs, but its effect on mitochondrial iron in COPD macrophages is unknown. Using an in vitro model of smoke exposure, we show that CS alters expression of the mitochondrial iron transporters mitoferrin 1 and 2 and mitochondrial iron content in immortalised BMDMs, with further dysregulation upon lipopolysaccharide treatment. Single-cell RNAseq of AMs isolated from CS-exposed mice revealed similarly altered expression patterns in vivo. These findings illustrate the role of macrophage mitochondrial iron dysregulation in COPD pathogenesis and present the manipulation of mitochondrial iron in the lung as an intriguing therapeutic target.

5.5 Robot-Assisted Lung Volume Reduction Surgery in Management of Severe Emphysematous Disease: A Case Series

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Chronic obstructive pulmonary disease (COPD) is a progressive inflammatory disease of the airways, alveoli and pulmonary microvasculature[1]. In selected patients, lung volume reduction surgery (LVRS) has been shown to improve lung function and quality of life[2]. Minimally invasive techniques have become standard of care, offering distinct benefits over thoracotomy. We present a case series, describing our experience of robot-assisted LVRS.

A retrospective review of patients who underwent robot-assisted LVRS in a Dublin hospital was carried out to assess morbidity and mortality. Main outcome measures were post-operative length of stay and chest drain duration.

Robot-assisted LVRS was performed in 5 patients between April 2019 and September 2020. The mean age of patients was 56.6 years (median age 58 years, range 48–63 years). Patients had a mean pre-operative FEV1 of 46%, total lung capacity of 110% and residual volume of 220% of predicted. The median post-operative length of hospital stay was 6 days (range 2–13). The median post-operative chest drain duration was 6 days (range 3–19). There were no operative, in hospital or 90 day mortalities.

Based on our experience, robot-assisted LVRS appears safe and feasible. Future projects aim to compare post-operative outcomes in robot-assisted versus video-assisted thoroscopic surgery (VATS) LVRS.

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5.6 COPD Care Pathways, COVID and Institutional Memory Loss

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A diagnosis of Chronic Obstructive Pulmonary Disease (COPD) carries significant morbidity and mortality which often results in admission. The End to End COPD Model of Care (2019) provides guidelines for best practice. COPD Quality Improvement Initiative (COPD QI) was rolled out to support the implementation of the guidelines in 2018 and 2019. The first surge of the COVID-19 pandemic necessitated restructuring of hospital services and redeployment of staff. We aimed to audit COPD care in our institution based on this guideline in the aftermath of the first surge of the COVID-19 pandemic.

This retrospective study reviewed 20 patient charts with admissions for an exacerbation of COPD between September and November 2020. Data was collected with a predetermined pro forma based on standards in the End to End COPD Model of Care and previous COPD QI. The results are highlighted in Table 6.

COPD pathways are very likely to have been impacted by the changes forced on hospitals during the COVID surges. Institutional memory is short lived. We recommend that a dedicated staff member is appointed in each institution to champion and drive the changes and standards endorsed by the End to End COPD Model of Care and COPD QI.

Table 6 DECAF: Dyspnoea, Eosinophilia, Consolidation, Acidaemia, Atrial Fibrillation; GOLD: Global Initiative for Chronic Obstructive Lung Disease; CXR: Chest X-ray; ABG: arterial blood gas

Patients, n	20
Time to review (minutes)	
Registration to triage	12.1 ± 6.69
Registration to emergency doctor review	66.62 ± 51.25
Registration to medical admitting doctor review	232.4 ± 139.8
Review by respiratory services, n (%)	
Respiratory doctor review	11 (55)
Respiratory nurse or physiotherapist review	12 (60)
No review by any member of the respiratory service	4 (20)
Length of stay (days)	6.85 ± 10.94
Documentation of diagnosis and risk scores, n (%)	
DECAF	3 (15)
GOLD stage or spirometry	10 (50)
Investigations, n (%)	
CXR	20 (100)
ABG	19 (95)
Bronchodilator use, n (%)	
Bronchodilator use	16 (80)
Steroid nebulisers	0 (0)
Antibiotics, n (%)	
Antibiotic use	19 (95)
Oral route	2 (10)
Intravenous route	14 (74)
Amoxicillin, doxycycline or macrolide	15 (79)
Steroids	
Steroid use, n (%)	18 (80)
Oral route, n (%)	11 (61)
Mean cumulative dose of prednisolone (milligrams)	287.5 ± 163.47
Mean duration of use (days)	10.16 ± 7.62
Prevention, n (%)	
Active smoking	5 (25)
Smoking cessation offered	3 (60)
Vaccination status documented	0 (0)
Discharge planning, n (%)	
Inhaler technique documented	1 (5)
Referral to pulmonary rehabilitation or COPD outreach	7 (35)
Self management plan documented	7 (35)

5.7 A 2-year longitudinal follow-up study examining physical activity and frailty in supplemental oxygen users attending a respiratory outpatient service

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The aim of this study was to assess and longitudinally follow up physical parameters of people with COPD who were supplemental oxygen users over a 2-year period.

Eighteen participants [11 males, mean (SD) age 71.67 (9.93)] took part in a telephone-based assessment at baseline (T1) and 2-year follow-up (T2). The following variables were assessed; spirometry, dyspnoea

severity (eMRCD), health-related quality of life (HRQoL, EQ5D5L), sleep quality (Pittsburgh Sleep Quality Index), physical activity levels (Physical Activity Vital Sign) and frailty (FiND questionnaire).
Spirometry remained stable over time (mean %predicted FEV1 47.2 ± 16.9 at T1; 47.7 ± 15.8 at T2) as did dyspnoea scores (median eMRCD 3 at T1; 3 at T2). 27.8% (n = 5) were frail at baseline compared to 66.7% (n = 12) at follow up. Sleep quality scores were lower at follow up (8.17 ± 4.19 at T1; 9.56 ± 5.03 at T2). Mobility and usual activities were the domains of HRQoL most affected at both T1 and T2. Adherence to physical activity recommendations was very low at both timepoints (16.7% (n = 3) at T1; 11% (n = 2) at T2).
Overall, although disease progression and dyspnoea remained stable over two years, physical activity, HRQoL and sleep quality decreased and frailty levels increased. This study highlights areas which represent exercise intervention targets in supplemental oxygen users.

5.8 Does the Test of Adherence to Inhalers Questionnaire Correlate with the Inhaled Corticosteroid Medicines Possession Ratio of Patients Attending a UK Hospital Asthma Clinic?

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A common method of determining adherence to inhaled corticosteroid treatment is the medicines possession ratio (MPR) calculated from prescription records as observed pickup/expected. A high MPR (≥75%) suggests good adherence, 51–74% is intermediate and MPR ≤ 50% suggests poor adherence. Another strategy is the Test of Adherence to Inhalers[1] (TAI), a 5-point Likert scale questionnaire with 10-items which classifies adherence as good, intermediate or poor based on the patient's total response score (50/50, 46–49/50 or ≤ 45/50 respectively). Of 100 patients attending a hospital asthma clinic (60% female, mean age 46 years), 56 had a TAI that matched their MPR classification, 28 TAI suggested better adherence than MPR (10 significantly so) and 16 insinuated less ICS use (4 significantly so). The results are summarised in Table 7.
While the limitations of interpreting a high MPR are acknowledged (it does not guarantee adherence), a low MPR makes adherence unlikely. In this cohort of patients, using TAI to triage patients with intermediate/low adherence for medicines-taking support from the pharmacist identified 44 patients, of whom 14 were potentially inappropriate (high MPR), but importantly overlooked 17 with intermediate/low MPR. These data suggest TAI alone is unlikely to identify potential non-adherence and reiterates caution when interpreting the MPR.

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Table 7 Adherence suggested by TAI vs that suggested by their MPR

		MPR		
		Good (n = 53)	Intermediate (n = 19)	Poor (n = 28)
T	Good (n = 56)	39	7	10
A	Intermediate (n = 31)	10	10	11
I	Poor (n = 13)	4	2	7

5.9 The impact of the Respiratory Advanced Nurse practitioner on the surveillance of severe asthma patients on biologic therapy during COVID-19 pandemic

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To improve adherence to therapy and reduce future exacerbations, a shared decision approach between patients and specialized healthcare providers is essential in management of their disease.
Two severe asthma patients, on optimal asthma medications as per step 5 of GINA guidelines presented with frequent asthma exacerbations despite being on biologic therapy. Close monitoring by RANP included monthly PEFR monitoring, asthma education, assessment of adherence and assessment of airway inflammation using blood eosinophils and serial fractional exhaled nitric oxide (FeNO). Patient contacts were either face to face or virtual in keeping with COVID-19 guidelines. Using a shared decision approach, PEFR data and airway inflammation data: (1) There was an improvement in adherence to inhaler therapy by switching to once daily asthma regimen which led to a reduction in FENO, blood eosinophils and exacerbations; (2) Switching to anti-IL5 therapy was avoided in the second patient. When the patient decided to stop inhaled corticosteroid therapy, detection of early rise in FeNO, blood eosinophils and drop in peak flow led to the patient agreeing to re-commencement of inhaled corticosteroids.
RANP frequent contacts with severe asthma patients and a shared decision making resulted in improved medication adherence, reduction in asthma exacerbations.

5.10 A Survey of the Multidisciplinary Team Understanding of the Impact of Inhalers on Carbon Footprint

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Health care's climate footprint is equivalent to 4.4% of global net emission[1]. Pressurised metred dose inhalers (MDIs) contain a propellant (hydrofluroalkanes) which has a disproportionate global warming potential to dry powdered inhalers (DPIs) and soft mist inhalers (SMIs). In this study an anonymous, online, 23 question, survey of the respiratory multidisciplinary team assessed the understanding of the impact of inhalers on carbon footprint.
Sixty-one members of the respiratory multidisciplinary team completed the survey. Sixty two percent of respondents prescribe inhalers at least weekly. Eighty percent would appreciate further training on inhaler technique. Forty-seven percent were not aware that some inhalers release greenhouse gases and eighty nine percent had never discussed the correct disposal of inhalers with their patients. Half did not feel confident identifying patients who do require an MDI and those could be suitably managed with a DPI. Ninety- four percent felt it was important to consider carbon footprint when choosing an inhaler for a patient.

When informed, the respiratory multidisciplinary team recognises the importance of considering carbon footprint when prescribing inhalers. Further education is welcomed by the respiratory multidisciplinary team to increase awareness of the impact of inhalers on carbon footprint.

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5.11 A Novel Respiratory Physiologist Led Diagnostic Spirometry Service in Primary Care: Sláintecare Integration Fund (SIF) 159 Project

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This project was affiliated with Sláintecare, Pobal, the National Clinical Programme (NCP) Respiratory, the office of NCAGL for chronic disease and Primary Care Strategy & Planning

Respiratory Physiologists, historically hospital based in Ireland, are experts in performing and interpreting lung function tests. Irish General Practitioners (GP) do not often have direct access to a quality spirometry diagnostic service in Primary Care. Respiratory Physiologists, based in Northeast Wicklow (CHO6) and Longford/Westmeath (CHO8), began providing a novel community based spirometry diagnostic service in April 2021. The data from the first 150 patients has been audited and results are presented in Table 8. Data is presented as percentages or mean ± SD as appropriate

Both patients and GP's are very satisfied with this service, which is providing a rapid and direct access service in primary care.

In conclusion this audit demonstrates early success with this novel service. This new initiative has the potential to be rolled out nationally.

Table 8 Results

Parameter	Results
Females v males	57% v 43%
Age years	57 ± 16
BMI Kg/m2	31 ± 6.5 kg/m2
Smoking history	28% non, 45% ex, 27% current smokers
Unknown prior diagnosis	69%
Abnormal spirometry & significant reversibility	39% + 18%
Diagnosis confirmed (spirometry & history)	78%
Referred to PFT Lab only v Respiratory consultant	18% v 10%
GP engagement	49 practices + 65 GPs

5.12 A retrospective review of clinical outcomes in patients switched from Omalizumab to Anti-interleukin-5 therapy in a regional asthma specialist centre

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Interleukin-5 (IL-5) is a pro-eosinophilic cytokine that contributes to inflammation in the airways. First approved for HSE reimbursement in 2018, anti-IL-5 therapies allow for targeted asthma care in carefully selected patients with refractory disease.

We assessed clinical outcomes in severe eosinophilic asthmatics who remained suboptimally controlled despite Omalizumab and were therefore switched to Anti-IL-5 therapy.

All patients who switched therapy were reviewed (2018–2021). Asthma Control Questionnaire (ACQ), exacerbation rate, eosinophil count, maintenance corticosteroid (OCS) dose, and FEV1 were analysed. Comparisons were made pre Omalizumab vs one year established on Omalizumab and pre switch on Omalizumab vs. one year post anti-IL-5 commencement.

Ten patients met criteria. All switched therapy September 2018-September 2020. Six patients commenced Benralizumab, and four commenced Mepolizumab.

There was a significant reduction in exacerbation rate, eosinophil count, and FEV1 in Omalizumab vs. one year post anti-IL-5, ($p = 0.029$, $p = 0.007$, $p = 0.028$) respectively.

Median annual exacerbation rate decreased from pre Omalizumab to one year post (10 vs. 5) and from pre anti-IL-5 to post (6 vs. 0). Median OCS dose decreased from pre anti IL-5 to post (7.5 vs. 2.5 mg). Median ACQ score decreased (3.0 vs 1.9).

Asthmatics who are suboptimally controlled despite Omalizumab should be considered for anti-IL5 therapy

5.13 A Different Approach to the Delivery of a Respiratory Integrated Care Service.

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The Respiratory Integrated Care Service aims to provide expert diagnosis and care for patients with COPD and Asthma. Mentorship between the integrated clinical nurse specialist (CNS) and advanced nurse practitioner (ANP) within secondary care was created. It was envisioned that the ANP would supervise and sign off the majority of the clinical patient caseload for the CNS, with overall clinical governance by the respiratory consultant. Inclusion and exclusion criteria would be applied to referrals and complex cases would be discussed with the respiratory consultant.

Monthly statistics were gathered and patient files were reviewed retrospectively. Data was collected from the commencement of the service in April 2021 to end of July.
In total 55 patients have been assessed. Of these, 12% (n=7) had no previous diagnosis of pulmonary disease. To clarify a diagnosis, 43% (n=24) were sent for additional testing (PFTs). 5.5% (n=3) had change in their diagnosis from Asthma to COPD. Overall, 27% (n=15) were referred to the consultant for further discussion/assessment.
This project shows that integrated care services can be supervised safely and effectively by a registered ANP once sufficient medical supports are in place. This in turn will lead to a time saving benefit for the consultant.

Conflict of interest: The authors have no conflict of interest to declare.

5.14 Omitted

5.15 A Patient Experience Survey of a Review of asthma biologics within the outpatient service in Cork University Hospital

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[2] Health Research Board, Clinical Research Facility, University College Cork, Cork

The asthma biologic outpatient service has been in operation in CUH since 2018. A survey to determine patient satisfaction was carried out in July 2021. A questionnaire was distributed to all patients who received more than three infusions within the outpatient setting in the previous 12 months
A 7 item Likert questionnaire was developed. Questions 1–6 were based on a scoring scale of 1–5 to rate the service, and question 7 was open ended to allow for feedback. These questionnaires were discussed with patients with help from administration staff whom the patients had never met previously to exclude any bias. Patients who responded to a text message agreed to being contacted, to complete the questionnaire.
All patients felt they would be able to contact the respiratory team in an event of acute deterioration in their asthma symptoms. 96% of patients felt by attending asthma biologic clinics, that they had a greater level of knowledge on disease management. 78% of patients felt by attending the asthma biologic service that they avoided a hospital admission by early interventions of the multi-disciplinary team.
Our results suggest that the provision of an outpatient asthma biologic service is a modality of treatment delivery supported by our asthma cohort.

5.16 A Nurse led Respiratory Integrated Care Service for CHO 6—4 months on

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Affiliations: This project was affiliated with Sláintecare, Pobal, the National Clinical Programme (NCP) Respiratory, RIC CHO Area 6, St. Michael's Hospital.
The purpose of this integrated nurse led clinic is to provide diagnosis, treatment and management of Asthma and COPD in a Primary Care setting. Patients are referred by their GP and then assessed by a CNS. Cases are discussed with an Advanced Nurse Practitioner and a report with a diagnosis and a management plan are sent to the GP. Overall clinical governance is by the respiratory consultant.
Monthly statistics were gathered and patient files were reviewed retrospectively from April – July 2021.
Overall 55 patients were seen for first assessment, and 38 follow-up reviews occurred. 12% (n=7) of patients had no respiratory diagnosis. To clarify a diagnosis, 24 patients were referred for additional testing (PFT). Of these, 15 patients were referred to the consultant for further assessment. To date, we have diagnosed 15 new Asthma and 2 new COPD patients. There were 3 changes to diagnosis from Asthma to COPD.
This nurse led model of care is a new integrated way of working and can improve healthcare experience and health outcomes for respiratory patients living with a chronic disease.

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Conflict of interest: The authors have no conflict of interest to declare.

5.17 Adherence to Physical Activity Following Virtual Pulmonary Rehabilitation

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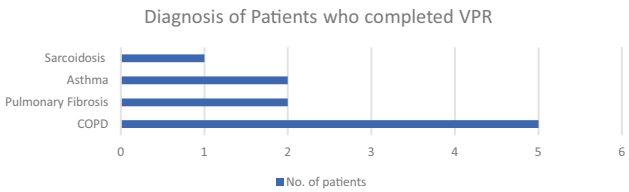
Pulmonary Rehabilitation (PR) doesn't always improve long-term physical activity (PA) levels (Egan et al., 2012). Our aim was to evaluate the Virtual PR (VPR) service, implemented due to Covid-19 restrictions in Tallaght University Hospital (TUH), by monitoring adherence to PA. We measured daily PA levels and sedentary behavior in patients following VPR and assessed the barriers to PA.
The first 12 patients who completed VPR in TUH were contacted via telephone an average of 19 weeks post completion of the programme. The International Physical Activity Questionnaire (IPAQ) Short Form, a self-reported survey that assesses PA, was administered. In addition patients were asked to give examples of PA performed and barriers limiting PA.



Ten patients were included (one patient did not answer the phone and one patient had died). Eight patients performed moderate PA, walking for an average of 24 min per day, no patients partook in vigorous PA. Two patients completed strengthening exercises and housework was the most common PA reported. Reduced motivation when exercising alone, Covid-19 restrictions, dyspnea, fatigue and oxygen dependency were barriers to PA.
Poor adherence to PA was observed following VPR. This service evaluation highlights the need for interventions to promote long-term adherence to PA following VPR.

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5.18 Virtual pulmonary rehabilitation: virtual reality or virtual insanity?

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Emergent literature suggests Virtual Pulmonary Rehabilitation (VPR) may be as effective as traditional models of Pulmonary Rehabilitation (PR) for improving key patient outcomes.
We examined accessibility, completion rates, safety and effectiveness (minimally important difference (MID) in exercise capacity or health status) of an 8 week (× 2/weekly) supervised VPR programme on Zoom for patients with chronic respiratory disease (CRD). Pre and post outcomes included a 1-min sit-to-stand test and/or 6-min walk test (6MWT) as a measure of exercise capacity. Health status was measured using a disease specific questionnaire.
An initial scoping review of the PR waiting list (n = 54) found that 33.3% (n = 18) were interested in VPR and had IT access. Sixty eight participants (female 43.2%, mean age 68.4 ± 11.2 years, mean MRCD 2.8 ± 1) enrolled over 1-year. The dropout rate was 45.5% (n = 31). Post assessment outcomes (n = 34) demonstrated MID in exercise capacity or health status was achieved in 91.1% of participants (70.5%, n = 24 in exercise capacity; 50%, n = 17 in health status; 29.4%, n = 10 both). No adverse events were recorded.
This service evaluation found barriers to engagement with telehealth in people with CRD. While safety and feasibility were demonstrated, clinical effectiveness has not been fully established.

5.19 Comparison of Subjective and Objective Outcomes in 8-Week Virtual Pulmonary Rehabilitation Program with Telehealth Alternative

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a)Effectiveness of virtual/telehealth Pulmonary Rehabilitation (PR) versus in-person PR, demonstrated in COPDAssessment Test (CAT) scores. b)Effectiveness of virtual (VPR) versus telehealth PR, demonstrated in COPDAssessment Test (CAT), Generalised Anxiety Disorder (GAD-7), 1-min Sit-to-Stand (1MSTS) test.
Participants in VPR and telehealthPR programmes completed pre- and post-assessments including the CAT, GAD-7 and 1MSTS outcome measures. Differences between pre- and post- scores were evaluated and compared between virtual and telehealthPR groups. The outcome measure common to both groups, CAT scores from virtual/telehealthPR participants were compared to pre-COVID, in-person PR.
In-person PR outcome measures were recorded between March 2019–2020, and virtual/telehealthPR between July 2020-May 2021. Similarly significant reduction observed in median CAT score for participants of both in-person PR (-3;n = 53) and virtual/teleheathPR (-3.68;n = 44) Significant reduction (-4.76 points)in median CAT score was observed for VPR participants (n = 29;MCID = -2). A non-significant reduction (-0.96) observed for telehealthPR participants (n = 15). Similar improvements observed in median GAD-7 scores for telehealth (-0.5; n = 14) and virtual (-1; n = 31)PR groups. A significant increase (3reps) in median 1MSTS scores observed for telehealthPR participants (n = 19; MCID = ≥3reps). A non-significant increase (2 reps) observed for VPR participants (n = 33)
In-person and virtual/telehealthPR programmes were equally effective for CAT scores. VPR programmes were more effective than telehealth CAT scores.

5.20 Should frailty assessment be incorporated in COPD Outreach Programmes?

Daphne Masterson, Martha O Connor, Angela Radley, Yusuf Vapra, Kenneth Bolger

Chronic Obstructive Pulmonary Disease (COPD) Outreach Team, Respiratory Department, Tipperary University Hospital (TippUH), Clonmel, Co Tipperary

A Sláintecare funded COPD Outreach Programme was commenced in October 2020. COPD Outreach Programmes have been proven to reduce length of stay (LOS), reduce re-admission rates and improve quality of life.
National inclusion and exclusion criteria for COPD Outreach ensure safety is maintained but precise measures to predict who will require readmission, are less robust. Baseline measures such as FEV1, mMRC, CAT, EuroQoL EQ-5D-5L, previous admissions, LOS, and co-morbidities are captured. Our programme includes frailty assessment using the Rockwood Clinical Frailty Scale (CFS).
32 candidates, with a CFS ranging from 3–7, have been enrolled and discharged within 72 h. 15/32 (47%) have passed the 90 day since acceptance. 7/15 have been readmitted, of which 57% were associated with a CFS-6 which is a moderately frail classification, with the remainder at CFS-5 (mildly frail). These re-admissions utilised 21.5 bed days, compared with 51.5 bed days in the previous 90 days.
This study questions whether frailty scores should be incorporated in inclusion /exclusion criteria. On identification of a frail patient, further resources and interventions could then be made available through the COPD Outreach Programme, to further optimise health outcomes and potentially reduce re-admissions.

5.21 Reviewing Bone Health in a COPD Outreach service in South Tipperary

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A Sláintecare funded COPD Outreach was commenced in 2020. Bone health is a potentially modifiable factor in health outcomes in patients with COPD. Assessment of bone health includes vitamin D measurement and DEXA scanning, to guide prescribing and address lifestyle modifications such as BMI, smoking, diet and exercise.
Of 32 patients managed to date, 15 have had a DEXA scan. 14/15 (93.3%) have highlighted bone health disorders. Two studies showed osteoporosis in spine, femoral neck and total hip (-2.5 to -4.2). The remainder demonstrated a combination of normal to osteoporosis in the 3 separate dimensions of the scan (-0.3 to -2.5).
13/32 (40%) of the total patients were prescribed bone protector medications with 3 of these having no documented DEXA scan. 14/32 were deficient in Vitamin D. 7 have successfully ceased smoking; 11 continue to smoke. 5/32 candidates had a BMI of less than 20.
This study highlights one associated comorbidity of patients treated during an Outreach program. This highlights the need for a systemic approach to patient health rather than solely lung health. Assessing and treating bone health through pharmacological and non-pharmacological means has the potential to improve the COPD associated health burden, and prevent hospital admissions and readmissions.

5.22 Can Grip Strength be used as a predictor of re-admission in patients enrolled in a COPD Outreach Early Supported Discharge (ESD) Programme?

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Chronic Obstructive Pulmonary Disease (COPD) Outreach Service, Respiratory Department, Tipperary University Hospital (TippUH), Clonmel, Co. Tipperary

COPD Outreach ESD commenced in TippUH as a Slaintecare project in November 2020. One aim of ESD is to reduce re-admission rates. An estimated 35% of patients hospitalised with acute exacerbation of COPD are re-admitted within 90 days. The first step towards avoiding re-admission is identification of patients at risk. Studies have explored potential predictors for re-admission, including frailty. Hand grip strength, a component of the Frailty Phenotype is an objective measure which may predict re-admission.
All patients accepted for ESD (36 to date) performed grip strength measurement, using a Saehan Hydraulic Hand Dynamometer. Grip strength was classified as 'Weak' or 'Not Weak' using cut off scores stratified by gender and BMI, as per 'Strength' component of the Frailty Phenotype assessment.
15 patients have passed 90 days post acceptance. Of those, 10 (67%) were 'Weak' and 5 (33%) were 'Not Weak'. Of the 'Weak' patients, 7 (70%) were re-admitted within 90 days. Of the 'Not Weak' patients, only 1 (20%) was re-admitted.
Results indicate a potential clinically significant difference between 'Weak' and 'Not Weak' groups. However as patient numbers are limited, further data collection and analysis are required to determine association between grip strength and re-admissions for COPD patients.

5.23 Join the living Quit smoking. A smoking cessation physiotherapy led Slainte care initiative

Angela O'Donovan, Martha O'Connor, Rosaleen Anglim, Daphne Masterson, Yusuf Vapra, Kenneth Bolger

Chronic Obstructive Pulmonary Disease (COPD)Outreach Team, Respiratory Department, Tipperary University Hospital (TippUH), Clonmel. Tipperar

COPD outreach commenced in TippUH in October 2020 as a Slaintecare project. There are 3 pillars to this programme(Pulmonary Rehab, Smoking Cessation & Early Supported Discharge).Smoking is the top modifiable risk for mortality in COPD. 6000 deaths a year in Ireland due to smoking.
The Smoking Cessation service is committed to promoting positive health and well-being, by reducing the harm caused by tobacco use. We do this through education, client centred treatment, advocacy, audit and evaluation.
Patients are referred to the smoking cessation service with their consent as in-patients where brief intervention and NRT is commenced. Then patients are reviewed in the Physiotherapy OPD department for face to face behavioural support with regular carbon monoxide(CO) monitoring.
All patients are registered on the national Quitmanager database.
To date 368 patients have received smoking cessation advice. 68% were smoke free after the 12 week programme. 79% smoke free at 6 months.
This ongoing initiative demonstrates the importance of a smoking cessation face to face behavioural support programme with CO monitoring. Brief intervention re smoking cessation should be commenced at ward level and continued in out-patients.
The author encourages patients to remember that their last puff is their first breath of a new life so join the living Quit the habit.

Conflict of Interest: The authors have no conflict of interest to declare.

5.24 Sláintecare Integration Fund 159 Project: Development of an End to End Respiratory Model in two Community Healthcare Networks – The Clinician's Perspective

M. Ward, Change Manager, Sláintecare Integrated Fund 159

Affiliations: This project was affiliated with Sláintecare, Pobal, the National Clinical Programme (NCP) Respiratory, the office of NCAGL for chronic disease and Primary Care Strategy & Planning.

Development of an End to End Respiratory Model in two community healthcare networks is aligned to strategic actions three and four in the Sláintecare Implementation Strategy 2018[1]. To date respiratory services have generally been delivered in acute secondary care. This project looked at the development of a community based respiratory team across two sites – Northeast Wicklow and Longford/Westmeath. Disciplines included in the team were: Clinical Nurse Specialist Respiratory, Senior Physiotherapists x2WTE, Senior Respiratory Physiologist and a Smoking Cessation Officer. The team was governed clinically by the local acute hospital respiratory consultant and the NCP Respiratory.
At the end of the project a questionnaire was distributed to each team member to obtain their feedback on the project.
Highlights of the project were:
Successful implementation of the community based respiratory team
Positive patient feedback about attending respiratory services in primary care
Improved service delivery for respiratory patients with increased accessibility to respiratory services
Team approach and collaborative working to provide an array of community respiratory resources for respiratory patients
Challenges to the project as reported by the team included:
Difficulty sourcing accommodation
Some services had to be modified to an online platform due to the COVID-19 pandemic
All team meetings initially were virtual which meant that team members were unable to meet face to face
Overall this project overcame all challenges to successfully implement the End to End Respiratory Model in two community sites embracing the Sláintecare ethos of bringing high quality integrated care closer to the patient's home.

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5.25 The COPD Adviceline – Have you heard?

Joan Johnston[1], Sam McCabe[2], Tim McDonnell[3], Martina Blake[4]

[1]*Joan Johnston, General Manager, COPD Support Ireland*
[2]*Samantha McCabe, Respiratory Nurse Specialist, COPD Adviceline, Asthma Society of Ireland*
[3]*Tim McDonnell, Consultant Respiratory Physician, COPD Support Ireland*
[4]*Martina Blake, Patient Services Manager, Asthma Society of Ireland*

The COPD Adviceline (COPD-Adv) is a Freephone, Respiratory Nurse call-back service for people living with COPD, funded by the HSE since 2016. However, the COVID-19 Global Pandemic highlighted its

underutilisation amongst the COPD population. We aimed to explore the reasons for this and determine what improvements could be made to increase utilisation.
A 10-question e-survey was disseminated through respiratory health care professional (R-HCP) organisations as well as sharing it on twitter. Results confirmed a lack of awareness of COPD-Adv amongst R-HCPs; 60% were aware of it, but only 31% referred patients to it. Of non-referrers, 14% reported their service fully met their patients' needs, the remainder either didn't know about COPD-Adv, didn't have details to distribute, or didn't think of it. Amongst respondents, Respiratory Nurses and Physiotherapists had most familiarity with COPD-Adv, indicating promotion amongst medical doctors could be beneficial. Main referrals were for new diagnosis COPD and exacerbation self-management education. Most valued features were delivery by fellow R-HCPs and suggested developments to allow video-call inhaler technique, breathlessness management and tailored home exercise programmes were proposed.
Overall, the response was positive regarding service content, but awareness was low, suggesting increased promotion across R-HCPs would be beneficial.

5.26 Implementation of a Virtual Pulmonary Rehabilitation Programme for patients with chronic respiratory disease in response to the COVID-19 pandemic

Clare Baily-Scanlan[1], Barry Kehoe[1], Professor Eddie Moloney[2]

[1]Physiotherapy Department, Dublin South West, CHO7, [2]Professorial Respiratory Centre, Tallaght University Hospital

Pulmonary Rehabilitation (PR) is one of the most effective and efficient treatments for patients with chronic lung conditions(1). In response to the COVID-19 pandemic, face to face PR classes across the country were suspended. The community-based PR staff in Dublin South West sustained the delivery of PR through a virtual medium, which has previously been shown to be safe and feasible (2).
43 patients were referred to the virtual PR (VPR) service. Of these, 14 declined due to technical issues, 19 were assessed and suitable and the remaining 10 were unsuitable. Patients were invited to log onto the HSE approved digital platform Attend Anywhere or attend in person, depending on public health advice, for their initial and post assessments. Classes were delivered via Attend Anywhere and ran twice a week for 8 weeks. 52% (n = 10) of participants showed significant improvement in their health status using the COPD Assessment Tool. 63% (n = 12) showed significant improvement in exercise tolerance, using either the 1 min sit-to-stand or 6 min walk test. Three patients dropped out of the programme.
VPR has been shown to be effective for a select group of patients who have both the equipment and technological literacy to engage in it. Although it will not replace traditional face to face PR, it will continue be a vital method to enable continued access and prevent service interruption in the future.

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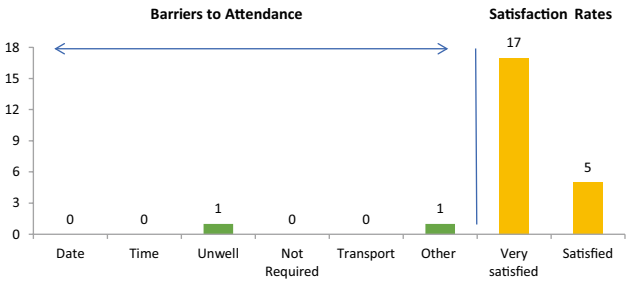
5.27 Patient Satisfaction and an Exploration of Barriers to Attendance at the Chronic Obstructive Pulmonary Disease (COPD) Optimisation Clinic at St. Vincent's University Hospital (SVUH) During the Lockdown Period of COVID-19

Maedhbh Ní Chléirigh, Jomma Mathew, Emer Kelly

COPD Outreach Department, St. Vincent's University Hospital, Elm Park, Dublin 4

Our COPD Optimisation Clinic provides a comprehensive multidisciplinary assessment, GOLD classification diagnosis, and lifestyle behaviour change treatment options for patients who are newly diagnosed COPD / established COPD.
This report aimed to firstly look at patient satisfaction of our current service, and secondly to try to establish causes for our 28% Did Not Attend (DNA) / Unable To Attend (UTA) rates.
Every patient (N = 42) who was offered an appointment to attend one of our eleven COPD Optimisation Clinics from January 2021 to July 2021 was sent a questionnaire and a stamped-addressed envelope. Patients' GOLD classification varied; GOLD 1 = 27%, GOLD 2 = 23%, GOLD 3 = 23%, GOLD 4 = 9%, differential diagnosis = 18%.
Of the 42 questionnaires issued, 23 were returned, representing each classification group. 100% reported receiving enough notice of their appointment and were "very satisfied" (77%) or "satisfied" (23%) with the service (Fig. 1). 92% of replies reported attending their appointment and Fig. 1 also reports the reasons for not attending their appointment (N = 1).
This information is positive that patients are subjectively reporting their satisfaction with the service. We will continue to review reasons for DNA to the clinic.

Fig. 1 Barriers to Attendance and Satisfaction Rates



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5.28 What percentage of patients with COPD have had pulmonary function testing – an audit of inpatients with a label of COPD

T O' Halloran[1], U O' Connor[1], A Scott[1]

[1]St. John's Hospital, Limerick

Spirometry is required to make a diagnosis of COPD with FEV1/FVC < 0.7 in the correct clinical context confirming the diagnosis as per GOLD guidelines[1]. Access to pulmonary testing has been limited internationally[2,3,4] and locally. We aim to assess what percentage of patients attending our hospital with COPD have had Pulmonary function tests (PFTs) or spirometry.
The respiratory consultants in St. John's hospital daily inpatient ward census was reviewed for April 2021. Patients were selected if they had

COPD in their problem list. Charts were retrieved and checked for documented PFT or spirometry results.
N = 21 patients were selected with diagnosis of COPD; 9 of them were admitted with infective exacerbation of COPD (IECOPD). Of the 21 patients with COPD in the problem list, 33%(7) had had PFTs/spirometry documented in the past. Of the 9 patients admitted with IECOPD, 44% (4) had PFTs/spirometry documented in the past.
More than half of the patients admitted with IECOPD and two thirds of patients with a labelled diagnosis of COPD had no record of pulmonary function tests. It is planned to begin pulmonary function testing at St Johns Hospital Limerick which will improve local access to this essential diagnostic testing.

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5.29 RAST Testing: Inhaled allergen profile, an audit of Specific IgE RAST testing carried out in St Vincent's University Hospital from January to April 2019

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Allergic disease has become more common with manifestations including asthma, rhinitis, eczema, food intolerance and anaphylaxis. Ireland has one of the highest rates of allergic asthma internationally and identifying aeroallergens may help improve symptom control [(1,2)]. IgE sensitization testing when used in combination with a comprehensive allergy history can be used in this identification[3]. To date there is no published data on the prevalence of sensitization to aeroallergens in Ireland.
We sampled the population of patients that had specific IgE to aeroallergens at St Vincent's University Hospital (SVUH) and compared our results to the Specific IgE data available for the NHANES cohort[4].
From January to April 2019, 1,830 RAST specific IgE to inhaled allergens tests were performed in SVUH, of which 344 (19%) were positive (> 0.35 IU/L). NHANES reported positivity of 44.6% in their population.
At SVUH, specific IgE to house dust mite was the most commonly performed (18.6%), followed by cat dander (16.9%), dog dander (16.8%), grass mix (16.1%) and Aspergillus (15.2%). The least commonly tested were weed mix (1.3%), silver birch (1.2%), and moulds (0.9%).
Comparing the positivity between SVUH and the NHANES, similar positivity was found for cat (14.2% vs 13%) and dog (13.7% vs 12%), while differences were found for house dust mite (36.4% vs 18.5), grass mix (26.9% vs 16.8%,) and aspergillus (9.3% vs 6.5%).
In conclusion, positivity to aeroallergens was lower at SVUH compared to the NHANES epidemiologic cohort. However, similarities in positivity were found for some indoor allergens between both populations.
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5.30 A Description Of The SS Alpha-1 Antitrypsin Deficiency Phenotype

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Alpha-1 antitrypsin deficiency (AATD) is a common genetic disorder that can cause lung, liver and skin disease. Guidelines advocate screening all people with airflow obstruction, cryptogenic liver disease, difficult-to-control asthma and first-degree relatives of those affected. The most common deficiency-causing mutation in Ireland is the S mutation (Glu264Val, rs17580), with 1 in 10 Irish individuals affected. This is one of the highest allele frequencies in Europe. The S mutation causes a mild plasma deficiency and S heterozygotes (MS phenotype) are not at risk of disease. However, the clinical characteristics of individuals homozygous for S (SS phenotype) are not well described (1).
We evaluated the characteristics of a cohort of individuals diagnosed with the SS phenotype attending the national centre of expertise for AATD at Beaumont Hospital.
43 individuals with the SS genotype were included in our analysis. Baseline demographics, PFT results and co-morbidities were recorded for each person.
Our study demonstrated that the prevalence of lung and liver disease is high in individuals with the SS phenotype referred to our clinic. Our data suggests that increased vigilance may be required in the management of the SS phenotype.

Reference

1. Carroll TP, O'Connor CA, Floyd O, McPartlin J, Kelleher DP, O'Brien G et al (2011) The prevalence of alpha-1 antitrypsin deficiency in Ireland. Respir Res 12(1):91

5.31 IZ it really that bad? Clinical features of the rare IZ Alpha-1 Antitrypsin Deficiency genotype

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The National Alpha-1 Targeted Detection Programme was introduced in Beaumont Hospital, Ireland in 2004. Since its introduction 7,786 cases of alpha-1 antitrypsin deficiency have been identified in Ireland. The most common genotypes are MZ, MS, SZ and ZZ. However, serum deficiency and/or clinical suspicion has led to the identification of rarer genotypes, such as the I allele, which is less well understood. The extent of lung and liver disease in the IZ genotype requires clarification.
Since 2004, 24 IZ patients have been identified. This represents 0.001% of tests. The majority were referred for diseases related to alpha-1 antitrypsin deficiency, rather than family screening. The mean alpha-1 level at diagnosis was 0.65 g/dL (range 0.49 – 1.06 g/dL). Half of those tested were female. The average age at diagnosis was 49 (range 12—73). Gender had no influence on the age at diagnosis. Abnormal spirometry was seen in smokers only.

From our data the IZ phenotype appears to represent moderate risk state akin to MZ and SZ genotypes.

5.32 Rare Alpha-1 Antitrypsin Variants in Ireland

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AAT deficiency (AATD) is a genetic condition caused by mutations in the SERPINA1 gene. It can cause chronic obstructive pulmonary disease (COPD), liver disease and panniculitis. Over 200 SERPINA1 mutations exist in addition to the well described Z mutation (p.Glu342Lys). AATD continues to be under-diagnosed in Ireland despite its high prevalence.
21,000 individuals have been screened for AATD following ATS/ERS guidelines as part of a HSE-funded national targeted detection programme. AAT quantification is by turbidimetry and AAT phenotyping is by isoelectric focusing. Rare SERPINA1 mutations are identified by DNA sequencing.
We identified a large number of rare AAT mutations including I, F, Null (Q0), E_{tokyo}, M_{malton}, $M_{wurzburg}$, P_{lowell}, S_{munich}, $X_{christchurch}$, and $Z_{bristol}$. The I mutation (p.Arg39Cys) is most common with 182 cases, with 85 cases of the F mutation (p.Arg223Cys). The most common severe mutation is M_{malton} (p.Phe52del, 15 cases). In addition, 7 novel mutations were identified, including the novel Null mutations $Q0_{dublin}$ and $Q0_{cork}$. The rare intronic Null mutation, $Q0_{porto}$ was also identified in 3 cases.
Rare mutations were detected in 1.5% of individuals screened with many causing profound serum AAT deficiency. Our findings highlight the importance of a comprehensive diagnostic approach to AATD that includes phenotyping, genotyping and if necessary, DNA sequencing.

6. SLEEP/NIV

6.1 Assessing the Burden of Undiagnosed OSA in Patients Hospitalised with COVID-19

Cara M Gill, Laura M Piggott, Aoife Carolan, Liam Townsend, Peter Coss, Orla Gavin, Alanna Martin, Rebecca McLoughlin, Tracey Matthews, Ciaran Bannan, Parthiban Nadarajan, Barry Kennedy, Brian D Kent

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There are numerous risk factors common to Obstructive Sleep Apnoea (OSA) and morbidity and mortality from Coronavirus Disease 2019 (COVID-19).
The primary aim of this study is to assess the incidence of undiagnosed OSA in patients hospitalised with COVID-19. The secondary aim is to assess the influence of OSA on morbidity and mortality from COVID-19.
This is a prospective, observational study. A consecutive cohort of patients hospitalised with COVID-19 were invited to participate. Patients completed sleep health questionnaires and underwent home sleep testing (HST) using the WatchPAT novel diagnostic device.
Mean age of participants (n = 17) was 64 years, with 64.7% male and mean body mass index (BMI) of 29.55 ± 6.25. 94% of patients had HST suggestive of OSA, with moderately-severe disease identified in 56%. Patients admitted to ICU had higher mean Apnea–Hypopnea Indices (pAHI) (21.95 ± 19.85) than those on wards (15.3 ± 10.3). Patients with at least moderate OSA had lower mean fatigue scores (14.5 ± 3.5) than those without (18.5 ± 3.5). Similarly, patients with pAHI > 15 had lower mean Epworth scores (5.5 ± 1.5) than those with pAHI < 15 (16.5 ± 2.5).
This highlights the prevalence of undiagnosed OSA in this population. Fatigue may be independent of OSA severity. OSA is a confounding factor in COVID-19 morbidity.

6.2 An Audit of Non Invasive Ventilation Services in Cork University Hospital and a Comparison to the BTS Adult NIV Audit Report 2019

Maeve O'Grady[1], Annemarie Fitzgerald[1], Avril Hallahan[1], Siobhán Healy [1], Dr. Des Murphy[2], Dr. Mike Henry[2]

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In 2020 the physiotherapy department in CUH carried out a 2 month audit of all acute NIV services. A data collection tool, based on that used for the BTS Adult NIV Audit 2019, was used.
NIV in CUH is provided in multiple settings, by multiple teams. The aim was to establish areas to be improved upon and to benchmark against an internationally recognised guideline and a large multicentre audit (BTS 2019). Results were compared to the BTS Audit results and recommendations outlined in the BTS/ICS guideline 2016.
There were aspects of NIV provision in CUH that compared favourably to the BTS audit results. The number of patients discharged home off NIV was above that reported in the BTS audit and the overall mortality of patients commenced on NIV in CUH was comparable to the BTS results.
There were however areas where CUH did not consistently meet recommended standards. Documentation of prescribed settings and an escalation plan and the taking of an ABG within 2 h of commencing NIV were suboptimal. Timely initiation of NIV following an indicating ABG was again suboptimal.

	CUH Audit	BTS Audit
Documentation of prescribed settings	55%	N/A
Documentation of escalation plan	32%	83%
NIV commenced within 60 min of indicating ABG	50%	51%
ABG within 2 h of initiating NIV	55%	62%
D/C home off NIV	76%	56%
Mortality	27%	26%
Physiotherapy Department CUH 2021		

An NIV pathway has been developed in CUH and these audit results will inform focus areas during pathway implementation.

6.3 To Review the Prevalence and Under Recognition of Obstructive Sleep Apnoea in Octogenarians

Dr Liam Doherty, Dr Paul Gallagher, Dr Niamh Moloney

Bons Secours Hospital Cork, Ireland

Obstructive Sleep Apnoea (OSA) is characterised by heavy snoring, witness apnoea and excessive daytime somnolence. The reported prevalence of OSA in octogenarians is 13–33% (1–3) yet few patients > 80 are referred for evaluation. This could be attributed to under-recognition, lack of perceived relevance or assuming octogenarians do poorly on CPAP therapy. Aims: 1. Determine referral rate for OSA evaluation in octogenarians. 2. Demonstrate CPAP efficacy in octogenarians.

Methods: A retrospective database review of sleepstudy outcomes from patients > 80 years in Bons-Secours Cork Sleep Lab 2006–2021. Study population: adults > 80 years referred for sleepstudy. Results: 3771 patients were referred for OSA investigation, only 63 (1.6%) were > 80 years and only 17 (27%) were community referrals. 22 female (35%). OSA was present in 88% of the elderly cohort with a mean age (± SD) 82 years. 46% had a successful CPAP trial at 1 month with average post-CPAP AHI was 6.5 compared to 28.1 pre-CPAP. At 1 year, 3 were lost to follow-up, remaining participants showed a 95% success rate of CPAP therapy. Conclusion: Sleepstudy referrals in octogenarians are very rare despite significant subjective improvement in quality-of-life and objective improvement in AHI score pre & post CPAP. The suggestion is an ageist approach to OSA investigation. Further analysis is needed with larger sample size, more complete follow-up and multivariable-adjusted linear regression analysis.

References

Glasser M, Bailey N, McMillan A, Goff E, Morrell M (2011) Sleep apnoea in older people. Breathe 7(3):248–256
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Senaratna C, Perret J, Lodge C, Lowe A, Campbell B, Matheson M, Hamilton G, Dharmage S (2017) Prevalence of obstructive sleep apnea in the general population: A systematic review. Sleep Med Rev 34:70–81

6.4 Clinical Specialist Respiratory Physiotherapy Management of the High Risk Non Invasive Ventilation and High Flow Oxygen Therapy Patient

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Cork University Hospital

This study evaluated the impact the role of the Clinical Respiratory Physiotherapist has in the cohort of the High Risk Respiratory Non Invasive Ventilation (NIV)/High Flow Oxygen Therapy (HFOT) Patients in Cork University Hospital (CUH).
Over a two month period (Jan –Feb 2021), all high risk NIV/HFOT patients, that were identified on an NIV Tracking system, were reviewed by the Respiratory Clinical Specialist Physiotherapist (CSP). High Risk included those on FiO_2 > 60%, flowrate > 50 l/min, PEEP > 10 and IPAP > 12. The CSP Treatments performed and further care provided to escalate the care of the patient was documented.
Out of a population of 60 patients, 68% (41/60) were referred for Physiotherapeutic review due to a change in the Early Warning Score (EWS). The most frequently provided CSP Treatment included arterial blood gas sampling (56%); Initial NIV/HFOT set up (63%); FiO_2 changes made (66%); ceiling of care discussion with team (51%) and NIV/HFOT settings changes (68%). To further escalate care for these patients, the CSP Physiotherapist requested Anaesthetic Review in 50% of these cases and only 17% of these 60 patients were admitted to Intensive Care.
Hospital Outcome for these High Risk Patients, 58% were discharged home and 40% had an inpatient mortality outcome. Of those admitted to Intensive Care (n = 10), 60% were discharged home and 40% died.
Clinical Specialist Respiratory Physiotherapists are valuable team members in preventing deterioration in a High Risk Non Invasive Ventilation / High Flow Oxygen Therapy Respiratory patient. They aid with preventing ICU admissions in Cork University Hospital.

6.5 Comparison of the WatchPAT device with Home Limited Sleep Studies for the Diagnosis of Obstructive Sleep Apnoea

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Obstructive Sleep Apnoea (OSA) is an extremely common disorder creating a significant burden on Respiratory services. Sleep studies where among top 5 procedures for elective hospitalisation in 2016. Since the emergence of the SARS-CoV2 pandemic, there has been a shift towards home Limited Sleep Studies (LSS) which are widely accepted for OSA diagnosis. They are, however resource intensive and can be challenging for patients. WatchPAT is a wrist-based device which utilised peripheral arterial signal, heart rate, oximetry, actinography, body position, snoring and chest motion to provide AHI, RDI, ODI & Sleep Time for OSA diagnosis. WatchPAT is clinically validated, with an 89% correlation with PSG. To date, it has not been compared to Limited Sleep Studies.
We preformed 38 simultaneous home Limited Sleep Studies and WatchPAT analysis (13 female, age 50 years $\pm$ 12 years) recruited from our Sleep Clinic. Thirty six WatchPAT studies were diagnostic and 38 LSS. Mean AHI by LSS was 21 $\pm$ 23 events per hour, with 6 normal studies, 7 with mild, 12 moderate and 15 with severe OSA. Correlation between LSS and WatchPAT AHI, RDI and ODI is 0.81, 0.80 and 0.74, $p < 0.001$ respectively.
We found the WatchPAT device is accurate for home diagnosis of OSA in a Sleep Clinic population.

6.6 A Retrospective review of the diagnostic value of the Epworth Sleepiness Scale and Stop-Bang Questionnaire in a regional Sleep Medicine Clinic

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This review aimed to assess the role of the Epworth Sleepiness Scale (ESS) and the STOP-BANG (SB) questionnaire in triaging referrals to a regional specialist sleep clinic. Obstructive Sleep Apnoea (OSA) is highly prevalent, but remains both underdiagnosed and undertreated. The ESS and SB are common OSA assessment tools however their ability to help stratify patients requiring priority investigation is uncertain. This retrospective review analysed records of public patients reviewed in a regional sleep medicine clinic in 2020. Gender, Apnoea-hyponea index (AHI), ESS and SB were analysed. Patients were compared using an AHI ≥ 15 as the cut-off due to the clinical practice of prescribing CPAP at this score. SB scores were categorised as 0–4 (low-intermediate risk), and 5–8 (high risk). ESS was categorised 0–10 and ≥ 11.
One hundred sixty patients were identified. SB was associated with a higher AHI score when examined as both a continuous and categorical (0–4 vs 5–8) variable, both ($p < 0.001$). SB strongly correlated with AHI ($r = 0.638$, $p = < 0.001$) but ESS did not correlate with AHI ($r = 0.051$, $p = 0.518$). SB only correlated weakly with ESS ($r = 0.175$, $p = 0.027$).
SB has significantly superior correlation with AHI and should assist in prioritisation of referred patients for respiratory sleep assessment.

6.7 Embolic Stroke of Undetermined Source- is OSA a contributing factor?

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Embolic stroke of Undetermined Source (ESUS) is a type of ischaemic stroke defined as a non-lacunar brain infarct without proximal arterial stenosis or cardioembolic sources. ESUS accounts for about 1 in 6 ischemic strokes. Obstructive sleep apnoea, a form of sleep-disordered breathing, is associated with multiple major stroke risk factors including hypertension and atrial fibrillation, but it is also an independent risk factor for stroke.
We conducted a prospective study assessing 11 patients in Connolly Hospital admitted with a diagnosis of ESUS who underwent sleep studies between January and August 2021. All of these patients underwent a full stroke workup prior to their sleep study including CT brain, MRI brain, Echocardiogram, Carotid dopplers, Holter monitor and a full blood panel.
Of the 11 patients, 7 (63.6%) of the patients were female with a median age of 63. All 11 patients (100%) had an AHI (Apnoea-Hypopnoea Index) on their sleep study consistent with Obstructive Sleep Apnoea (OSA). The median AHI observed was 16.5, with 4 patients (36%) in the mild category (AHI 5–15/hour), 4 (36%) in the medium category (AHI 15–30/hour) and 3 (27.2%) falling into the severe category (AHI > 30/hour)

6.8 Retrospective Comparison of Traditional Face to Face Clinical Physiologist Led Consultant Supervised PAP Review Clinic and Clinical Physiologist Led Consultant Supervised Virtual PAP Review Clinic

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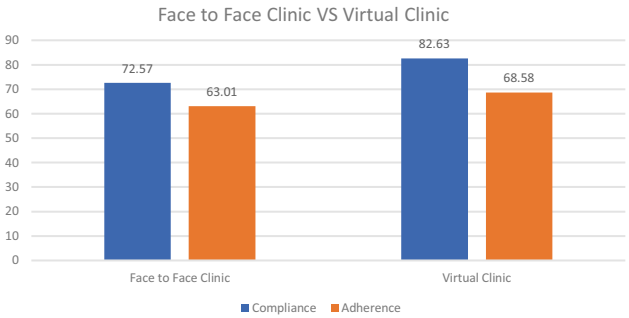
A retrospective study of 423 patients divided as 248 followed traditional Face to Face Clinic and 175 patients followed by Virtual Clinic between November 2016 and April 2021.
The COVID 19 pandemic forced changes in the delivery of our PAP service for OSA patients.
A new Virtual Clinic service is delivered by Clinical Physiologist, Supervised by Consultant, in which the patient is contacted virtually, assessed and advised by the Clinical Physiologist, then subsequently individually reviewed with the supervising Consultant. The traditional clinic was a face to face review by the Clinical Physiologist then subsequently individually reviewed with the supervising Consultant.
Compliance and Adherence were the primary outcome of this study.
ESS on treatment, number of patients seen in clinic was the secondary outcome.
The demographic of the two groups were comparable including BMI, ESS, STOP/BANG Score, Neck Circumference, Waist to Hip Ratio.
There were minor non significant differences were seen in Mallampati Score, AHI, PLM index, Arousal Index, RDI and severity of OSA.
We found that patients followed up in the Virtual Clinic had better compliance and adherence.
The ESS on treatment was also better in the Virtual clinic group (6.08 v 3.44 / 24).
Total number of patients seen per clinic was similar in both groups (10) with multiple advantages including optimal utilisation of staff time and expertise.
Conclusion: Virtual Clinic are at least non inferior to traditional Face to face Clinic in the follow up of patients on PAP for OSA. They may actually be better.
We recommend that all PAP review clinics should transform into Clinical Physiologist Led Consultant Supervised Virtual Clinics.



6.9 The Role of a Virtual Sleep Clinic in Reducing Sleep Waiting times in a Tertiary Referral Centre

Eleanor Cronin[1], Christina D Campbell[1], Daisy O'Connor[1], Thomas Kane[1], Richard Costello[1], Imran Sulaiman[1]

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In 2020 the emergence of SARS-CoV-2 lead to restructuring of many respiratory services, with a consequent increase in waiting times. In response to this, a virtual sleep clinic was formed at our centre.
Triaged referrals were sent directly for sleep studies, if diagnostic for moderate/severe obstructive sleep apnoea (OSA), a phone call and commencement of treatment followed. After three months of treatment, following virtual consultation, if the individual was adherent and had a treatment response, they were discharged to community follow-up.
We analysed data from patients referred to the sleep service between 2016 and 2020. We compared waiting list times, results of limited sleep studies (LSS) as well as time to treatment.
In 2020 the mean time to LSS was 7 months, compared to 11, 17 and 22.5 months in 2019, 2018 and 2017 respectively. Also in 2020, the time to result was 3 months, compared to 6.7, 11 and 16 months in 2019, 2018 and 2017. While time to treatment from LSS was 7 months in 2020, compared to 11 months in 2018.
Changes in work practices in our hospital, including utilisation of virtual consultations has improved waiting times for the diagnosis and instigation of treatment for OSA.

6.10 Domiciliary Sleep Study Testing During COVID-19 Pandemic

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During the COVID-19 pandemic, our centre began using WatchPAT devices, measuring peripheral arterial tone as a surrogate marker for sleep disordered breathing (SDB), to perform limited sleep studies. A retrospective review of studies undertaken until 01/12/2020 was performed to evaluate results.
50 patients were reviewed. Mean age was 53 years and 38 were male. Average time since referral was 13 months, mean wait time for home sleep apnoea testing (HSAT) approximately 1 month. 44/47 recorded had a STOP-BANG≥3. Mean Epworth Sleepiness Score 9. Mean number of co-morbidities 2.5. Mean BMI 34 kg/m^2. Four patients had an uninterpretable or failed study. 38 studies were diagnostic for OSA

requiring inpatient follow-up, 13 of which were severe, requiring *Continuous Positive Airway Pressure* (CPAP).
The implications of this are that this domiciliary service has shown to be adequate at diagnosing sleep apnoea in those with a high-pre-test probability, with notably reduced wait times, subject to availability of devices. Given limited inpatient resources and an ongoing pandemic, WatchPAT can provide an important resource in the first steps of managing OSA.

6.11 Non-invasive ventilation for acute hypercapnic respiratory failure, a quality improvement project

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The use of non-invasive ventilation (NIV) in the treatment acute respiratory failure has proven to limit the need of intubation, duration of hospital admission and mortality (Ferrer, et al.). We conducted a quality improvement project, and the global aim was to improve quality of care for patients presenting with AHRF associated with AECOPD. The smart aims were to ensure that every patient with AHRF receives evidenced based standardised treatment and to improve access to the respiratory specialist service.
A quality improvement NIV team was established, and 2-weekly meetings were held. Process mapping was used, and baseline data gathered to understand the complexities of our current system. Subsequently, SMART aims and driver diagrams were developed. A respiratory nurse attended the emergency department and the wards to screen for patients who were commenced on NIV for AHRF.
Process mapping demonstrated the need to standardise the prescription process for NIV and ensure treatment is in line with evidence-based practice. The NIV prescription sticker was introduced to standardise treatment. This change idea will be tested prospectively using the PDSA cycle.

Reference

Ferrer M, Torres A (2020) Non-invasive Ventilation and High-Flow Nasal Therapy Administration in Chronic Obstructive Pulmonary Disease Exacerbations [published online ahead of print, 2020 Jul 28]. Semin Respir Crit Care Med. https://doi.org/10.1055/s-0040-1712101

6.12 Audit of NIV usage, awareness and compliance with local guidelines at Mayo University Hospital

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Mayo University Hospital (MUH), Castlebar, Co. Mayo

Non-invasive ventilation (NIV) use in patients with acute exacerbations of chronic obstructive pulmonary disease (COPD) in a ward based NIV unit is effective and reduces the need for tracheal intubation (Plant *etal*). To ensure a standardised treatment approach for patients admitted with hypercapnic respiratory failure, NIV guideline was developed in MUH. We sought to assess the awareness of these guidelines amongst non-respiratory NCHDs, those whom in practise, commence the majority of NIV support out of hours.
An online anonymised questionnaire was administered to 42 medical NCHDs. The response rate was 45%. Of the respondents, 32% of individuals didn't feel confident recognising those who require BiPAP, 53% didn't feel confident prescribing initial settings and 37% didn't feel confident adjusting ventilator pressures. 32% of the respondents were aware of the local NIV protocol, however, only 2 individuals knew how to access the protocol. Participants were asked initial NIV pressures as per MUH guidelines only 26% supplied the correct answer.
The audit highlights poor awareness of MUH NIV guidelines amongst NCHDs which could impact poorly on management of patients with hypercapnic respiratory failure. Promotion of a greater awareness of the NIV guidelines is required at our institution.

Reference

Plant PK, Owen JL, Elliott MW (2000) Early use of non-invasive ventilation for acute exacerbations of chronic obstructive pulmonary disease on general respiratory wards: a multi-centre randomised controlled trial. Lancet 355:1931–193

6.13 An audit on the implementation and follow-up of patients prescribed Non-Invasive Ventilation (NIV) for long term stable hypercapnia in Chronic Obstructive Pulmonary Disease (COPD)

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NIV has been shown to improve survival rates in acute respiratory failure however NIV in stable hypercapnia COPD patients is less studied but potentially may improve clinical symptoms, admissions and survival[1].
The implementation of NIV and follow-up in this patient group is disjointed and uncoordinated in St James hospital. We decided to audit the current patients prescribed domiciliary NIV.
Sixty-two (62) patients were identified as having home NIV. Forty-four (44) of these patients had a diagnosis of COPD. Information was gathered using the electronic patient record (EPR).
The audit results showed 6 (9.7%) of patients had a diagnosis of asthma, 10 (16.1%) had no recorded Arterial Blood Gas (ABG) on the EPR prior to commencing domiciliary NIV. Of those with a diagnosis of COPD that had an ABG done 4 (9.1%) did not show hypercapnia and 41 (93.2%) had an ABG and respiratory follow-up however the timing of this was haphazard and ranged from months to years.
A more structured and standardised approach is needed in the care of COPD patients commencing home NIV. This review has prompted a larger scale quality improvement project to standardise domiciliary NIV care in line with international guidelines.
Macrea, M., Oczkowski S., et al. An Offical American Thoracic Society Clinical Practice Guideline: Long-term Noninvasive Ventiliation in Chronic Stable Hypercapnic Chronic Obstructive Pulmonary Disease. *American Journal of Respiratory and Critical Care Medicine* 2020 Vol 202(4):e74-e87.

7. COVID-19 I & II

7.1 A physiotherapy prospective observational study of post-intensive care COVID-19 patients in Tallaght University Hospital

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[1]*Physiotherapy Department, Tallaght University Hospital*

7.2 Pneumothorax & Pneumomediastinum in the covid-19 Pandemic: Virus versus Ventilator?

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Pneumomediastinum is a rare complication of all forms of ventilatory support. The pathogenesis is due to alveolar rupture secondary to Barotrauma usually in lungs with reduced compliance.[1] We describe a case series of 18 patients with severe covid pneumonitis requiring Respiratory CPAP or Intubation & Ventilation in an ICU setting. All had evidence of pneumomediastinum with 7 having pneumothorax requiring intercostal drain insertion.

Results: 14 were male (age range 36–70; mean 53.3), 4 female (range 61–70; mean 66.3). All but 2 were initially treated with CPAP on the Respiratory unit with PEEP 8-10 cm H20 depending on sex, body habitus & initial response. A maximum PEEP of 12 was used for several patients with high BMI. 11 were escalated to the Intensive Care Unit (9 intubated). Timelines have been reviewed for each case with duration of CPAP, PEEP & Intubation schedules reviewed. 50% of cases resulted in mortality.

Learning: High PEEP is a risk factor with imaging on admission defining extent of pneumonitis, emphysema & bullae with potential risk stratification. Management is largely supportive with a rapid taper of pressure support.

Conclusions: Balancing appropriate ventilation whilst minimising risk of air leaks with covid pneumonitis is a challenge and we have demonstrated a higher proportion of injury in male patients and those with severe covid with reduced compliance and elasticity.

References

1. Volpi S et al (2020) Eur J of Cardio-Thor Surg 58:646–7

7.3 Initial Findings from a new dedicated Post COVID-19 Physiotherapy Service

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COVID-19 recovery is characterised by three stages denoted as acute, ongoing and long. The understanding and management of post COVID-19 sequelae is still evolving. A new physiotherapy service was established to identify and employ appropriate management to reduce the severity and duration of these sequelae.

Referrals were accepted from the Post COVID-19 clinic respiratory consultants, COVID-19@Home Remote Monitoring service and physiotherapy colleagues. A holistic assessment was completed with baseline individualised patient reported outcome measures.

826 patients successfully discharged following hospital admission with COVID-19 were offered a Post COVID-19 clinic appointment. 95 (11.5%) were identified with persistent post COVID-19 symptoms. Prior to physiotherapy assessment, symptom duration ranged from 18 days to 16 months. 19 (34.5%) of the assessed (n = 55) patients were healthcare workers. 16 (29.1%) patients were unable to return to work with 27 (49.1%) returning to a modified level.

Fatigue (n = 43, 78.2%) and breathlessness (n = 33, 60%) were subjective primary issues. 34 (61.8%) had a Fatigue Severity Score of ≥ 30/63. Breathing pattern dysfunction was identified in 19 (34.5%). 23 (41.8%) were offered mental health support referrals. A persistent dry cough was identified in 9 (16.4%). 3 (5.5%) patients presented with a resting tachycardia. Discharged patients required a median of 6.5 physiotherapy interventions.

Post COVID-19 sequelae were identified in 11.5% of discharged COVID-19 patients from Connolly Hospital with fatigue and breathlessness the primary issues. Identified cardiorespiratory issues included breathing pattern dysfunction, persistent dry cough and resting tachycardia. Fatigue was characterised by a disabling nature with widespread lifestyle and occupational modification.

7.4 6 month Patient Profile of the Connolly Hospital COVID-19@ Home Monitoring Service

Sinéad Delahunty[1], Sarah Nolan[1], Prof. Liam Cormican[1,2], Ciara Feeney[1], Helen Johnston[1], Aisling McGowan[1], Louise Brien[1], Megan McGrane[1], Catherine Devine[1] and Ciarán Browne[1]

[1]*Connolly Hospital, Blanchardstown, Dublin 15;* [2]*RCSI, Dublin 2*

The study aimed to provide a six month insight into the service outcomes and user demographics of the COVID-19 at Home (CO@H) Remote Monitoring Service in Connolly Hospital Blanchardstown. The service was founded to optimise timely discharge, appropriately escalate acute deterioration, minimise patient mortality and enhance acute recovery following COVID-19 infection.

Collation and analysis of patient data from both inpatient and CO@H monitoring periods. Utilised a bespoke database and patients logging data four times daily via patientMpower technology.

126 patients were enrolled onto the programme, 123 of which completed the programme with 0% mortality. The patient cohort ranged from 20–88 years with 53.2%:46.8% male:female. 8% of patients (9) developed a PE pre-enrolment on the service. One patient who was re-admitted developed a PE during their re-admission. 8% of patients who completed the CO@H programme required re-admission to hospital. Upon discharge, resting tachycardia (≥ 100 bpm) was found in 16.3% of patients who completed the service (20/123) and 21% required referral to post COVID-19 physiotherapy (26/123).

Ethnicity:	Inpatient Care:	
Irish (63): 50% Asian (15): 11.9% African (10): 7.9% Other European (32): 25.4% Unknown (4): 3.2%	ICU (7): 5.5% Intubation (4): 3.2% NIV -CPAP, BiPAP, Airvo, Hi-flow O_2 (8): 6.3% O_2 (82): 65% Antibiotics (110): 87.3%	Steroids (102): 81% Anticoagulation (88): 69.8% Vitamin D (50): 39.7% Diuretics (26): 20.6% Remdesivir (6): 4.8% Tocilizumab (5): 4%

Co-morbidities

3 + co-morbidities (23): 18.5% Cardiac history (42): 33.9% Respiratory condition (32): 25.8%	Asthma (16): 12.7 HTN (33): 26.2% COPD (5): 4% Increased BMI (16): 12.7% CCF (6): 4.8% High cholesterol (11): 8.7%	DM (11): 8.7% T1DM (2): 1.6% T2DM (9): 7.1% CVA (3): 2.4% Cancer (3): 2.4% Ex-smoker (6): 4.8%

Discharged on anticoagulation (47): 37.3%

Reason for Readmission:

Desaturation (6): 4.8% High temperature (4): 3.2% Chest pain (2): 1.6% Gastric issues (1): 0.8%	Pneumonia (1): 0.8% Irregular heart rate (1): 0.8% Productive cough (1): 0.8%

CO@H is a safe and effective method to monitor patients at home. Patients had their care appropriately escalated in the case of deterioration. Early access to Post COVID-19 physiotherapy services was provided for timely chronic disease management. At monitoring completion, resting tachycardia was evident within this patient group.

7.5 Tocilizumab – real world data from a third wave of the Covid-19 pandemic

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7.6 Impact of Long COVID Syndrome on Lung Function in an Irish Population

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Long COVID syndrome is defined as 'signs and symptoms lasting more than 12 weeks that are not explained by an alternate diagnosis'. It is thought that between 10–50% of survivors may develop Long COVID, with many experiencing ongoing symptoms such as, dyspnoea, cough and fatigue.
A retrospective audit of patients attending the Pulmonary Laboratory at St Vincent's University Hospital was conducted. All pulmonary function tests (PFTs) were carried out according to the ATS/ERS 2005. Data (as percentage, mean ± SD, as appropriate) from the first 100 patients is presented in Table 9.
Gas exchange (DLCO) and inspiratory muscle strength (MIP) were the most reduced lung function parameters. The results of this retrospective audit of Irish patients is consistent with current published data. Further research is required to identify cause and treatments for this new syndrome.

Table 9 Results

Females v Males	59% v 41%
Age years	48 ± 13
BMI kg/m2	30.88 ± 7.76
Smoking history	72% non, 26% ex, 2% current smokers
Underlying conditions Respiratory & Cardiac	30% & 21%
Admitted to hospital	36% (20 required oxygen therapy)
Admitted to ICU	13% (9 were intubated)
Abnormal PFT results	Spirometry 18%, DLCO 46%, MEP 36%, MIP 67%

7.7 The effects of a 6-week virtual COVID19 recovery programme on exercise capacity, fatigue scores and quality of life in individuals recovering from COVID-19

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Post-COVID19 symptoms have been widely reported within the literature. The aim of this study was to assess the effect of a 6-week virtual exercise rehabilitation programme in people recovering from COVID-19.
Participants referred from a post-COVID-19 multidisciplinary clinic were included if presenting with persistent dyspnoea, reduced exercise capacity and/or reduced physical function. Pre and post programme assessments (6-Minute Walk Distance(6MWD), Chalder Fatigue Score(CFQ-11) and Short-Form 36 Questionnaire(SF-36)) were completed in person.
Forty participants were assessed between April and August 2021, and 5 participants have completed post programme assessment. Results demonstrate significant increases in 6MWD distance (n = 5) (pre: mean distance 439.2 m ± 66; post: mean distance 530 m ± 67) as well as reduced dyspnoea scores (mean peak Borg pre: 2.8 ± 1.9; Borg post: 1.4 ± 1.6). There were no adverse effects on fatigue levels (mean CFQ-11 17 ± 4.5 pre; mean CFQ-11 14 ± 6.08 post). SF-36 scores improved (mean 402 ± 174 pre; mean 496.5 ± 184 post) with participants showing improvement in physical functioning, role limitations due to emotional problems and pain domains.
These preliminary findings suggest a physiotherapist delivered virtual post-COVID-19 recovery programme can improve exercise capacity, dyspnoea and quality of life without exacerbating fatigue.

7.8 Tocilizumab Use In 44 Hospitalized Patient With Severe Covid-19 Pneumonia, A Single Centre Observational Study

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BACKGROUND Coronavirus disease 2019 (COVID-19) is associated with a dysregulated immune response and hyperinflammation, a key mediator of which is cytokine IL-6. Tocilizumab (TCZ) a humanised anti-human IL-6 receptor monoclonal antibody, may be a possible adjunctive therapy in this context.
METHODS This is a single centre observational study of patients infected with COVID-19 who were treated with tocilizumab. 453 patients were admitted with covid 19 from the start of third surge of which 44 were identified for tocilizumab therapy by the following inclusion criteria: laboratory proven SARS-CoV-2 infection or high clinico-radiological suspicion of COVID-19 infection, CRS category C1, C2 and D, within 24 h of starting nasal high flow (NHF) oxygen with an Fi02 of 0.6 or greater, (NIV) or invasive mechanical ventilation (IMV).
RESULTS: Data was collected from 44 patients who were severely ill with covid 19 infection and received tocilizumab. The study population

of 27 men (61.3%) and 17 women (38.6%) and median age of 63 years (range 35–86). The mean BMI was 36 kg/m2 (range 29–48). The average Charlson comorbidity index (CCI) was 4. 11 (25%) patients progressed to intubation and in 33 (75%) patients oxygen requirement reduced. Thirty-seven (84%) patients were discharged, and seven (15.9%) patients died; thirteen out of thirty-seven patients needed admission to ICU and among them seven got mechanical intubation. The SOFA score for all patients in our study group range in between 2 to 6. On average we noticed oxygen wean off time were thirteen days with range (4 to 26 days). There is significant improvement in PaO2/FiO2 ratio at every three-day interval observed post tocilizumab treatment. In addition, out of thirteen ICU admissions eight(61.5%) got discharged with average stay of 17–20 days in ICU and other five patients died. There had been only five (13.5%) patients in our study group who had secondary infection (fungal) post tocilizumab. Interestingly, we found C-reactive proteins (CRP) value for twenty patients (45%) in our study group improved to normal ranges in 3 to 5 days.
Conclusion: This study supports the use of tocilizumab in critically ill COVID 19 patients (C1, C2 and D category on CRS) as it is safe, decreases progression of respiratory failure and had mortality benefits. CRP is a useful indicator of treatment response.

7.9 Risk of transmission of SARS-CoV-2 in Health-Care Workers

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Aim—To understand transmission rates of COVID-19 among health-care workers in Sligo University Hospital, from March 2020 to December 2020.
Methods—A survey was sent to all health workers working in different wards in Sligo University Hospital. We obtained data from health-care workers regarding their specialty, Exposure to aerosol generating procedures, symptoms, source of transmission and whether or not SARS-CoV-2 PCR test was positive by them.
Results—The Survey was distributed in December 2020, and we got 118 responses. The biggest group of responders were health-care providers working in the emergency department (25.64%), followed by internal general medicine (23%), and nurses scattered in different wards (16.24%). There was 14.66% worked in ICU while the rest worked in other departments. About 88% worked with COVID-19 suspected or confirmed patients, and 64.96%were involved in aerosol generating procedures. Of the 63 responders who were tested for SARS-CoV-2, 13 (20.31%) tested positive for the virus.
Discussion and conclusion:It appears from the results that aerosol generating procedures are associated with increased risk of transmitting SARS-CoV-2 infection among health-care.
We will spread this survey nationally to compare the risk of transmission in different hospitals in Ireland. If findings were found to be significant, necessary recommendations will be relayed to concerned bodies to, review and adjust national guidelines accordingly.
Keywords: SARS-COV-1; SARS-COV-2; COVID-19 virus; coronavirus; detected; positive; aerosol generating procedures, PCR; healthcare workers; transmissio

7.10 Effects of non-invasive respiratory support on gas exchange and outcomes in COVID-19 outside the ICU

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7.11 Effective Quality Care of patients with Severe COVID-19 on a Respiratory Ward

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Severe COVID -19 defined by the National Office of Clinical Audit as *Care in an intensive Care Unit (ICU) or use of mechanical ventilation or discharge to hospice or death* (NOCA 2020). Many patients with severe COVID not suitable for the ICU may not be included in statistical analysis therefore.
Retrospective study of patients admitted to the respiratory ward with Severe COVID 19 March 2020 to April 2021. Severe COVID classified as Covid Respiratory Category C (High flow Nasal Oxygen HFNO or CPAP therapy- ITS).
90 COVID-19 patients admitted to PUH audited. 25% DNAR status. 35 Severe COVID patients managed on Respiratory Ward using CPAP. 10 failed CPAP and intubated(29%). 25 ward CPAP survived to discharge. 5 ward CPAP deaths (20%). 12 ward patients HFNO up to FiO2 0.7. CPAP hoods used to facilitate compliance. Well tolerated and preferred by many.
Many patients with Severe COVID-19 can be successfully managed on Respiratory Wards. The NOCA definition of Severe COVID should be amended to take this into account. Consideration should be given to additional funding for Respiratory Wards to reduce pressure on ICUs.

7.12 SingStrong for Long Covid: A singing and breathing pilot intervention for respiratory symptoms and general health in Long Covid: A mixed-methods study

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The authors have no conflict of interest.
This pilot study explored the efficacy of a breathing and singing programme (SingStrong for Long Covid (LC)) to address respiratory and other common LC symptoms. The 10-week bi-weekly online programme was comprised of a 45-min class of mindfulness, breathing retraining, vocal exercises and singing. Sessions were recorded for non-attenders and conducted by a trained vocal coach experienced in respiratory cohorts. Hospitalised/non-hospitalised persons with confirmed Covid diagnosis and persisting symptoms were invited to participate. Demographic and Covid-19 data, DePaul Symptom Questionnaire Short Form (DSQ- SF) and Covid 19 Yorkshire Rehab Screen (C19-YRS) questionnaires were collected at baseline. Questionnaires were re-administered post-intervention and focus groups were conducted. Of 27 (F = 23(85%)) participants recruited, data from 21 who completed at least ten (50%) classes were analysed. Participants showed significant pre-post intervention improvements in all breathlessness domains (at rest: $p < 0.001$; dressing: $p = 0.01$; stairs: $p < 0.001$), fatigue ($p = 0.03$), usual activities ($p = 0.04$), pain/disability ($p = 0.03$), voice quality ($p = 0.01$), and communication/cognition ($p = 0.04$). Pre-post number of instances meeting DSQ-SF criteria for myalgic encephalomyelitis (ME) and chronic fatigue syndrome (CFS) decreased by a net of nine cases (14.3%). No association between hospitalisation status and diagnosis of ME/CFS was identified. Qualitative feedback from eight participants was overwhelmingly positive with all reported breathing improvements.

7.13 Pulmonary Findings in Patients Post Mild/Moderate COVID-19

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On March 2020, the World Health Organization declared coronavirus disease 2019 (COVID-19) as a pandemic. There is little knowledge related to alterations in pulmonary function in Post COVID-19 patients. In the Respiratory Department at the Bon Secours Hospital Tralee, we carried out a retrospective study on 38 subjects diagnosed with Mild/Moderate COVID-19 Infection. From January to June 2021, Pulmonary Function Tests (PFT) were performed at least 30 days after diagnosis of COVID-19. D-Dimers, Protein C-Reactive, radiological changes and bronchoscopy data were also documented. Our objective was to determine the prevalence of PFT abnormalities in subjects diagnosed with COVID-19.

We present our experience of a growing data set of patients Post COVID-19. From the 38 subjects, 24 were female and 14 male with a mean age of 47 years old. The PFTs were performed in all subjects with an average time of 92 days after COVID-19 diagnosis.

Of 38 patients, 26% (N = 10) of them had PFT abnormalities. 5 of these patients had pre-existing lung disease but there were no significant changes in PFT values Pre and Post COVID-19. The remaining 5 patients (13% of total number) without prior PFTs appeared to have abnormalities in lung function after COVID-19.

7.14 The impact of Covid-19 on the red flag respiratory pathway: An audit of the 2019 and 2020 patient red flag pathways

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This audit's purpose was to investigate the management of patients with lung cancer in 2019 compared to 2020 and assess what influence the Covid-19 pandemic may have had.

We audited the process of lung cancer management from initial presenting stage to available treatments. We looked at the distribution of treatments available in 2019 compared to 2020 and the number of days from presentation to treatment.

When auditing the mode of referrals to red flag respiratory in 2019 30% (65/216) were GP referrals compared to 33% (60/182) in 2020. Endobronchial Ultrasound biopsy remained the most used method for obtaining tissue across both years. The key discrepancy between 2019 and 2020 when obtaining tissue was with CT guided biopsy. 11.2% less patients were referred for this procedure in 2020. Changes between 2019 and 2020 regarding treatment options available were highlighted, such as in 2020 40% of patients underwent referral for palliative treatment compared to 14% in 2019 and 11.6% of patients in 2020 had been referred for radiotherapy treatment compared to 26.5% in 2019. In conclusion, we can see variations in the red flag pathway between 2019 and 2020 because of Covid-19. A review of the 2021 data may further support this.

7.15 Prone-Positioning in Awake, Non-Intubated Patients with COVID-19 Hypoxemic Failure: A Single-Center Prospective Cohort Study

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A surge in critically-ill patients with respiratory failure secondary to COVID-19 has overwhelmed ICU capacity in many healthcare systems across the world[1]. Given significant resource limitations, less-invasive and inventive approaches such as prone-positioning (PP) of non-intubated patients with hypoxemic respiratory failure was implemented [2,3]. This is a prospective observational study. The aim is to evaluate the impact of awake PP at ward level on oxygenation levels of patients with COVID-19 requiring supplemental oxygen.

The primary outcome is to evaluate the change in SpO2:FiO2 (SF) before and after PP. SF is compared in the participants who tolerated and those that did not tolerate PP. Secondary outcomes are assessment of risk-factors of treatment failure (requirement for ICU or death).

A total of 63 patients admitted to Beaumont Hospital between January and February of 2021 were recruited. 47 (74%) participants were reported as tolerating and 16 (26%) as non-tolerating. Table 10 shows baseline demographics. The mean change in SF in the tolerating group was 38 vs 16 non-tolerating. This was statistically significant ($P < 0.001$) with a mean difference of 22. A regression model was

Table 10 Baseline characteristics of patients

Characteristic		Non tolerating	Tolerating	p-value
Total Number (%)		16 (26%)	47 (74%)	
Mean Age (SD)		69 (14)	60 (13)	p = 0.03*
Mean BMI (SD)		29 (4.86)	32 (8.06)	p > 0.05
Female sex-number (%)		9(56%)	17(36%)	p > 0.05
Mean SF on admission (SD)		356 (95)	323(119)	p > 0.05
Mean SBP on admission (SD)		142 (14)	127(18)	p > 0.028*
Number of Smokers (%)		10 (62%)	32(68%)	p > 0.05
Chronic Lung Disease Number (%)		8 (30%)	19 (70%	p > 0.05
Mode of Oxygenation on admission Number (%)	Room Air	0 (0%)	2 (4%)	p > 0.05
	Nasal Prong	9 (56%)	27 (57%	p > 0.05
	Face Mask	2 (14%)	1 (2%)	p > 0.05
	CPAP	4 (25%)	14 (29%)	p > 0.05
	BiPAP	1 (6%)	0 (0%)	p > 0.05
	AirVo	0 (0%)	3 (6%)	p > 0.05

utilized to show SF ratio on admission, BMI and age are all significant and strong predictors for length of stay and treatment failure ($R^2 = 0.52$, $P < 0.05$).
PP was associated with improvements in oxygenation parameters without any reported adverse events. A well-designed RCT testing the efficacy of PP in non-intubated COVID-19 patients is needed to give more robust evidence prior to widespread adoption of this practice.

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The authors express no conflicts of interest.

7.16 Pulmonary Embolism in Hospitalised Patients with COVID-19

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Pulmonary embolism (PE) is a recognised complication of SARS-CoV-2 infection, particularly in hospitalised patients. Here we performed a retrospective review of Wave 1 (W1, March – May 2020) & Wave 3 (January 2021) of COVID-19 admissions: patient demographics, imaging, d-dimer levels & illness severity was recorded. Data collection is ongoing.
During W1, 318 SARS-CoV-2 positive patients were admitted to Beaumont Hospital, and 222 during W3. Of these patients, 41 (13%) in W1 and 59 (27%) in W3 had a CT-pulmonary- angiogram (CTPA) to diagnose a PE (this compares to 35% internationally). There was a 46% positivity rate in W1 and 27.11% in W3. For those in ICU, 50% W3 & 55% in W1, 29% in W3, 40% in W1 on non-invasive-ventilation and 21% in W3 and 33% in W1 on ward level care had PEs. Of the PEs identified in W3, 68.75% were segmental and 75% bilateral. Radiographic evidence of right heart strain was noted in 43.75%. The overall incidence rate of PE was 5% in W1, compared to 7% in W3.
In this study, by W3 of the COVID19 pandemic the incidence rate of PE increased while the positivity rate decreased, consistent with increased awareness of PE in SARS-CoV-2 infection & increased level of CT imaging. This incidence rate is comparable to that reported internationally.

7.17 D-Dimer Levels and PE detection in Covid 19 patients admitted to Tallaght University Hospital

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Studies have linked COVID 19 with increased risk of venous thromboembolism including pulmonary embolism. Abnormalities in coagulation profile including elevated d-dimer are a feature of early disease.
In this study we examined the number of COVID 19 patients with elevated d-dimer and the outcome of CTPA, if done. Data was collected retrospectively using HIPE records for patients admitted to Tallaght University Hospital from of January to June 2021. Inclusion criteria was any patient over age 17 with COVID 19 infection listed as a diagnosis on discharge.
Our review included total of 510 patients with COVID 19 infection. Of these, 390 (76%) had elevated d-dimer (>0.42 ug/ml). 75 (15%) never had a d-dimer level checked and 45 (9%) had normal d-dimer levels. In total 258 (50%) patients underwent CTPA during the course of their admission, 36 of these were positive for PE.
Of the patients who had elevated d-dimers, 9% were diagnosed with PE. Overall, although the majority of patients with COVID 19 will have elevated d-dimers, it remains reasonable to proceed to CTPA if there is clinical suspicion.

7.18 Surge Two: therapeutic and mortality outcomes for COVID-19 in a District General Hospital

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Since the beginning of the COVID-19 pandemic, around 170,000 individuals have tested positive for the virus in Northern Ireland with 2,200 associated deaths. October 2020 saw Derry and Strabane have the highest number of COVID-19 cases per 100,000 population in the UK. This study aimed to measure therapeutic and mortality outcomes in patients admitted with COVID-19 between September 2020 and March 2021 in a district general hospital. All COVID-19 related discharges or deaths from COVID-19 wards and intensive care (ICU) were reviewed with a sample size of 647 patients. The created database comprised of discharge data, length of stay, use of steroids/remdesivir, use of higher respiratory support and inpatient mortality. The average length of stay was 11 days. Therapeutic outcomes demonstrated that 71% of patients received steroids and 39% received remdesivir. With regards to higher respiratory support—20% of patients required AIRVO and 16% required CPAP. ICU care was required for 8% of patients. Overall male mortality was 21% whilst female mortality was 16%. The data demonstrates that the majority of inpatients required oxygen therapy and steroids. Hospital admission was associated with higher mortality but overall mortality was in keeping with national mortality rates.

7.19 How do you manage a respiratory pandemic in a hospital with an emergency department but no critical care? One DGH's experience

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The COVID-19 pandemic has generated huge numbers of patients requiring hospital admission for supplemental oxygen therapy. A significant proportion of these patients will go on to require critical care input and advanced oxygen delivery techniques such as continuous positive airways pressure (CPAP), non-invasive (NIV) or invasive mechanical ventilation (IMV).
Often these patients deteriorate early and quickly, this poses challenges in regard to ensuring these patients are managed in appropriate care areas, this is a particular challenge when the emergency department and critical care are not located within the same hospital site.
In this situation we developed a protocol for guiding the management of these patients depending upon the patient's escalation status, their ceiling of treatment and their current level of hypoxemia measured objectively by the PF ratio.

This protocol is then used to guide patients into one of four groups.
Best supportive care, remaining in DGH
Active care up to and including NIV remaining in DGH
Active care up to and including IMV, P/F > 25, remains in DGH and monitored
Active care up to and including IMV, P/F < 25, Transferred to local hospital with ICU available.
We believe this protocol has functioned well and would be of interest to the Irish respiratory community which is comprised of many small DGH hospitals in a similar situation.

7.20 Predictors of worsening respiratory disease in COVID-19 positive post lung transplant recipients

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Transplant recipients are at an increased risk of adverse outcomes from COVID-19 infection. Furthermore, concerns associated with suboptimal vaccine immunogenicity suggest an impaired protection from serious adverse events. In this study we assessed the incidence of COVID-19 infection amongst recipients in Ireland. We further identify risk factors associated with serious adverse outcomes amongst this population.
To date, 22 recipients have tested positive for COVID-19. Of these, 18 recipients were positive prior to vaccination rollout and a further 4 recipients were positive despite vaccination. Of patients with COVID-19, 67% required hospital admission. On presentation, the identification of radiographic changes, lymphopaenia, elevated serum LDH and ferritin conferred a worse outcome, specifically, the requirement for supplemental oxygenation and ventilator support.
Lung Transplant recipients have high rates of morbidity and mortality associated with COVID-19 infection. The completion of a standard vaccination course did not substantially reduce the risk of severe COVID-19 or death. Ongoing care during the COVID-19 pandemic continues to pose many challenges in this cohort, and advice regarding continued preventative strategies to mitigate risk is required.

7.21 An insight into the technology literacy, service accessibility and service user satisfaction of the Connolly Hospital COVID-19@ Home Monitoring Service

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The study aimed to provide an insight into the COVID-19 at Home (CO@H) Remote Monitoring Service design to promote tech literacy, service accessibility, patient satisfaction and reduce compliance barriers to prioritise a patient centred service.
Service design focused on technology literacy and equity of service. Data collated from referral and CO@H monitoring period. A ten question dichotomous style anonymous patient satisfaction survey was distributed. Weekly service team meetings ensured adaptation to service user needs.
Service users ranged from 20–88 years. 6 lived alone and 19 patients provided readings via text message due to lack of internet access or required a Next Of Kin (NOK) to log readings due to tech literacy issues. English was not the primary language of 64 patients. Of the 126 enrolled, 123 completed and 4 did not complete the programme (3 non-compliant and 1 inappropriate referral). Survey results displayed an extremely high patient satisfaction level.
Patient and carer education during service on-boarding was critical in maintaining patient compliance and meeting service user needs. Equitable service provision was ensured by allowing logging of readings via text message or NOK. An initial study limitation was that all service user materials and technology were provided in English. Equitable access to telehealth initiatives must be prioritised in service design.

7.22 COVID-19 – An Experience Within An Acute General Hospital

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Until 2021, patients requiring non-invasive ventilation were managed in an ICU setting in Wexford General Hospital (WGH). During the third wave of COVID-19 infections in Ireland in early 2021, Wexford General Hospital saw an unprecedented volume of admissions with respiratory failure requiring ICU level care.
Between January and March 2021 there were 222 admissions to hospital secondary to COVID-19. 42 (18.9%) patients required advanced oxygenation and 18 (8.1%) required ICU care. This is in comparison to 93 admissions in the entirety of 2020, with 13 patients requiring ICU care and no NIV managed at ward level.
In the first quarter of 2021, 42 patients required advanced oxygen therapy in the form of high flow nasal oxygen (HFNO) or continuous positive airway pressure (CPAP). Of these 8 patients, who were considered for full escalation in the event of deterioration, were managed solely on the ward with CPAP therapy, thus preventing 8 ICU admissions. An admission and oxygen weaning protocol was designed and implemented to streamline patient care.
In total during this time 6 patients were transferred to ICUs in other clinical sites as a result of bed capacity.

7.23 Investigating the activity of an acute hospital's post-COVID19 physiotherapy service from April to August 2021

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Little is known about the rehabilitation needs of those who are recovering from COVID-19. The aim of this study is to describe the activity of a post COVID-19 physiotherapy service in a large acute teaching hospital.
In May 2020, a post COVID-19 multidisciplinary clinic was established to provide follow-up care to both patients and staff members who tested positive for COVID-19. The physiotherapist's role at this weekly clinic is to assess patients' physical functioning during their recovery from COVID-19. The physiotherapy assessment includes collection of information on baseline/current exercise levels and return to work status as well as an evaluation of any persistent symptoms. Following assessment, a plan of care is developed.
Between April and August 2021, 117 patients were referred to the physiotherapy service. 20% (n=24) were given advice on their recovery trajectory and education on returning to physical activity and discharged at the time of initial assessment. 21% (n=25) were referred to community based services including post COVID-19 community rehabilitation. 34% (n=40) were enrolled onto a 6-week virtual exercise programme. 24.5% (n=28) were followed-up for 1:1 physiotherapy sessions for more individualised care.

As post COVID-19 rehabilitation models of care begin to emerge, this study will inform the follow-up rehabilitation needs of this new patient cohort.

7.24 Outcomes of Patients admitted with COVID pneumonia at 3 month follow up

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7.25 A 3 months survey in the north-west of refusals versus partially Covid-19 vaccinated patients admitted during the 4th wave. Behavioural factors in the decision-making processes

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Introduction: 4 major vaccines are being developed to control the Coronavirus 2019 disease beside the current measures and the social distancing. In the winter of 2021 Ireland started vaccinating against the coronavirus. Doubt to have the vaccine is an increasing recognized global phenomenon. This played a role in limiting people's desires for the vaccine and unfortunately this could itself be impacted by the epidemic. The definition given by the WHO for vaccine hesitancy is a delay in acceptance or refusal of vaccines despite availability of vaccine services. This complex context was influenced by factors such as convenience, smug-satisfaction, misinformation on social media, and confidence. The rapid development of COVID-19 vaccine, and its deployment among adults played an important rule among COVID-19 vaccine refusals.
Objective: The aim of this survey is to estimate the incidence of positive new cases among fully, partially or refused vaccinated, to know the major consequences of vaccine's rejection, how many of the refusals end up in the ICU, the indecision towards a vaccine against COVID-19, and if there is regret of doing that.
Materials and Methods: A survey will be submitted to the ITS congress based data collected of all admissions between the beginning of July and the end of September 2021. The collected data will be used to estimate the current refusals among the rest of COVID-19 admitted patients and the severity of the disease. There will be a supplementary part to link the type of vaccine among refusals.
Results: The results indicate that around 49% of respondents were willing to be vaccinated, with 28% undecided and 77% of individuals potentially were not willing to be vaccinated. The main variables that explained the probability of indecision were associated with the side effects, perceived benefits, decreased fear of contagion. Our analysis of hypothetical vaccine scenarios revealed that individuals preferred less risky vaccines in terms of fewer side effects, rather than effectiveness.
Conclusions: We discovered that it is necessary to formulate vaccination-promotion strategies among the anti-vaccine groups.

7.26 Characteristics and clinical outcomes of patients requiring non-invasive ventilation for management of COVID-19 pneumonia

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Non-invasive ventilation(NIV) for the management of COVID-19 induced hypoxaemic acute respiratory failure was commonly employed during the pandemic. The characteristics of patients requiring NIV on a specialist respiratory unit and clinical outcomes were retrospectively examined.
The medical notes of ninety-three patients were reviewed. The mean age was 68 (14) years. The majority (60%) were male and 84% were overweight or obese. Multimorbidity was common (75%). All patients had a ceiling of care established; 57% for full escalation of care including intubation and 43% for ward-level care. Median time to NIV initiation was 2 days. NIV continued for > 72 h in 70% of patients. Overall 58% of patients recovered to discharge. Of those who survived, the median length of hospital stay was 15.5 (2–60) days.
Over 75% of patients for full escalation survived, 54% required intubation. Intubated patients had more pronounced hypoxaemia at hospital admission and prevalence of co-morbidity was greater.
NIV can be used effectively to manage respiratory failure due to COVID-19 pneumonia in the appropriate patient and setting. Additionally patients can successfully tolerate a prolonged duration of therapy. Identification of those most at-risk and early intensivist involvement is important to ensure timely escalation of treatment if required.

7.27 Potential for Increased Risk of Infection Following Tocilizumab Treatment in COVID-19

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Tocilizumab, an interleukin-6 inhibitor, is proven to improve survival and other clinical outcomes in COVID-19. However, increased risk of infection is a known and common side effect.
This study investigated the occurrence of post-treatment complications (i.e. infection) in patients treated with tocilizumab. We reviewed the electronic care records of all patients (n = 37) who were given tocilizumab in a five month period (January-March 2021), screening for documented infections, positive microbiology results and antibiotic prescriptions in the three months after treatment.
Results showed that 59.45% (n = 22) of patients given tocilizumab had evidence of infection in this period, with 40.90% of these patients having evidence of multiple infections. The most commonly identified source of infection was the respiratory tract (63.63% of patients with infection). An array of organisms were identified, the most common being coliforms (45.45% of infections).
These results appear to show that tocilizumab does carry an increased risk of bacterial and fungal infection after treatment. Some patients went on to develop multiple and/or severe superimposed infections which may have contributed to higher morbidity and mortality. While further investigation is required, clinicians should consider these risks when prescribing tocilizumab.

7.28 CPAP versus HFO therapy for severe COVID-19 ARDS

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7.29 A retrospective observational study of admission rate during the first wave of the COVID-19 pandemic and re-admission rate in UL Hospitals Group (ULHG), Mid West, Ireland

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Background The Coronavirus disease caused by the severe acute respiratory coronavirus 2 (SARS-CoV-2), yielded an outbreak which begun in 2019. The first established case of COVID-19 in Ireland was in February 2020 and in the ensuing months many patients suffering from the virus required admission. Although majority of positive cases were managed in the community, 12.9% of cases required hospitalisation in Ireland.
Methods In this retrospective observational study, we reviewed the electronic records of SARS-CoV-2 positive cases, aged at or above 18 years, admitted to University Limerick Hospital Group within March 1st to May 31st, 2020. Positivity was confirmed with polymerase chain reaction testing of nasopharyngeal/ sputum samples. The rate of hospital admission within this three month span was recorded and from this data, we reviewed the rate of re-admission into hospital.
Results Of a total of 540 cases reviewed, 46.3% (250/540) required hospital admission within March 1st and May 31st. Of this hospitalised group, 31.6% (79/250) of hospitalised cases required re-admission to hospital in the subsequent months. 36.7% (29/79) of re-admitted cases occurred within the first 3 months post discharge. Approximately 13.2% (33/250) were deceased post COVID-19 infection.
Conclusion It is evident from the data, that almost 50% of positive cases, required hospital admission in the first wave of the COVID-19 Pandemic in ULHG. It is concerning that, approximately third required re-admission, with the highest peak falling within three months of discharge from hospital. This highlights the need for a formal pathway of post-discharge care for patients infected with COVID-19 in the Mid-West.

7.30 IS IMMUNOSUPPRESSION TRIGGERING mRNA BNT162b2 VACCINE BREAKTHROUGH INFECTION? – CASE SERIES

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SARS-CoV-2 vaccines have played a significant role in reducing mortality and morbidity from Covid-19. However, concern remains that immunosuppressed individuals may develop breakthrough infection despite full vaccination, resulting in severe Covid pneumonia.
We assessed vaccinated patients admitted with Covid pneumonia between 09 July 2021 – 09 August 2021. We measured Anti-SARS-CoV-2 spike (anti-S IgG) and nucleocapsid (anti-N IgG) antibodies, clinical severity, imaging, immunosuppressant drugs and oxygen requirements.
Three fully vaccinated patients developed severe Covid pneumonia. All were male, with an average age 53 years (range 51–59). Two had haematological malignancies, one had systemic sclerosis associated interstitial lung disease, and all were on B-cell depleting immunosuppression therapy. One patient had detectable anti-S IgG, compatible with a humoral response, another had both anti-S and anti-N IgG, compatible with a serological response to SARS-CoV-2 infection, the third was seronegative. Peak CRP was 146 ± 92. All three required high flow nasal oxygen therapy, prolonged self-proning and high dose corticosteroids, two receiving Tocilizumab.
Immunosuppressed patients may remain at risk of severe Covid pneumonia despite full vaccination. This may be particularly the case in patients receiving B cell depleting therapies, even in the presence of apparent humoral response to vaccination and/or infection.

7.31 Organising Pneumonia as a complication of SARS-COV-2 infection

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Organizing pneumonia (OP) can occur in a small number of patients following initial resolution of SARS-COV-2 infection. We aimed to analyse the outcome of OP in COVID-19 patients.
A retrospective single-centre cohort study was used to assess a total of 6 patients who developed OP following resolution of COVID pneumonia admitted to the COVID unit in St James' Hospital between 01/12/2020 and 01/05/2021. Patients were categorised based on their oxygen requirement, CT imaging, steroid therapy, duration of hospital stay, and clinical outcome.
The mean age was 70.8 years, with mean CRP 110 ± 49.8. 5 (83%) patients were male. The median (range) onset developing OP from positive RT-PCR was 17 (9–22) days. 4 (66%) required high flow nasal oxygen (HFNO) therapy; no patients needed invasive ventilation. The median (range) daily prednisolone dosing was 40 (40–60) mg, and hospital stay 46(6–52) days. Of these 6, one died within 3 days of treatment.
We achieved a favourable outcome in most patients with early introduction of steroid, thereby regressing lung injury. Therefore, it is important to recognize and treat the unpredictable patterns post-COVID infection.

7.32 "Janssen adenoviral-vector COVID-19 vaccine associated cerebral venous thrombosis"

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Cerebral venous sinus thrombosis (CVST) is a rare event with an incidence of 0.22–1.57 per 100,000 and a Female: Male ratio of 3:1 and mortality of up to 24%. Rarely CVST have been associated with adenoviral-vector vaccines against Covid-19. As of April 2021, over 6 cases of CVST have been reported following administration of this specific vaccine after 6.86 million doses (reporting rate 0.87 cases per million doses). We report the case of an otherwise healthy 21-year-old male who presented with a 5 day history of headache and left arm pain who suffered a grand mal seizure 2 weeks following a Covid-19 vaccine (Janssen) whilst driving his car. CT Venogram identified a left superior sagittal and sigmodal venous sinus thrombosis. Platelet count was low at 133×10^9. Vaccine-induced Immune-Thrombotic-Thrombocytopenia screen was positive confirming vaccine-related venous sinus thrombosis. Rarely associated with the AstraZeneca COVID vaccine, this case was related to the Janssen vaccine – another adenovirus mediated COVID-19 vaccine. It again highlights the need for vigilance and continued assessment in this select population.

7.33 Vitamin D Status and Disease Severity in COVID-19

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Data links a low Vitamin D status with increased COVID-19 severity. This might be attributable to co-founding factors.Alternately, since vitamin D has anti-inflammatory effects on lymphocytes and macrophages, the link between a low vitamin D and poor clinical outcomes might be attributable to dysregulated inflammatory pathways.
To examine the association between Vitamin D status and severity of COVID-19 in hospitalized patients and whether this association could be explained by inflammatory markers.
We prospectively measured serum 25(OH)D levels in 232 consecutive COVID-19 patients. Clinical severity outcomes (chest radiograph score, supplementary oxygen, length of stay, ICU admission, mortality) and different inflammatory markers were recorded. Univariate and Multivariate analyses were used to determine whether measures of inflammation and clinical outcome were associated with vitamin D status.
No association found between vitamin D status and X-ray scores, O2 requirement or the pro-inflammatory and pro-thrombotic biomarkers. ICU admission was more likely in VDD group (21.6%) and vitamin D insufficient group (28.3%); however this was abolished on multivariate analysis (p = 0.632). Mortality was higher in VDD group (21.6%) (p = 0.037).This persisted after adjustment for age, gender and diabetes. Although a low serum 25(OH) D is strongly and independently associated with increased mortality in Covid-19 hospitalized patients, no specific inflammatory marker was found explains this.

7.34 Pulmonary function assessment post covid-19 infection in University Hospital Limerick

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Pulmonary Function University Hospital Limerick

The Lungs are the organs most affected by COVID-19. The aim of this study is to investigate the effects of COVID-19 infection on Pulmonary Function in patients attending the Respiratory Clinic in UHL.
20 Patients were included in the study. Spirometry, DLCO and Lung Volumes Nitrogen Washout were measured. A questionnaire scoring the severity of symptoms at the time of infection, and the duration and severity of symptoms post infection was completed. Patient history and other relevant data were noted including smoking history, prior lung disease, age and if admitted during infection.
10% had Obstructive Spirometry. 55% had a mild reduction in DLCO. 5% had moderate reduction in DLCO, 15% had a reduced Total Lung Capacity. During infection, 55% described mild, 35% described moderate and 5% described severe symptoms. 18% of mildly symptomatic patients had abnormal Spirometry, 55% had abnormal DLCO and 27% had Restrictive Lung Volumes. 14% of moderately symptomatic patients had abnormal Spirometry and 57% had abnormal DLCO.
Abnormal Pulmonary Function was seen in 65% of study patients. The parameter most impaired was DLCO. The symptoms that persisted longest in patients were Dyspnoea, Cough and Fatigue.
This study suggests an association between COVID-19 infection and abnormal DLCO.

7.35 Review of the first 6 months of a virtual post-Covid-19 Virtual Pulmonary Rehabilitation Programme

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There are a large number of post-Covid-19 patients who are experiencing ongoing physical, functional and psychological impairments. Frequently reported symptoms are cough, breathlessness and fatigue(1). Evidence for post-covid-19 pulmonary rehabilitation (PR) remains limited, however these symptoms can be potentially managed within the traditional PR programme.
In response to the suspension of face to face PR due to Public Health Guidelines, the community-based PR staff in Dublin South West sustained the delivery of PR through a virtual medium. This has previously been shown to be safe and feasible (2). In the initial 6 months, 25 patients with post-Covid-19 symptoms were referred to virtual PR (VPR). 14 were assessed and 9 completed the programme. The remaining did not attend assessment as they were either back to baseline, medically unwell or had issues with the technology required.
Patients were invited to log onto the HSE approved digital platform Attend Anywhere or attend in person, depending on public health advice, for their initial and post assessments. Classes were delivered via Attend Anywhere and ran twice a week for 8 weeks.
88% (n = 8) of participants showed a significant improvement in exercise tolerance using either the 1 min sit-to-stand or 6 min walk test. Other outcome measures used were the Chalder Fatigue Score, short-form IPAQ and HADS.
The implementation of an integrated multidisciplinary service for patients experiencing post-Covid-19 symptoms is needed to address the rehabilitation needs of this patient cohort.

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7.36 The prevalence of chest x-ray changes in patients admitted to the University of Limerick Hospitals Group during the first wave of Covid-19

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The Covid-19 pandemic is a serious healthcare burden for Ireland and has led to significant morbidity and mortality. Many patients present with infiltrates/consolidation on imaging which requires a follow up chest x-ray(cxr) to investigate for any underlying malignancy. In this audit patients with a positive covid-19 swab received by the University Hospital Limerick microbiology laboratory were examined.
The microbiology department provided a list of positive cases from the first wave of Covid-19 (March 1st until May 31st 2020). Patients with cxr infiltrates during the acute phase of Covid-19 (until 14 days post positive swab result) were examined to determine if follow up imaging (up to 6 months post positive swab) showed resolution of these infiltrates.
50.8%(231/455) patients with a covid positive swab were admitted or presented to the Emergency Department. Of these 210 had a chest cxr and 60%(126/210) had infiltrates. The majority of follow up cxrs were reported as clear, however changes persisted in 15.9%(20/126) patients and worryingly 21.4%(27/126) had no follow up cxr.
A significant number of patients testing positive for Covid-19 present with cxr changes. Our study highlights an important finding, that many patients with infiltrates on imaging are discharged without a follow up cxr arranged.

7.37 Audit of Airvo and Non-Invasive Ventilation Usage Outside of Critical Care Areas in Cork University Hospital during Wave 3 of the COVID-19 Pandemic

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An audit completed by the Physiotherapy Department looked at the number of patients using Airvo and/or NIV outside the critical care areas during the months of January to March 2021 which encompassed Wave 3 of the COVID-19 pandemic.
In total, there were 303 patients using either Airvo or NIV or both during this time. 59% of these patients were COVID-19 positive. The results are outlined in the table below.

	COVID-19 Positive	Covid-19 Negative
Machine Usage		
Airvo (only)	96	79
NIV (only)	11	23
Both Airvo & NIV	73	21
Patient Outcome		
Discharged from CUH	92	79
Transfer to ICU	27	9
RIP on admission	61	33
Remain as inpatients	0	2

In terms of machine dependency, the majority of patients on Airvo were on 40–60% FiO_2 (50%) and a flowrate of 30-50L/min (73%). Most patients on BiPAP were on settings of IPAP≤12, FiO_2>40% or IPAP>12, FiO_2>40% (29% each). Most patients on CPAP were on 40–60% FiO_2 (58%) and a PEEP of 8-10cmH_20 (74%).
Airvo and NIV were used throughout the hospital during this time, but this audit illustrated that the wards with the highest numbers of patients on these machines were the COVID-19 designated areas and the emergency department all of which had extra physiotherapy staffing to account for the clinical need. Physiotherapists played an integral role in managing these deteriorating patients at ward level thereby helping to avoid ICU admissions when these beds were in high demand.

7.38 Prevalence and correlates of pulmonary embolism among Covid-19 patients undergoing CT pulmonary angiography

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Many patients hospitalised with Covid-19 undergo CTPA. Early reports had suggested a significant burden of pulmonary embolism (PE) in Covid-19 populations, but as the pandemic has evolved, this relationship has come under greater scrutiny. We assessed the burden of PE in Covid-19 patients undergoing CTPA at our institution.
All patients with confirmed SARS-CoV-2 infection who underwent CTPA in January 2021 were included. Demographic and clinical characteristics, calculated Well's scores, D-Dimer levels, and outcomes were compared between patients with and without PE.
Of 123 Covid-19 patients who underwent CTPA, 15 (12.2%) had PE. No significant differences were seen in demographic factors, gas exchange, respiratory support, or co-morbidities. No difference was seen in calculated risk of PE (median Well's score 4.5(2.5–5.5) *vs* 4.5(3.0–5.5); p = 0.425), but D-Dimers were significantly higher with PE (6,226 ± 4,252 *vs* 1,528 ± 1762 ng/ml; p < 0.001). No PE were identified in patients with a D-Dimer level < 1,000 ng/ml. No increase was seen in length of stay (9.0 (IQR 4.5–26) *vs* 10 (IQR 3–14) days; p = 0.363) or mortality (13.3% *vs* 12.8%; p = 0.968) in patients with PE. Pulmonary embolism is not uncommon in patients with Covid-19 undergoing CTPA, and is associated with elevations in D-Dimer levels. Clinical risk scores may be less reliable in Covid-19 populations.

7.39 Inpatients with COVID-19 pneumonitis and their COVID vaccination status

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The uptake of the COVID vaccine in Northern Ireland is the lowest in the UK and means that more adults are more susceptible to the most severe effects of COVID-19 infection.
We retrospectively reviewed the notes of patients admitted with COVID-19 pneumonitis between April 1st and July 31st 2021. We determined their COVID vaccination status and inpatient clinical course
During the 4 month period, we determined the vaccination status of 90 patients admitted with COVID pneumonitis – 46 male (51%) and 44 female (49%). Of the 90 patients, 36 were partially or fully vaccinated (40%) – 4 had single vaccine dose (11%) and 32 were fully vaccinated (89%). Of these 36 patients, 25% required higher level oxygen support or ITU admission. 54 patients were unvaccinated (60%) and 57% of these patients required higher level oxygen support or ITU admission. Of the 10 patients who required ITU admission, 9 patients (80%) were unvaccinated and 1 patient was vaccinated. Overall, 6 patients died – 2 patients unvaccinated and 4 fully vaccinated (one patient had significant immunosuppression).
In this initial review, we found that patients admitted with COVID pneumonitis and who had not received the COVID vaccine were more likely to require higher level oxygen support.

7.40 Antibiotic prescribing in COVID-19 patients – An Irish perspective

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Inappropriate antibiotic use is a global health issue. It is reported to be more prevalent in COVID-19 patients. Despite the low rates of bacterial co-infection, antibiotics are still frequently prescribed in this population. The CURB-65 criteria is often used to guide antibiotics in patients with suspected community acquired pneumonia.
The aim of this study was to determine the prevalence of potentially inappropriate prescribing (PIP) of antibiotics in COVID-19 patients admitted to hospital.
We retrospectively reviewed the notes of all the patients admitted with confirmed COVID-19, throughout the month of January 2021. The prevalence of PIP was determined by the CURB-65 criteria.
Of the 74 patients reviewed, 66% were male; median age was 59 [IQR; 47–71 years). 69 patients (93%) received an antibiotic, with 78% being prescribed a potentially inappropriate antibiotic.

Despite low rates of bacterial co-infections in COVID-19 patients, antibiotics continue to be prescribed in these patients. PIP of antibiotics can lead to increased levels of complications such as Clostridium difficile and antibacterial resistance. In this study, the level of antibiotic prescribing in COVID-19 patients was higher than the rates previously reported in literature and the CURB-65 criteria identified a high level of PIP of antibiotics in this population.

7.41 Assessing The Impact of COVID-19 in Severe Alpha-1 Antitrypsin Deficiency (AATD)

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Alpha-1 antitrypsin deficiency (AATD) is a genetic disorder arising from mutation of the SERPINA1 gene. The ZZ genotype of AATD results in severe deficiency of this key antiprotease and can lead to chronic obstructive pulmonary disease (COPD), even in never-smokers. As a respiratory pathogen, SARS-CoV-2 is presumed to pose a heightened risk to those with severe AATD and, as such, they were advised to cocoon. This study aimed to contextualize the impact of COVID-19 in this cohort.
Through the National AATD Registry, 184 eligible ZZ individuals were invited to participate via phone. Data on exacerbation frequency, COVID infection status and cocooning history were collected via a survey. The overall response rate was 63.5% (N = 117).
The prevalence of COVID-19 infection in our cohort was 12.3% (N = 12/117) with 4.2% of cases requiring hospital admission (N = 5) and no fatalities. Men who cocooned were the only group shown to have fewer exacerbations during the pandemic compared to pre-pandemic
Limitations of our study include the lack of COVID-19 diagnosis dates and the fact outcomes are patient reported. Nevertheless, our data shows that men with severe AATD reported fewer exacerbations in the COVID-19 era.

7.42 The benefits of a physiotherapy review for post intensive care COVID-19 patients

Maria Baily-Scanlan[1], Elaine Joyce[1], Evan Farrell[1], Eimear McCormack[1], Ciara Scallan[1]

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Post intensive care (ICU) Covid-19 survivors may experience a range of sequelae related to their critical condition. Emotional, cognitive and physical symptoms can limit patients functioning. A physiotherapy review can identify physical and exercise limitations which can be ameliorated to help patients' recovery. Patients (n = 27) who were in ICU in Tallaght University Hospital with COVID-19 between March and June 2020 were invited to attend a multi-disciplinary clinic of which 22 attended in October 2020.
Physiotherapy assessments included mobility status; a 6 min walk test (6MWT); grip strength assessment and completion of the short form international physical activity questionnaire (IPAQ-SF).
11 patients were referred to a community based pulmonary rehab programme due to their low levels of exercise tolerance. 3 patients were referred to the oxygen clinic due to on-going oxygen desaturation on exertion. 6 patients were referred for out-patient musculoskeletal physiotherapy review. These patients had shoulder dysfunction from proning (n = 3), foot weakness (n = 2) and back/hip pain (n = 1) since their discharge from ICU. Two patients required on-going physiotherapy which included neuro, aquatic and musculoskeletal rehabilitation. As indicated from their IPAQ-SF scores the overall levels of physical activity were low. Exercise advice, education and health promotion was provided to all patients.
A physiotherapy review is important for this patient cohort to identify/address needs and to ensure onward referral to appropriate health care services.

7.43 The Experience of people with Idiopathic Pulmonary Fibrosis living through the Covid-19 Pandemic

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As a response to the Covid-19 pandemic, restriction measures aimed to slow down virus transmission and protect vulnerable groups of people were introduced worldwide. People with IPF were particularly vulnerable due to increased risk of more serious illness from Covid-19, therefore many self-isolated to protect themselves. A qualitative descriptive design was undertaken using purposive sampling to recruit 13 participants with IPF attending the respiratory department of a large urban teaching hospital in Ireland. Data were collected between January 2021 and February 2021 through semi-structured interviews using an online platform. Thematic analysis was used for data analysis.
Four key themes were identified from participant's experience of living through the Covid-19 pandemic: (1) fear of contracting Covid-19, (2) living with reduced social interaction, (3) the adjustment in the relationship with healthcare professionals and (4) navigating an altered landscape. Participants were compelled to self-isolate due to fear and anxiety of contracting Covid-19. Participants reported increased social isolation with some experiencing anger and resentment at loss of precious time with family and friends. Conscious of their limited lifespan having IPF, many felt saddened and aggrieved at the time theft. Participants felt an increased responsibility for self-monitoring their condition and concern at differentiating symptoms of Covid-19 from an exacerbation. Participants discussed a variety of strategies that helped them cope through the pandemic and the important role they played.

8. ORAL PRESENTATIONS

8.1 Evaluation of the Effectiveness of a Virtual Model for Pulmonary Rehabilitation Delivery

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Recent restrictions to traditional pulmonary rehabilitation(TPR) delivery necessitated the establishment of a virtual PR(VPR) programme. The efficacy of VPR compared to TPR was examined.
Patients completed twice weekly TPR or VPR classes over 8 weeks. Pre- and Post-PR symptom, functional and emotional status was measured using validated questionnaires and assessment techniques, and compared between PR groups.
Fifty-three patients enrolled (29 TPR; 24 VPR). Overall, 72% completed the programme (76% TPR; 66% VPR, p = 0.53). The

majority(74%) of participants had COPD. The mean age was 69.6(8.4) years. Baseline COPD assessment test(CAT) score was high at 19.3(7.8), with mean FEV_1 53(20.8)% and 2.18(3.76) exacerbations in the year pre-enrolment. Baseline demographics were comparable between PR groups($p > 0.05$). The minimal clinically important difference(MCID) for CAT was achieved by 53%(TPR) and 69%(VPR) of patients, $p = 0.33$. Both groups achieved significant improvements in functional status with 71% exceeding the MCID in 6mwt and 1 min STS in TPR and VPR respectively. There was no difference in the proportion of patients reporting improvements in emotional status.
The majority of patients undergoing VPR achieve meaningful improvements in symptoms and functional status. Results are comparable to those achieved by a traditional PR programme. The long-term benefits of VPR need to be explored.

8.2 Outcome of a new dedicated Consultant delivered Post-COVID -19 Outpatient Clinic Service

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Background: The long term course of COVID-19 infection appears to be variable and unpredictable. Because of the numbers of patients involved, there has evolved an unmet clinical need and there is capacity for pre-existing respiratory ambulatory care services to be overwhelmed. In October 2020 we established a new respiratory consultant delivered post COVID -19 outpatient clinic service so that all COVID-19 patients discharged from Connolly hospital were offered a follow up appointment at 3 + months following discharge. The dedicated clinic served as a 'one stop shop' diagnostic hub for COVID-19 related pathology and a gateway to a multidisciplinary team. Here-in we describe the findings.
Methods and Results: This was an observational study. There were 972 admissions with COVID-19 infection (inc. 86 ICU patients). 826 patients were successfully discharged from hospital, and all have been offered out-patient appointments at 12 plus weeks from discharge at post COVID clinic. There was smaller proportion (n = 20) of GP referrals to the service. The following investigations were performed in advance of attending; repeat chest x ray, ECG, full pulmonary function test(spirometry, lung volumes and diffusion studies), 6-min walk test, Hospital Anxiety and Depression score (HADS-A, HADS- D), Fatigue Severity Score (FSS), Insomnia Severity Index (ISI).
Of the 826 patients discharged from hospital and offered an appointment, 310 patients accepted and attended and the reminder have not availed of the appointment. We present data on the first 204. patients (male 52%), median age of 57 years (range 17–98) Caucasian 174 (85.2%), Asian 24 (11.7%), Black (2.9%). Of the 204 appointments 62 patients required additional investigations and follow up appointment and the remainder 142(69.6%) patients were discharged from the service after 1 visit. Only 18(8.8%) patients had residual changes on chest Xray and were advised repeat chest Xray in 8–10 weeks' time. All patients in our study population have normal spirometry with FEV1 (median value of 99% predicted), FVC (median-101% predicted), DLCO (median- 79%) and FEV1/FVC (median- 80%). There were minor reductions in DLCO. Also results of 6-min walk test had been normal for all patients with oxygen saturation (range 94%-98%) pre and post-test. A small number had persistent interstital changes requiring further investigation, Fatigue Severity Score was significantly elevated with average 26 (range 7–63), HADS-D average 14 (range 8–20), HADS-A average 15 (range 9–21). Post COVID syndrome was diagnosed in 51 (6% of those offered appointment following COVID -19 infection, mandating referral to a dedicated post COVID Physiotherapy service.
Conclusion: Organisation and delivery of a dedicated post COVID clinic service requires time, staff resource and infrastructure. Post COVID syndrome occurred in at least 6% of discharged patients at a conservative estimate.

8.3 Omitted

8.4 Candidate role for Toll-like receptor 3 L412F polymorphism in bacterial infection and acute exacerbation in idiopathic pulmonary fibrosis

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We previously established that the toll-like receptor 3 Leu412Phe (*TLR3* L412F; rs3775291) polymorphism attenuates anti-viral responses and is associated with accelerated disease progression in IPF (*AJRCCM* 2013, 188: 1442). To date, the role of *TLR3* L412F in bacterial infection and acute exacerbations (AE) in IPF has not been reported.
Here, we investigated the effect of *TLR3* L412F on the lung microbiome using 16S rRNA qPCR and pyrosequencing. The effect of *TLR3* L412F on anti-bacterial TLR-responses of primary IPF lung fibroblasts was quantitated. Hierarchical heatmap analysis was employed to establish bacterial and viral clustering in nasopharyngeal lavage samples from AE-IPF patients.
We observed a significant increase in AE-related death in 412F-variant IPF patients. We demonstrated that 412F-heterozygous IPF lung fibroblasts have reduced anti-bacterial TLR responses to LPS (TLR4), Pam3CYSK4 (TLR1/2), flagellin (TLR5) and FSL-1 (TLR6/1) and have reduced responses to live *Pseudomonas aeruginosa* infection. Furthermore, 412F-heterozygous IPF patients had a dysregulated lung microbiome with increased frequencies of *Streptococcus* and *Staphylococcus spp*.
This study reveals that *TLR3* L412F dysregulates the IPF lung microbiome and reduces the responses of IPF lung fibroblasts to bacterial TLR-agonists and live bacterial infection. These findings identify a candidate role for *TLR3* L412F in viral- and bacterial-mediated AE-death.

8.5 Characterisation and Epithelialisation of 3D Printed Scaffolds for Tracheal Tissue Engineering

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8.6 A Retrospective Analysis of the Use of Continuous Respiratory Rate Monitoring in the Management of Respiratory Failure

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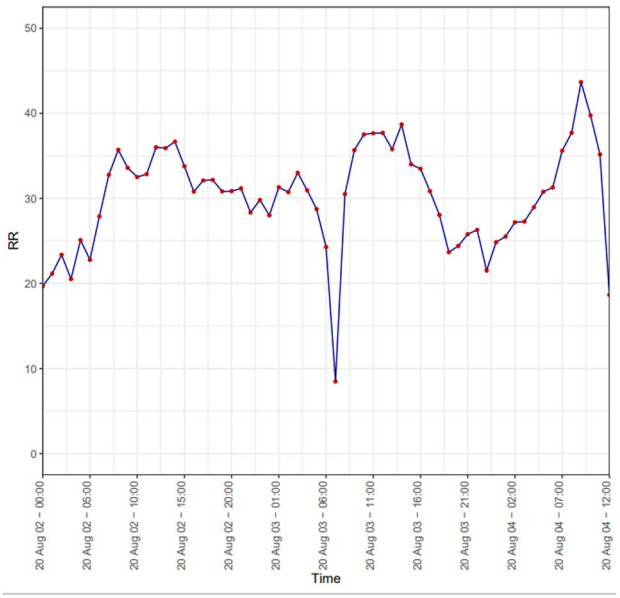
Respiratory rate (RR) is an important predictor of serious adverse events during hospitalisation. Issues in RR recording include the absence of a gold-standard recommendation for RR measurement and a dependence on manual recordings with significant inter-observer variability.
The purpose of this study was to introduce electronic continuous RR monitors on an acute respiratory ward. In addition, we aimed to assess whether or not electronic RR monitoring correlated with manual RR; if electronic measuring of RR would lead to a different NEWS score; if a change in the pattern or rate of respiration preceded a clinical deterioration; if ABG readings correlated with trends in RR; and if triggering of medical review based on RR monitoring would reduce acute deteriorations.
90 inpatient episodes were analysed. Discrepancies between electronic and manual RR readings were noted throughout, with both over- and under-estimations of RR common, with subsequent impact on the NEWS score The RR trends for five patients in particular showed increased frequency in RR spikes in the 24 h preceding a deterioration requiring medical input.
Continuous RR monitoring should be routinely available for inpatients in order to monitor trends and trigger earlier medical intervention for those at risk of acute respiratory compromise.



[8.6]

8.7 Is Full Nocturnal Polysomnography on an Acute Medical Ward comparable to that in a Dedicated Sleep laboratory in terms of Sleep Quality?

Walsh S, Janjua A, McEvoy K, Stewart L, McGowan A, Faul J, and Cormican L

8.8 Characterisation of exosomes from Lymphangioleiomyomatosis (LAM) patients

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Exosomes are a class of Extracellular Vesicles (EVs) released by fusion of Multivesicular Bodies (MVB) with the plasma membrane and defined by a diameter of 30-150 nm. This study aims to characterise exosomes from the serum of patients with Lymphangioleiomyomatosis (LAM), a rare, low-grade, metastasizing neoplasm that occurs almost exclusively in females.
Using serum samples from patients with LAM and healthy individuals as controls, exosomes were isolated via ultracentrifuge. The presence

of exosomes was confirmed by western blot and Nanoparticle Tracking Analysis (NTA). The activity of metalloproteinases in exosomes was measured by zymography. A549 cells were treated with serum derived exosomes and the effects were analysed by western blot and zymography.
LAM patients have significantly increased numbers of exosomes in their serum when compared to the controls (8.9×10^9 vs 13.8×10^9 particles/ml; $p = 0.024$). Interestingly, these LAM-derived exosomes had significantly higher activity of Pro-MMP-9 (threefold increase), but lower activity of MMP-9. Vimentin, a protein expressed in mesenchymal cells and a marker of epithelial-to-mesenchymal transition (EMT), showed higher expression in A549 cells treated with LAM-derived exosomes compared to control.
Findings indicate an exosome mediated EMT pathway in LAM. This exploration advances our knowledge of LAM and the role of exosomes in metastasising diseases.

9. PAEDIATRICS

9.1 Evaluation of the teach-to-goal method in improving inhaler technique in paediatric asthma patients

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9.2 REPEATABILITY OF THE DELTA 12 s INDEX TO SCREEN FOR OBSTRUCTIVE SLEEP APNOEA IN CHILDREN

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Table 11 Night-to-night repeatability of the Delta 12 s parameter over 3 nights

	Lin's CCC	95% LoA
Night 1 and 2	0.82	-0.35–0.34
Night 1 and 3	0.84	-0.35–0.33
Night 2 and 3	0.88	-0.30–0.30

Polysomnography is the gold-standard test for Obstructive Sleep Apnoea (OSA), but availability is limited. Nocturnal pulse oximetry can be a cost-effective screening tool for OSA. Delta 12 s, a measure of oxygen saturation variability, has been validated for screening for OSA in adults and in children with Down's syndrome. However, it is not known if a single night of oximetry is sufficient as the repeatability of Delta 12 s over successive nights is unknown. The aim of the study was to determine the repeatability of the Delta 12 s index over three consecutive nights in children with potential OSA.
A retrospective study of nocturnal home pulse oximetry over 3 consecutive nights was conducted in children with suspected OSA between July 2018 and July 2020. Night-to-night repeatability of the Delta 12 s parameter was assessed by calculating 95% limits of agreement (LoA) and Lin's Concordance Correlation Coefficient (CCC). A CCC > 0.95, 0.9-.95, and < 0.9 suggest good, moderate and poor agreement respectively.
Of the 481 patients included; 268 patients had 3 nights of technically adequate oximetry data recorded. Table 11 demonstrates poor agreement in the delta 12 s parameter over successive nights.
Due to night-to-night variability one night of oximetry done in children using the Delta 12 s index may be insufficient to screen for OSA