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Abstracts

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SSRA 2019 Research Abstracts

1. NOVEL ELECTROMYOGRAPHIC BIOMARKERS FOR AMYOTROPHIC LATERAL SCLEROSIS USING TARGETED MOTOR TASKS

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Amyotrophic lateral sclerosis (ALS), the most common form of motor neuron disease (MND), is a progressive neurodegenerative disorder characterized by upper and lower motor neuron involvement leading to muscle weakness, respiratory failure and death[1]. Diagnosis is based on clinical criteria, detailed history and neurological examination, supported by neuroimaging and electrophysiology. There remains an unmet clinical need for biomarkers to aid in more timely and more accurate diagnosis and phenotyping of ALS.

This work aimed to exploit differentially-affected neural motor circuits in ALS to harness the potential of surface electromyography (sEMG) as a diagnostic tool by using advanced signal analysis techniques and targeted functional motor tasks in order to discover potential biomarkers for ALS[2]. Bipolar sEMG signals from three muscles of the right hand were recorded during functional isometric pincer grip tasks in 11 ALS patients and 11 age-matched healthy controls. Intermuscular coherence (IMC) was calculated in low and high alpha and beta frequency bands. Repeated-measure 2-factor ANOVA was used to assess the effect of the task and condition on IMC.

The results show significant ($p < 0.05$), medium-size effects (partial $\eta 2 > 0.08$) of the motor task and task-condition interaction in low beta frequency band in specific muscle pairs, highlighting a difference between sEMG in control and ALS patients across different tasks. These findings can pave the way for the introduction of new, more sensitive biomarkers to allow for the quantification of neuromuscular impairments in individual patients for timely diagnosis and use in clinical trials.

Acknowledgments:
Staff at the Academic Unit of Neurology, Trinity Biomedical Sciences Institute, Trinity College Dublin, Dublin, Ireland. Patients and healthy controls who volunteered their time at the Clinical Research Facility, Saint James's Hospital, Dublin, Ireland.

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2. Dukic S, McMackin R, Buxo T, Fasano A, Chipika R, Pinto-Grau M, et al. Patterned functional network disruption in amyotrophic lateral sclerosis. Human brain mapping. 2019.

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2. INVESTIGATING THE ROLE OF EPIGENETICS IN PSEUDOEXFOLIATION GLAUCOMA

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Glaucoma is a leading cause of blindness worldwide, with pseudoexfoliation glaucoma (PXFG) having a particularly high prevalence in the Irish population. Pseudoexfoliation syndrome (PXF) is a systemic disease, causing a build-up of extracellular material which can block the drainage system of the eye, leading to PXFG. Lysyl oxidase-like 1 (LOXL1), transforming growth factor beta 1 (TGFβ1) and Ras protein activating like 1 (RASAL1) levels contribute to fibrosis and are influenced by methylation[1, 2]. The aim of this project is to investigate the alteration of the expression of these genes in PXF and PXFG.

Methylation specific PCR was used to determine the methylation state of the LOXL1 promoter in bisulfite treated PXF, PXFG and control DNA. RT-PCR was used to analyse LOXL1, TGFβ1 and RASAL1 expression levels in human tenon fibroblast (HTF) cells from PXF, PXFG and normal donors. Normal HTF cells were subjected to hypoxia, which is known to cause aberrant methylation, and expression levels of the same factors were compared to untreated samples.

The level of LOXL1 promotor methylation was increased in PXF and significantly increased in PXFG DNA. The expression of anti-fibrotic LOXL1 and RASAL1 was decreased and pro-fibrotic TGFβ1 was increased in PXF and PXFG. Hypoxia was seen to induce a similar pro-fibrotic phenotype in normal HTF cells.

This provides an indication that aberrant methylation mediates fibrosis in PXFG, possibly induced by hypoxia. The reversal of this methylation is a potential therapeutic strategy that could decrease PXFG pathogenesis in the eye.

Acknowledgements:
The author would like to acknowledge funding from the Health Research Board Summer Student Scholarship.

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2. Bechtel W., et al., Methylation determines fibroblast activation and fibrogenesis in the kidney. Nature medicine, 2010. 16(5):544–50

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3. AMONGST BOYS ONLY, ECZEMA, ALONE IS ASSOCIATED WITH SHORTER HEIGHT OR IN COMBINATION WITH ANTI-INFLAMMATORY MEDICATIONS IS ASSOCIATED WITH LOWER HEIGHT-CHANGE FROM CHILDHOOD TO ADOLESCENCE

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Eczema, is a chronic, inflammatory itchy skin condition, which often presents in early childhood and precedes other allergic disease[1]. Whereas another allergic disease, asthma has been associated with shorter height[2], it is unclear if such associations exist for eczema. Thus, we aimed to examine associations between eczema, including medication use and timing of onset, and growth, in boys and girls. We used data from a nested case-control study of children born in 1995, in Manitoba, Canada, assessed by paediatric allergists for various allergic diseases, including eczema. Anti-inflammatory use was parental reported. Timing of eczema was defined as persistent (childhood + adolescence), or transient (childhood only). Height (cm) was measured by our research team. Analyses included linear regression, adjusted for confounding variables.
Overall, 469 (56.9% boys) were seen at both 7-8 years (childhood) and 11-14 years (adolescence). In childhood, 16.9% boys and 20.8% girls had eczema. Corresponding numbers in adolescence were 8.2% and 9.9%. In childhood, no statistically significant associations were found between eczema and height. In adolescence, boys, but not girls, with eczema were 6cm shorter than their peers without eczema (ß-0.06; 95%CI -0.1; -0.02). Amongst boys only, childhood eczema alongside anti-inflammatories, was also associated with less growth from childhood to adolescence (ß-0.04; 95%CI -0.08;-0.001). Timing of eczema was not associated with height outcomes in adolescence.
In conclusion, amongst boys only, eczema is associated with shorter height in adolescence or together with anti-inflammatories, manifests less growth from childhood to adolescence. These findings may inform discussion on potential side-effects.
Acknowledgements:
Deepest gratitude to Dr. Protudjer, George Fay Yee Centre for Healthcare Innovation, Department of Paediatrics and Child Health, University of Manitoba, Winnipeg, Canada, SSRA program UCD, friends and family.
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2. Protudjer JLP, Lundholm C, Bergström A, Kull I, Almqvist C. The influence of childhood asthma on puberty and height in Swedish adolescents. Pediatr Allergy Immunol. 2015 Aug; 26(5):474–81
Presenting Author: Aimée Gilmartin
Supervisor: Dr Jennifer Protudjer
Co-supervisor: Dr Alex Singer

4. A SIMULATION STUDY TO DISTINGUISH THE EFFECT OF DISASSORTATIVE MATING FROM MATERNAL EFFECT

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In many studies that look at genetic maternal effects, the fathers are used as the primary control for the autosomal genome comparison. One confounding factor which may lead to false positive results in these types of studies, is disassortative mating. This is the phenomenon by which individuals with dissimilar genotypes mate with each other[1]. In our study, we used the results from a previous unpublished study on maternal genetic effects in Autism spectrum disorders. Using this, we investigated the effects of disassortative mating on a control population.
We developed a simulation computer program that looks at the effect of disassortative mating on simulated data. Parameters can be varied in the program, such as population size and the degree of disassortative mating. The program implements disassortative mating on two generations. From the results used, the population size was 1558 cases (mothers) and 1558 controls (fathers). The odds ratio (OR) was 1.63. We carried out this study using our simulation program and using the same population size.
The studied showed no real increase in the OR. We concluded that the OR of 1.63 is too high to be explained by disassortative mating. In light of this, we are trying to apply different disassortative models that may induce an increase in the odds ratio.
In summary, we have constructed a program that allows one to investigate the effect of disassortative mating in a control population. This can be used in future studies that look at maternal genetic effects and use the fathers as the controls.
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1. Qiao Z, Powell JE, Evans DM. MHC-Dependent Mate Selection within 872 Spousal Pairs of European Ancestry from the Health and Retirement Study. Genes (Basel). 2018 Jan 22;9(1). pii: E53. doi: 10.3390/genes9010053
Presenting Author: Neil Farrugia
Supervisor: Prof Denis Shields
Co-Supervisor: Ms Catherine Mahoney

5. CAN ROUTINE PERIOPERATIVE HAEMODYNAMIC INDICES PREDICT POSTOPERATIVE MORBIDITY AFTER MAJOR SURGERY?

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Postoperative morbidity occurs in 10-15% patients undergoing major, non-cardiac surgery[1]. Predicting which patients are at higher risk may optimize perioperative prevention. Currently, preoperative haemodynamic parameters, Systolic arterial pressure (SAP)<100mmHg, Pulse Pressure(PP)>62 or <53 mmHg, and Mean Arterial Pressure (MAP) <75mmHg are associated with increased postoperative mortality[2].
Our objective was to evaluate the correlation between these haemodynamic indices, measured electronically intraoperatively during anaesthesia, with postoperative morbidity, measured by the Comprehensive Complication Index(CCI) and Hospital Length of Stay(LoS). Further, we correlated CCI and LoS with blood preoperative NT-ProBNP.
This was a retrospective analysis of patients in MET-REPAIR, a pan-European observational study correlating self-reported physical activity with postoperative morbidity. Patients' electronic record of perioperative haemodynamic data was correlated with 30-day postoperative morbidity, CCI and LoS. Correlation was by Kendall's Tau or Spearman's Correlation Coefficient. Blood for NTproBNP was collected <31 days before surgery and analysed by immunoassay.
Data from n=50 patients was analysed. Intraoperative duration PP>62(tau=0.317, P=0.007) was associated with prolonged LOS. When

stratified according to age >70 yr, duration MAP<75 was associated with higher CCI (tau=0.57, P=0.001) and prolonged LOS (tau=0.39, P=0.02). When stratified according to ASA>2, SAP<100 and PP>62 were also associated with increased CCI and LOS. There was no correlation between preoperative NTproBNP and either CCI (Spearman's correlation co-efficient r=-0.01,95%CI -0.30-0.28, P=0.93) or LOS(r=-0.09,95%CI -0.02-0.38, P=0.54).
Our results indicate that intraoperative PP>62, MAP<75 in older patients and SAP<100 in ASA>2 patients are associated with increased postoperative CCI and LOS. These warrant confirmation in larger databases and evaluation of whether real-time intervention may improve postoperative outcomes.
Acknowledgements:
We thank Dr. Athina Kranidi, UCD C-STAR centre, for statistical consultation.
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Presenting Author: Eleanor Buggy
Supervisor: Prof Donal J Buggy
Co-Authors: Francois Bonnet, Barbara Cusack, Aislinn Sherwin, Maria Fitzgibbon

6. HEPATITIS C CARE STANDARDIZED, ADAPTED ACROSS THE EU AND COMPARED TO OTHER INITIATIVES

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Hepatitis C virus (HCV) can cause chronic liver disease. Chronic HCV infection is curable with direct-acting antivirals[1]. In the EU/EEA, it is estimated that 5.6 million people are infected with chronic HCV infection[2]. The HCV care cascade starts from screening for HCV+ patients, to referral for treatment, to starting treatment and finally to the achievement of cure. However, the dropout rate from each stage of the cascade is high. HepCare is a new European Union HCV care model created to address this problem through different work packages (HepCheck – screening, HepLink - linkage to care, HepEd – HCV education, HepFriend – peers for patients, and HepCost - cost evaluation) tailored to the needs of individual sites. In this study, HepCare implementation across the EU is compared; HepCare itself will also be compared to other HCV initiatives. Reports from each country were collected on their implementation of HepCare at different sites. The implementation of each work package of HepCare from each site was compared for their similarities and differences. Comparison to alternatives models of care in the EU with components similar to HepCare packages were also included.
The implementation of HepCheck, HepLink, HepED and HepFriend work packages has shown that HepCare can be adapted to the different resources and systems in four different countries. However, HepCost work package has not been completed.
The results from the HepCare project feeds back into the national and EU structures. It will be used to guide policies to create better standardized HCV care across the EU.
Acknowledgements:
The author would like to acknowledge funding from HepCare Europe and the HSE.
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7. THE USE OF TICKPLEX PLUS IN DIAGNOSING LYME DISEASE: A COMPARISON TO THE STANDARD TESTING METHODS

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Standard testing (ST) for Lyme disease (LD) targets the spirochete form of *Borrelia burgdorferi sensu lato.* This study aims to compare ST to a new testing platform, the Tickplex plus (TPP), which tests for spirochetes, round bodies and co-infections. This study will assess if this broader scope of testing improves the diagnosis of persistent LD.
For this cross-sectional study a chart review was performed of 216 charts, with 28 participants deemed eligible. Results from the TTP, ST, self-reported symptom scores and blood tests were extracted. Descriptive statistical analysis, Cohen's kappa and paired t-tests were used to compare results.
There was a 39.29% agreement between TPP and ST (Cohen's k: 0.1119). No participants received positive results on ST and negative results on TPP. 59% tested positively on TPP but not ST. 22% tested positively on both TPP and ST. 19% received negative results from both tests. All groups improved with treatment but this was not statiscially significant (p=0.765, p=0.251 p= 0.640). 90% of all participants tested positively for co-infections. 60% of participants with negative results for LD, tested positively for co-infections. 100% of those who tested positively for Borrelia, responded to round bodies, while 75% responded to spirochetes.
As round bodies are associated with persistent infection[1] and co-infections are common in Ireland[2], their prevalence is unsurprising but unaccounted for by ST. The TPP demonstrates the importance of their inclusion in a comprehensive assay for the diagnosis and management of persistent LD. Further research with a larger sample size is warranted.
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2. Zintl, A., et al., Ticks and Tick-borne diseases in Ireland. Ir Vet J, 2017. 70: p. 4.
Presenting Author: Sarah O'Loughlin
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8. OPTIMIZATION OF PRIMARY HEPATOCYTE CULTURE FOR NEONATAL MICE TO IDENTIFY LIVER-INTRINSIC DEFECTS IN SPINAL MUSCULAR ATROPHY

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Spinal Muscular Atrophy (SMA) is an inherited neurodegenerative disease characterised by lower motor neuron degeneration resulting in muscle weakness and paralysis due to low survival motor neuron (SMN) protein levels. The *Smn*$^{2B/-}$ SMA mouse model develops fatty liver likely consequent to dysfunction in lipid and glucose metabolism[1, 2]. To determine whether these defects are intrinsic to the liver, we aim to develop a primary hepatocyte *in vitro* culture model. However, primary hepatocyte isolation protocols have not been established for young mice. As such, we wish to identify an efficient and reliable isolation technique for the establishment and initial characterization of SMA hepatocytes.
Hepatocytes will be extracted from pre-symptomatic (P9) and symptomatic (P19) mice and control littermates to better characterize molecular pathways involved in fatty acid metabolic abnormalities.
The collagenase *in vivo* perfusion method was inadequate for isolation of primary hepatocytes in young mice. As such, we developed an alternative technique involving a chemical and mechanical digestion of liver in collagenase. Using this approach, we succeeded in isolating and culturing viable primary hepatocytes *ex vivo*. We have stained P9 and P19 hepatocytes using BODIPY to visualize differences in lipid droplet size.
Currently, it is unclear how SMA patients and SMA mice become more susceptible to fatty liver. Here, we have established an *in vitro* experimental framework allowing for the identification of important molecular changes of fatty liver and potential therapeutic targets to abrogate it. This will ensure prompt management of comorbidities that may arise in SMA patients.
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2. Bowerman M, Swoboda K, Michalski J, Wang G, Reeks C, Beauvais A et al. Glucose metabolism and pancreatic defects in spinal muscular atrophy. Annals of Neurology. 2012;72(2):256-268.
Presenting Author: Alexandra Tierney
Supervisor: Dr Rashmi Kothary

9. GENDER-DEPENDANT RADIATION THERAPY; THE NEXT STEP IN PERSONALISED MEDICINE?

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Ionising radiation is an extremely common form of cancer therapy. In 2016-17, 63,500 courses of radiation therapy were given in Australia alone [AIHW website]. The aim of this report was to examine the differences in efficacy and potency of radiotherapy between genders.
It is well known that individuals do not react to Ionising Radiation (IR) in a homogeneous manner. Recent radiogenomic research has proven that individual polymorphisms can correlate with treatment response [Alsbeih, G., et al. (2016), Barnett, G. C., et al. (2012)] most likely due to variation in the ability to recognise and repair DNA Double-strand breaks (DSB's). The difference in radiosensitivity between genders has been well documented, yet most radiotherapeutics guidelines (Including the Royal college of Radiologists and American Society for Radiation Oncology) recommendations are based solely on population averages rather than demographic subgroups such as age, race and gender. We chose to review the burgeoning literature available on this topic to investigate whether there are differences in patient outcome as a result.
Results: 8 papers were identified as relevant to the hypothesis, and of those, 7 showed discrepancies in treatment response between genders. However, the limited pool of literature of other confounding factors means that the results cannot be proven to be statistically significant. As gendered medicine becomes more prevalent, this is a question that certainly merits further research.
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Presenting Author: Louis de Courcy
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Co-Supervisor: Prof Loredana Marcu

10. TESTING NOVEL SERUM RESPONSE FACTOR (SRF) INHIBITORS IN TRIPLE NEGATIVE BREAST CANCER CELL

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Current treatments for prostate cancer mainly target the Androgen Receptor (AR), however despite initial response these treatments fail. Triple negative breast cancer (TNBC) is an aggressive form of breast cancer for which there are no targeted therapies. AR expression in TNBC has been associated to poor prognosis[1]. Serum response factor (SRF) was previously identified as an important transcription factor in in vitro model of castrate-resistant prostate cancer (CRPC) and demonstrated a cross-talk between AR and SRF in vitro and in clinical samples[2]. We hypothesize that SRF plays a role in the response/resistance of AR antagonists and that its inhibition can re-sensitize cells to anti-androgens. The aim of this study is to test the effects of SRF inhibition on TNBC cell lines using novel SRF inhibitor, Lestaurtinib.
The MTT assay was performed to assess the cytotoxic activity of Lestaurtinib in MDA-MB-231 and Hs578t. The effect of Lestaurtinib on the cell cycle progression and cell death of breast cancer cells was detected by flow cytometer. Western blotting was performed to determine changes in proteins involved in cell cycle.
MDA-MB-231 and Hs578t are responsive to Lestaurtinib treatment, which decreases the cell viability in both cell lines with IC50 in the order of 1 μM. Lestaurtinib treatment induces cell death in Hs578t ($p<0.001$), but not in MDA-MB-231($p<0.05$) and induces polyploidy in both MDA-MB-231 and Hs578t. Downregulation of CDK1 and upregulation of p27 are seen in both cell lines after treatment, which indicates cell cycle arrest. The result demonstrated the cytotoxic and cytostatic effect of Lestaurtinib on TNBC cell lines.
Acknowledgement:
The author would like to acknowledge funding from the Health Research Board.
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Presenting Author: Kuan Yee Ng
Supervisor: Dr Maria Prencipe

11. THINKING DIGITALLY: ONLINE CLINICAL SKILLS SCENARIOS IN THE DELIVERY OF ACUTE CARE TRAINING TO UNDERGRADUATE MEDICAL STUDENTS

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There is an increasing trend to move away from traditional lecture and passive learning to more student-centred interactive online learning (IOL) [1]. IOL is a feasible teaching method that improves engagement of medical students[1, 2]. However, there is inconclusive evidence regarding the superiority of IOL over the traditional lecture[1, 2].
Medicine in Community is a module delivered to stage 5 UCD medical students. It incorporates a clinical skills day. The aim of this research is to introduce an IOL resource for students to complete prior to attending this clinical skills day.
Three online clinical scenarios were constructed using Storyline technology, an IOL tool; Acute adult asthma, fever in paediatrics (FIP) <5years, and chest pain. A pilot of FIP was constructed to gain feedback from student and staff perception of a traditional PowerPoint versus IOL. A survey was constructed based on a modified previously validated online questionnaire[1]. This pilot was made available online to SSRA medical students and staff of the Medicine in Community module.
The response of medical student (n=20/34) and lecturer (n=2/15) participants correlated with literature suggesting IOL is associated with high student satisfaction[1, 2]. 90% (18/20) of students agreed the IOL tool was more student friendly than the traditional lecture. All participants agreed they would use a similar IOL tool again. This IOL tool has proven to be effective at encouraging student participation. There is potential for a blended teaching approach of IOL and traditional methods as a solution to overcoming the inherent limitations of both.
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Presenting Author: Aoife O'Sullivan
Supervisor: Dr Nick Breen
Co-Supervisor: Prof Gerard Bury

12. THE BURDEN OF MULTIMORBIDITY AND ASSOCIATED FACTORS IN A TREATED ADULT COHORT OF PEOPLE LIVING WITH HIV (PLWH) AND HIV UNINFECTED SUBJECTS

Doyle D[1], Connolly S[2], Macken A[3], Sheehan G[2], Lambert JS[1, 2], Muldoon E[2], Mallon P[2,3], Tinago W[3] and the UCD-ID Cohort Study

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This study aims to describe the burden of multimorbidity and associated factors in a treated adult cohort of people living with HIV (PLWH) and compares disease burden between older PLWH and uninfected individuals.
A cross-sectional analysis on PLWH and HIV-uninfected subjects enrolled in the University College Dublin Infectious Diseases Cohort (UCD-ID Cohort). Data on comorbidities, medications and treatment history was collected from medical records. Multimorbidity was defined as presence of ≥2 comorbid conditions in one patient. Prevalence ratios were obtained by Poisson regression with robust error-variance, to describe and identify factors associated with multimorbidity.
259 PLWH (57.9% >40 years) and 33 HIV-uninfected (all >40 years) were included. Among PLWH, median age was 42.5(36.7-48.8) and 58.3% were male. The median number of comorbid conditions in PLWH was 1.5(1-2), the commonest were dyslipidaemia 65(25.1%) and Hypertension 49(18.9%) and the overall prevalence of multimorbidity was 34.4% (95% CI 29%-40%). In adjusted Poisson regression model, older-age (p=0.000), IDU (p=0.001) and alcohol consumption (p=0.05) were independently associated with greater multimorbidity in PLWH.
In both older PLWH and HIV-uninfected subjects, the prevalence of individual comorbidities was similar with the exception of chronic kidney disease, which was more frequent in PLWH (p=0.04). There were no difference in the number of comorbidities and prevalence of multimorbidity between the two groups (p=0.09, 0.42, respectively).
A high burden of multimorbidity was observed in PLWH and was independently associated with older-age, IDU and alcohol consumption. There was no difference in the prevalence of multimorbidity between older PLWH compared to HIV-uninfected subjects.
Presenting Author: Denise Doyle
Supervisor: Dr Willard Tinago
Co-Supervisor: Prof Patrick Mallon

13. EFFECTS OF CD4+ AND CD8+ T-CELL SUBSETS ON CHANGES IN CD4:CD8 RATIO IN AMBULATORY ART-TREATED PEOPLE LIVING WITH HIV

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Immune recovery on effective antiretroviral therapy (ART) is most likely a composite of initial redistribution of trapped memory CD4+ and CD8+ T-cells from the lymphoid tissues, accompanied by a continuous slow repopulation with newly produced naïve T-cells. Associations between higher naïve CD4+and CD8+ T-cells with higher CD4:CD8 T-cell ratio have been demonstrated in cross-sectional analyses. This study aims to examine if T-cell subsets predict changes in CD4:CD8 ratio over time.
In an observational prospective cohort of people living with HIV (PLWH), data on CD4:CD8 ratio and expanded T-cell subsets (naïve, central memory and effector memory) were evaluated from laboratory

analysis of fresh blood samples. Demographic, clinical and treatment-related data were collected from patients' records. Association between T-cell subsets measured at study entry and changes in CD4:CD8 ratio over follow-ups were assessed using linear mixed-effects models.
190 HIV+ subjects, of which 173(91%) on ART were analysed, age 43(±9)years, 63% male and 66% Caucasian, were followed up for a median(IQR) of 6.4(5.9-6.6)years. 96(55%) individuals maintained viral suppression throughout follow-up. In multivariable analysis adjusting for demographics, clinical and treatment-related factors, higher %CD8 naïve (+0.012, p=0.005) was associated with a higher CD4:CD8 ratio at cohort entry and lower subsequent increase (–0.005, p<0.001) in CD4:CD8 ratio over time. No significant effect was observed with other T-cell subsets. CD8 naïve T-cells were independently associated with changes in the CD4:CD8 T-cell ratio in this cohort of PLWH and might have a potential role in determining which subjects have greater improvements in their T-cell ratio.
Presenting Author: Emmanuel Ohaa
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14. STRESS MANAGEMENT IN FINAL YEAR MEDICAL STUDENTS

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Despite the prevalence of stress in the medical profession research on its impact on medical students is scarce. This research aims to profile stress in final year medical students, using standardized stress scales.
Data was collected from 2018/19 (n=93), including age, gender, GEM status, the quantitative Perceived Stress Scale (PSS) [1] and the Subjective Stress Scale (SSS). Participants also provided free text answers which were categorised for subsequent frequency analysis. Subjects had a mean age of 25.09 +/- 2.32 years; were 53.8% female, 46.2% male; and 37.6% GEM, 62.4% non-GEM.
Total mean PSS was 20.29 +/- 6.7 with no significant differences by SEX or GEM status. Stratification of PSS into low (0-13), moderate (14-26) and high (27-40) allowed for group comparisons of individuals' stress levels. 15% of individuals were in the low PSS group while 20% were in the high PSS group. Using the SSS, 8.6% reported low stress levels while 63% reported high levels, indicating a disparity between subjective and objective indices of stress.
High PSS individuals were more stressed by "personal life" than "work life," reported more cognitive impacts, and were more likely to practice "unhelpful" coping strategies. There was no difference regarding anticipated stress levels from the course. Notably, 28% of High PSS individuals stated they wouldn't do the course again. The majority of stressed individuals didn't seek any external support.
Identifying the origins and impacts of stress in medical students will inform stress modification interventions. Differences between subjective and objective experiences of stress warrant exploration.
Reference:
1. Cohen S. Perceived stress in a probability sample of the United States. The Claremont Symposium on Applied Social Psychology. The Social Psychology of Health (1988) (pp. 31-67).
Presenting Author: Matthew Larney
Supervisor: Assoc Prof Abbie Lane
Co-Supervisor: Prof Kevin Malone

15. INVESTIGATION OF THE PREVALENCE OF INTESTINAL PARASITES IN REPTILES AND CARNIVORES AT THE DUBLIN ZOO

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Parasitic infections are a common issue in zoos due to stress and building up of eggs/oocysts in habitats. These parasite burdens can become a concern to animal welfare but also a public health issue if the infections are zoonotic. The aim of this study is to record the prevalence of intestinal parasites in the carnivores and reptiles so the zoo can be vigilant to these parasites and their risks.
Faecal samples from thirteen species were collected from the Dublin Zoo for six days over a period of five weeks. Full parasitology screenings were carried out on each sample including a sugar flotation, zinc sulphate flotation, sedimentation, modified Baermann test, and a Kinyoun's stain test.
Parasite prevalence in reptiles was 25% (5/20) and 45% (5/11) for the carnivores. These parasites included *Strongyloides* sp. (5%), *Kalicephalus* sp./ other unidentified hookworm species (10%), ascarids (5%), and pinworms (5%) in reptiles and *Cystoisospora* spp. (18%), *Toxocara* spp. (27%), and *Trichuris* sp. (19%) in carnivores.
The results give the Zoo knowledge of parasitic infections among the carnivores and reptiles. This is important to have for the reptiles as the clinical signs are not easily identified. *Toxocara* spp. and *Kalicephalus*/pinworm spp. were important positive results. *Toxocara canis/cati* eggs are resistant and can survive in the soil of habitats, causing repeat infections, while also being a zoonotic risk[1]. *Kalicephalus spp.* and pinworms affect snakes and chelonians, build up quickly in the environment due to its life cycle, and can go unnoticed if not properly monitored[2].
Acknowledgements:
The authors would like to acknowledge Frank O'Sullivan, Sandra Molloy, Eddie O'Brien, Ciaran McMahon, Garth de Jong, Bridget Hayes, Laura Vines, Helen Clarke, Aisleen Greene, Ciara Tiernan, Gerry Creighton and all the zookeepers that helped along the way.
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2. Klingenberg R. Understanding reptile parasites. Lumina Media. 2016; 2:116-133.
Presenting Author: Lucy Wagstaff
Supervisor: Assoc Prof Theo de Waal

17. BILIRUBIN AS A SURROGATE MARKER OF DOLUTEGRAVIR ASSOCIATED CENTRAL NERVOUS SYSTEM SIDE EFFECTS IN HIV-POSITIVE SUBJECTS TREATED IN THE MATER MISERICORDIAE UNIVERSITY HOSPITAL

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Dolutegravir (DTG) is a 2nd-generation HIV integrase inhibitor which demonstrated a good safety profile in clinical trials[1]. However, Central Nervous System (CNS) side effects (SE) have been reported more frequently with everyday use than clinical trials had suggested[2]. Higher DTG plasma levels have previously been associated with CNS SE. DTG is metabolised by the UGT1A1 enzyme in the liver, which also metabolises bilirubin. The aim of this research was to measure bilirubin levels as a surrogate marker of poorer UGT1A1 activity, reflecting higher DTG plasma levels that mediate CNS side effects.

The study was a retrospective analysis of a prospectively followed cohort, the UCD ID Cohort, comprising HIV-positive subjects treated with DTG in the Mater Hospital. Cohort characteristics and frequency of SE were analysed using descriptive statistics. Differences in bilirubin levels between patients who did and did not suffer CNS SE were assessed using Mann-Whitney tests and mix-model effects as appropriate. The contribution of bilirubin levels to development of CNS SE was assessed using multivariate logistic regression models.

Of 372 subjects included in the study, 95(25.5%) reported CNS SE and 27(7%) discontinued DTG therapy. The bilirubin level prior reporting CNS SE was independently associated with occurrence of CNS SE after controlling for potential confounders including demographic factors and Hepatitis co-infection.

The results obtained showed a significantly higher proportion of patients experiencing CNS side effects than clinical trials suggested. Our results suggest a link between higher bilirubin levels and increased risk of experiencing CNS side effects.

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Presenting Author: Fergal Moran

Supervisor: Ms Elena Alvarez Barco

Co-Supervisor: Ms Ciara Leavy

18. PILOT FEASIBILITY OF A BREATHING INTERVENTION TARGETING HEART RATE VARIABILITY IN CARDIAC ARRYTHMIAS

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Decreased heart rate variability (HRV) can predict atrial fibrillation onset[1]. Treatments involving breathing modulation have improved psychological and cardiac outcomes in cardiac arrhythmia patients (CAP)[2]. Breath modulation alters HRV indicating this may be a mechanism of the therapeutic effect. This study assessed the pilot feasibility of a novel mobile health intervention targeting increased HRV's effects on affective and cardiorespiratory symptoms.

12 healthy individuals wore a non-invasive device continuously monitoring HRV paired with a custom smartphone application intermittently delivering an instructed breathing intervention designed to increase HRV. Assessments occurred in a controlled (laboratory) and uncontrolled (home) environment over four days, totaling 31 hours. Mental health surveys were collected before and after participation along with a post-study mobile health usability scale. One CAP received the intervention twice as part of an ABAB single-case design.

All participants showed increased HRV during laboratory testing. Complete data from the remote lab visit was obtained from nearly two-thirds of participants. The CAP showed some evidence of decreased depression, anxiety, and cardiac symptoms following access to the intervention. Perceived ease of use and overall usability was high in both groups (average of 4.7 for healthy individuals vs. 4.5 for the CAP) [range 1 -5]. In overall usability, healthy individuals averaged 3.9; CAP 4.7 (range 1-5).

High ratings of perceived usability and laboratory demonstrations of increased HRV provide initial demonstrations of the feasibility of this mobile intervention. Further testing is necessary to improve the collection and evaluation of target engagement in home settings.

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Presenting Author: Gregory Morrissey

Supervisor: Assist Prof Sahib Khalsa

20. THE IMPACT OF GREEN SPACES ON MENTAL HEALTH IN THE URBAN ENVIRONMENT: A SCOPING REVIEW

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In Ireland, almost two thirds of the population are living in urban areas and 18.5% of the total population are estimated to be suffering from common mental disorders, costing over €8.2 billion annually. Since the environment and health are intrinsically linked, it is useful to examine the effectiveness of Nature-Based Solutions (NBS), such as green spaces, in addressing mental health.

We used a five-stage process developed by Arksey and O'Malley (2005) for scoping reviews. The search process was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

A total of 27 studies across 8 different countries were included in the review. The studies were mostly cross-sectional analyses and used mostly adult sample populations from 18 years to retirement age. Almost all samples were taken from national survey data, with only one study using a sample group of psychiatric patients (n=30). A broad range of mental health outcomes were identified and were classified into self-reported measures, cognitive measures or physiological measures. Green space measures were classified as objective and subjective, encompassing four main characteristics – quantity, quality, accessibility and exposure.

Our findings suggest that green spaces that are positive for these characteristics are associated with positive mental health outcomes. However, most studies were cross-sectional in nature and only provided limited evidence for association. Furthermore, the population samples used in the studies were taken from national survey data and were not specifically primary care patients. Further studies that are longitudinal and assess primary care patients specifically are warranted.

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Supervisor: Dr Geoff McCombe

Co-Supervisor: Prof Walter Cullen

21. WHICH FACTORS IMPACT ON GENERAL PRACTICE CAREER INTENTIONS AMONG MEDICAL STUDENTS? A SCOPING REVIEW

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Internationally, healthcare systems are providing more community care. Consequently, there is an increasing demand for GPs and other healthcare professionals to work in primary care and this has implications for undergraduate medical education. In Ireland, this is especially the case[1]. The aim of this scoping review was to examine which factors positively influence medical students to pursue a career in general practice?
The scoping review framework comprised a five-stage process developed by Arksey and O'Malley[2]. The search process was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Both quantitative and qualitative studies were included, with no restriction on study design.
Fourteen records were included in the review and nine records relating to the research topic were hand-searched. The studies identified were mainly set in various medical colleges throughout Europe and North America. Factors that positively influence students to pursue a career in general practice were: curriculum factors (exposure, positive experiences on clinical rotations, positive GP role models and maintaining a positive view of the profession early). Intrinsic student factors, family, friends, community and those with a societal orientation were also associated with students pursuing a career in the specialty.
A range of student and curriculum factors appear to be associated with students intending to pursue a career in general practice. Further studies of curriculum factors where prospectively conducted and quasi-experimental designs are a priority.
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Presenting Author: Sameed Arshad
Supervisor: Dr Geoff McCombe
Co-Supervisor: Prof Walter Cullen

22. INTEGRATING PRIMARY AND SECONDARY CARE TO ENHANCE CHRONIC DISEASE MANAGEMENT: A SCOPING REVIEW

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Sláintecare has committed to delivering an integrated care framework to the community to address the increasing prevalence of chronic disease and its consequent burden on healthcare systems[1]. Integrated care is an approach to healthcare systems delivery that aims to remedy the fragmentation of patient services and improve care continuity. This study aimed to examine the extent and nature of existing research regarding the integration of primary and secondary care to enhance chronic disease management, and to identify gaps in the literature.
To determine best practice in access to and integration of care, a comprehensive search of the current literature was conducted in the form of a scoping review following the Arksey and O'Malley[2] methodology.
Twenty-two studies were included. The studies reported were conducted in a range of settings (most commonly Ireland, UK, the Netherlands), among patients with a range of chronic conditions (most commonly diabetes, COPD) and adopted a range of methodologies (most commonly randomised and non-randomised controlled trials). Interventions involving multidisciplinary teams were among the most commonly reported, sometimes led by GPs with special interest or coordinated by a nurse, usually incorporating an educational component. Outcome measures reported included cost-effectiveness, quality of life, clinical outcomes and hospitalisations. Of 8 studies that examined the effect of an intervention in a randomised controlled trial, 5 studies reported significant positive effect.
While considerable literature has examined the integration of primary and secondary care to enhance chronic disease management, further research examining new models of care to enhance multiple diseases is a priority.
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Presenting Author: Sara Murtagh
Supervisor: Dr Geoff McCombe
Co-Supervisor: Prof Walter Cullen

24. INVESTIGATING THE CARDIOPROTECTIVE ROLE OF LIPOXIN MIMETICS IN MODELS OF DIABETES

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Chronic, unresolved inflammation is associated with diabetes and diabetic vascular complications.[1-2] Lipoxins (LXs) are a family of eicosanoids which act to resolve inflammation. Using streptozotocin-induced diabetic ApoE-/- mice, we previously showed that synthetic lipoxin mimics (sLXMs) are renal and atheroprotective. Here we assessed the protective effects of the novel sLXM (KG522) on the cardiorenal axis.
ApoE-/- mice were administered streptozotocin via I.P, and diabetes was allowed progress for 10 weeks, after which mice were administered KG522 (2ug/kg) or vehicle. Heart and kidney tissue were analysed by histological staining, qPCR and western blotting. *In vitro* studies were performed in primary human cardiac fibroblasts (HCFs) stimulated with pro-fibrotic TGFB-1 (5ng/ml) and KG522 (0.1-10nM) for 24 hours. Statistical significance was determined using ANOVA and Student's t-test ($p<0.05$).
Diabetic ApoE-/- mice were hyperglycemic, with no effect seen by KG522 on blood glucose levels. Quantification of renal glomerulosclerosis identified an increase in the diabetic kidney which

KG522 reduced. Kidney tissue gene expression analysis indicated an upregulation of fibrotic (*col1a2, col3a1, col4a1, thbs1, acta2*) and inflammatory (*tnfa, f4/80, il6*) markers, attenuated by KG522. Heart tissue gene expression analysis revealed an upregulation of *myh7* and *nppa*, however these were unchanged by KG522. Western blot analysis of cardiac tissue suggested an increase in fibrotic marker expression in diabetic mice. HCFs treated with TGFB-1 led to a significant increase in CTGF and Fibronectin expression, with evidence of attenuation of Fibronectin by KG522.

These data suggest that the sLXM KG522 may confer protective effects on the cardio-renal axis in diabetes.

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Presenting Author: Alex McDaid
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Co-Supervisor: Prof Catherine Godson

26. ASSESSMENT OF PLASMA LEVELS OF SOLUBLE MARKERS OF INFLAMMATION IN OBESE AND NON-OBESE HIV+ SUBJECTS

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Obesity represents an emerging health problem that is increasingly common both in the general population and in people living with HIV (PLWH)[1]. Both obesity and HIV infection are associated with chronic inflammation which contributes to the development of several co-morbidities[2]. Their combined effect on inflammation is, however, still poorly understood. Our aim was to analyze differences in soluble markers of inflammation between obese and non-obese HIV positive subjects enrolled in the UCD ID cohort and explore the relationship between obesity and alterations in key clinical markers of immune activation and inflammation.

An ELISA method was used to assess levels of inflammatory markers (IL-1, IL-6, TNF-alpha, TNF RI, TNF RII, sCD163 and CD14) in stored plasma samples of 99 subjects previously enrolled in the UCD ID cohort study. Differences between obese (n = 33) and non-obese (n = 66) subjects were assessed using the non-parametric Mann-Whitney test for unpaired data.

Circulating levels of IL-1, IL-6, and TNF-a were statistically significantly higher in obese compared to non-obese HIV+ subjects. No significant differences were observed in the levels sCD14, sCD163, TNF RI, or TNF RII between the two groups.

Higher levels of inflammatory markers were observed in obese compared to non-obese PLWH. This might indicate an additional contribution of obesity to chronic inflammation and immune activation in HIV infection. Given the link between inflammation and the development of co-morbidities, investigating the impact of weight reduction on the inflammatory status of obese PLWH may represent an interesting direction for future research in prevention strategies.

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Presenting Author: Emma Haran
Supervisor: Dr Stefano Savinelli
Co-Supervisor: Prof Patrick Mallon

27. RESURGENCE OF MUMPS OUTBREAKS IN A HIGHLY VACCINATED POPULATION

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Recent mumps outbreaks have occurred in individuals who have received two doses of MMR vaccine predominantly affecting adolescents and young adults. Antibody titre determination alone is often an inadequate predictor of protective immunity.

The aims of this study were to examine the levels of mumps IgG and RNA viral loads in oral fluid samples of patients with mumps and to establish an avidity assay using the mumps vaccine strain (Jeryl Lynn), current circulating strain (G5) and Enders strain using samples from healthy controls and mumps cases. Enzyme immunoassay for detection of mumps specific IgG was used and the assays modified for measurement of IgG avidity.

A significant but age dependent correlation was observed between the level of mumps IgG and mumps viral load in oral fluid samples ($r=0.41$, $p<0.0001$). Mumps specific IgG levels in sera were higher in mumps cases ($n=13$) compared to controls ($n=40$); JL ($p<0.001$), Enders ($p<0.0001$) and G5 ($p<0.002$). Using a novel dissociation agent, avidity assays were successfully performed. There was a significant correlation between JL and Enders IgG to their respective avidities ($r=0.74$, $p<0.0001$) ,($r=0.59$, $p<0.0001$) respectively.

Our findings show that low mumps IgG levels in oral fluid correlate with high mumps viral loads indicating possibly insufficient levels of antibody to neutralise and clear the virus. Use of a mumps IgG avidity test may be a useful tool in determining susceptibility to mumps infection.

Presenting Author: James Kelly
Supervisor: Dr Jaythoon Hassan

28. USING CDK INHIBITORS IN ADVANCED PROSTATE CANCER

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The androgen receptor (AR) promotes cell cycle progression through the up-regulation of cyclin D1 expression and subsequent activation of G1 cyclin-dependent kinases (CDK4/6)[1]. CDK 4/6 inhibitors have been studied extensively in breast cancer and have shown great success[2]. This

information highlights a new approach to the treatment of PCa. The aim of this study is to investigate the effect of Abemaciclib on cell cycle, cell viability and to study the signalling pathway post-Abemaciclib treatment. Cell viability with Abemaciclib was assessed using MTT assay. Apoptosis and cell cycle profile was assessed using Propidium Iodide staining and flow cytometry. IC50 values were calculated using GraphPad Prism. Experiments were performed in the isogenic pair **LNCaP** parental (androgen-dependent) and **LNCaP Abl** (castrate-resistant). Western blotting was performed to quantify the expression of cyclin D1, cyclin E1 and Rb.

Analysis of MTT assay demonstrates that the LNCaP Abl cell line is 10 times more resistant to Abemaciclib treatment than LNCaP parental. Flow cytometry results provide information on cell death and cell cycle. Abemaciclib does not have a significant effect on cell death. Cell cycle arrest in G1 occurred in both cell lines. Western blot indicates a down-regulation of the Rb protein, indicating reduced phosphorylation in both cell lines. There were no changes in cyclin E1, CDK1, p21 and p27 expression.

Results indicate that Abemaciclib had no major effect on cell death. On analysis of the cell cycle, Abemaciclib causes arrest of the cell cycle in the G1.

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Presenting Author: Rebecca Pearson

Supervisor: Dr Maria Prencipe

29. EXPLORING MOTIVATIONS FOR PARTICIPATION AND NONPARTICIPATION IN CHRONIC DISEASE SELF-MANAGEMENT PROGRAMMES AMONG PEOPLE WITH ARTHRITIS IN IRELAND

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Chronic diseases are recognized as a major component of health service activity and expenditure[1]. "The Chronic Disease Self-Management Program (CDSMP)" developed by Stanford University is used to control chronic diseases[2]. In Ireland, courses based on this model are offered by the HSE and Arthritis Ireland. The aim of this research is to explore motivations for participation in CDSMP, particularly in relation to arthritis. It will investigate who takes parts - or does not take part in these programmes and whys.

A web-based questionnaire on arthritis patient's experience of CDSMP in Dublin was conducted. The participants included people of ages between 18 to 60 years and above whom attended and did not attend CDSMP. The research design used Public and Patient Involvement (PPI) where the student researcher collaborated with patients to gain feedback to ensure that the questionnaire was relevant, meaningful and accessible for patients.

In terms of respondents who had taken part in a CDSMP, exercise information was reported as the most useful and important things learnt during the programme. Indeed, 44 per cent (n=20) of participants self-reported that they increased in exercise and physical activity after attending the programme. In terms of respondents who had never taken part in a CDSMP, the survey found 49%(n=46) of participants are not aware of CDSMP and not available in their area.

The study was not well-represented for arthritis population in Ireland. It was only catered to participants who are familiar with using social media as a media for communication.

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Presenting Author: Joanne Tan Huey Min

Supervisor: Assoc Prof Suzanne Donnelly

32. ARTS IN HEALTH: USING LITERATURE TO SUPPORT CHILD AND ADOLESCENT PATIENTS AND CLINICIANS

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The aim of medical humanities is to provide better balance for today's advanced medicine by adding a more patient-oriented approach[1, 2]. Mind Reading 2019 is a collaborative project between UCD child and Adolescent Psychiatry and the Universities of Oxford and Birmingham. This two-days conference included talks and workshops covered attendee's previous experience in multidisciplinary education, narratives in medicine and issues of burnout and compassion fatigue, delivered an interdisciplinary learning environment; bringing together psychologists, psychiatrists, GPs, service users, and historians of literature and medicine. It aims to investigate the role of narratives in medicine as well bridging the gaps between different professional fields using literature as a neutral language.

The study was granted an ethical exemption from CHI at Temple St Children Hospital as a study of adult learners. Attendees were surveyed before and after the conference using encrypted, industry standard online methodology (surveymonkey). Data collected was reviewed and analyzed by SPSS statistical software and Excel. Response rate was 46.7%. Data analysis revealed that the program helped the majority of participants (85.71%) understanding the intersection between their roles and that of other professions, as well as addressing interprofessional aspects of mental health. Additionally, almost all participants became aware of clinical burnout and said that they would value further training on dealing with it.

In conclusion, interdisciplinary approaches can maximize the understanding of clinical problems which can enhance patient care. Data collected over the course of the project (MindReading 2017-2019) can be used to design an innovative teaching project for adult learners that harnesses learning from the program to support practice.

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Presenting Author: Sara Alsiyabi

Supervisor: Dr Elizabeth Barrett

Co-Supervisor: Dr Melissa Dickson

34. CARDIAC ARREST RESUSCITATION ATTEMPTS IN GENERAL PRACTICE: DEFIBRILATOR DATA AND OUTCOMES

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The Medical Emergency Responders Integration and Training (MERIT) project equips general practices in Ireland for cardiac arrest management by providing training and automatic external defibrillators (AEDs), thereby improving the local community response to life-threatening emergencies including sudden cardiac death[1].
AEDs provided by MERIT allow ECG data to be downloaded and analysed after a cardiac arrest event. The aim of this research was to analyse ECG data recorded by AEDs over the ten-year lifetime of the project.
ECG data were available for 191 individual out-of-hospital cardiac arrest events. Duration of ECG recordings ranged from 3 to 57 minutes. (median 16.8 minutes). Analysis of the initial rhythm showed that it was 'shockable' in 87/191 cases (45.5 %) and 'non shockable' in 104/191 cases (54.5%). In total, 40/191 (20.9%) patients survived to hospital discharge. Survivors had a median number of 1 shocks per case (range 1-8). Time interval between turning the device on to applying AED pads ranged from 4 seconds to 2 minutes (median 12s). Time interval between turning the device on and delivering the first shock ranged from 23 seconds to 1 minute 35 seconds (median 35s).
Downloaded ECG data provides an important insight into the care provided by GPs for patients who suffer cardiac arrest in the community. The relatively high proportion of initial 'shockable' rhythms and ultimate survivors emphasize the critical role of AED availability and of GPs who provide early cardiac arrest care in the community. Many survivors received only one shock from the AED. Further analysis of AED download data is on-going and will enhance the scientific understanding of cardiac arrest management in General Practice.
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Presenting Author: Ghazal Aljarad
Supervisor: Dr Tomas Barry
Co-Supervisor: Prof Gerard Bury

35. THE WATERSPORTS INCLUSION GAMES – WHAT ARE THE BENEFITS AND BARRIERS FOR CHILDREN AND FAMILIES WHO PARTICIPATE?

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The Watersports Inclusion Games (WIG) is an event for children and families with disability to participate in water-based activities[1]. HSC (Public Health Agency) guidelines state family participation physical activity can improve mental health and confidence in children with disability[2]. This study aims to gain an insight into the benefits and barriers of participation, perceived by parents and carers.
After an initial literature review, an online survey was constructed via SurveyMonkey containing industry standard encryption methodology. The anonymous pre-event survey was circulated three times to the guardians of the participants in the WIG. A post-event survey will be circulated after the event.

Number of survey-links sent to parents / carers	85
Total responses to date	19
Age range of participants	8-21
No. of males	10
No. of females	9

73% of pre-survey participants were primarily hoping to experience a new sport in a controlled environment and meet others with similar challenges. Over 60% of participants found that accessibility to watersports was a moderate limitation to participation in watersports outside the WIG. Availability of experts to guide watersport activities was a moderate limitation for 28% of participants.
The results of the pre-survey show that a majority of participants are hoping for a new experience in a safe environment. Furthermore, participants and carers alike are eager to meet new people of similar backgrounds. Accessibility, information availability and lack of watersports guides are barriers which limit children with disability from participating in watersports and areas which should be addressed in the future.
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Acknowledgments:
The community partners and families who participated.
Presenting Author: Ayodhya Salgado
Supervisor: Dr Elizabeth Barrett
Co-Supervisor: Ms Johanne Murphy

36. STATIN USE AND MAMMOGRAPHIC BREAST DENSITY

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Mammographic breast density is one of the strongest risk factors for breast cancer. Hence, identifying factors that can reduce mammographic breast density could have utility in breast cancer prevention. Previous studies showed conflicting results, therefore, we, investigated the associations of statin use with mammographic breast density, and further determined the impact of menopausal status.
We evaluated associations in 635 women recruited during annual screening mammogram at the Joanne Knight Breast Health Centre (BHC) at Siteman Cancer Centre at Washington University School of Medicine, St. Louis, MO, who provided detailed information on lifestyle factors, including statin use in the past 12 months. Volpara was used to measure mammographic breast density. We used linear regression models and adjusted for confounders (age, body mass index (BMI), race, family

history of breast cancer, age at first birth and parity, age at menarche and current alcohol intake).
The mean age of study participants was 52.3 years. Fifty women (7.8%) were statin users. After adjusting for confounders, the mean volumetric percent density was lower among statin users (7.6%) than non-users (8.9%), but this was statistically insignificant (p-value=0.09). Among premenopausal women, the mean volumetric percent density was 8.3% among statin users vs. 10.3% among non-users (p-value=0.06). Non-dense volume was, however, higher (1531.3 cm^3) among statin users than non-users (1519.6 cm^3 vs. 1410.5 cm^3; p-value= 0.03).
Statin use was associated with higher non-dense volume. The association of statin use with lower volumetric percent density was only evident in premenopausal women. Findings require confirmation in other studies.
Presenting Author: Chee Teik Lee
Supervisor: Dr Adetunji T. Toriola

37. INVESTIGATING THE BINDING ABILITY OF MYCOBACTERIUM TUBERCULOSIS EFFECTORS ESXG-ESXH WITH HUMAN OCRL

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TB is one of the leading causes of mortality worldwide; infection is caused by the bacteria *Mycobacterium tuberculosis* (Mtb). Mtb is such a successful pathogen because it can prevent its degradation in macrophages. Previously, we showed that the heterodimer EsxG-EsxH, a protein pair secreted by Mtb, is required for Mtb virulence and contributes to the impairment of phagosome maturation[1]. Our unpublished preliminary data suggests that EsxG-EsxH targets the human protein oculucerebrorenal syndrome of Lowe (OCRL), an inositol polyphosphate 5-phosphatase that has been implicated in lysosomal trafficking. EsxG contains a conserved sequence (F-x-x-x-H-x-x-ø) that has been shown in other proteins to bind the Ash-RhoGap-like domain of OCRL. Thus, we hypothesize that EsxG-EsxH binds the human protein OCRL and alters its function.
The objective of this study was to determine whether EsxG-EsxH, a secreted protein heterodimer from Mtb, directly binds the human protein OCRL in order to better understand the role of EsxG-EsxH in tuberculosis (TB) pathogenesis.
We subcloned full length OCRL, the Ash-RhoGAP domain of OCRL, and the PH-5-phosphatase domain of OCRL and expressed them in *E. coli* as GST fusion proteins. We incubated purified Ash-RhoGAP protein with recombinant EsxG-EsxH. Using a pulldown assay, we evaluated whether there was a direct interaction between EsxG-EsxH and the Ash-RhoGAP domain of OCRL.
Results from western blotting show enhanced interaction between the Ash-RhoGap domain of OCRL and EsxG-EsxH compared to a control protein. Further analysis is required to verify this preliminary result. Understanding the interaction between human OCRL and EsxG-EsxH may be useful in developing novel anti-virulence therapies for TB treatment.
Acknowledgments:
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Presenting Author: Eniola K. Kasim
Supervisor: Assoc Prof Jennifer A. Philips
Co-Supervisor: Mr Ekansh Mittal

38. SEX DIFFERENCES IN THE HYPERTENSIVE RESPONSE TO CHRONIC CIRCADIAN MISALIGNMENT: INVESTIGATING THE ROLE OF RAS

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Rotating shift work induces misalignment between behaviour and circadian rhythms in physiology and is linked to stroke, obesity and hypertension[1]. 15% of the working population engage in shift work, with meta-analysis showing that female shift workers carry less risk of developing hypertension, and experimental data suggests that female mice maintain transcriptional rhythms and show enhanced entrainment to phase shifts over males[2]. The mechanistic link between hypertension and misalignment is poorly understood.
As the Renin-Angiotensin System is a primary modulator of BP and a key therapeutic target in hypertension we investigated the effect of chronic misalignment on RAS in male and female mice. C57bl/6 mice on a high-fat diet (n=79) were divided by sex and misalignment was induced in experimental groups via weekly 8-hour light/dark phase shifts over 12 weeks. Blood pressure and activity were measured. Using RT-qPCR on kidney tissue, we quantified the expression of two clock genes (Bmal1 and Per2), the renin precursor gene and Angiotensin Receptors 1 and 2. We measured urinary 17 b-estradiol among females using ELISA.
Cosinor analysis of results showed a significant loss of rhythmicity both in clock genes and in expression of Ren1, Agtr1 and Agtr2 following misalignment. Significant differences in expression of RAS component genes were observed between sexes ($p<0.01$, ANOVA), but no difference in absolute expression was found that might suggest overactivity of the RAS system.
Further investigations into the response of sex hormones or the autonomic system to misalignment may help to explain sex differences observed in blood pressure.
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Presenting Author: Sorcha Lynch
Supervisor: Dr Sean Anderson
Co-Supervisor: Dr Garret A. FitzGerald

40. AN OVERVIEW OF THE ETIOLOGY, CLINICAL MANIFESTATIONS, MANAGEMENT STRATEGIES AND COMPLICATIONS OF HYPOPARATHYROIDISM FROM THE CANADIAN NATIONAL HYPOPARATHYROIDISM REGISTRY

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Hypoparathyroidism is a disorder characterized by surgically induced or idiopathic dysfunction of the parathyroid glands. These glands secrete parathyroid hormone (PTH), which regulates calcium homeostasis and phosphate clearance[1]. The Canadian National Hypoparathyroidism Registry serves to elucidate the aetiologies, symptoms, complications, and management of patients with hypoparathyroidism.
This study received ethics approval from the Hamilton Integrated Research Ethics Board in affiliation with McMaster University. Only patients with low PTH/serum calcium levels for at least 6 months were eligible. Patients provided written consent, after which medical details were extracted from their records. This information included relevant medication, blood work, aetiology, family history, initial symptoms, and hospitalizations. This was analyzed using descriptive statistics. As well, a t-test was used to compare patients with/without extra-skeletal calcification (brain/renal).
Data from 130 patients were entered in this study. The average age of onset was 41, with a median duration of 8 years. 77 patients had post-surgical hypoparathyroidism, while 36 had idiopathic/genetic hypoparathyroidism. The most common medications used were calcium (105/112), calcitriol (92/112), and cholecalciferol (78/112). Only 4/112 patients were on PTH replacement. Nephrolithiasis/nephrocalcinosis was present in 18/76 reviewed patients, while basal ganglia calcification was present in 12/53 reviewed patients.
This study describes the presentation, complications, and treatment of patients with hypoparathyroidism today. Of note is the high prevalence of complications and underutilization of PTH replacement therapy. Future prospective data will be of value in optimizing treatment strategies and reducing long term complications.
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Presenting Author: Mihai Romanovschi
Supervisor: Dr Aliya Khan

41. INTERFAMILIAL AND TEMPORAL VARIATION IN RETINAL STRUCTURE IN PATIENTS WITH X-LINKED CONE DYSFUNCTION SYNDROME

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Bornholm eye disease is an X-linked cone dysfunction disorder characterised by myopia, dichromacy and astigmatism. The disease was mapped to Xq28, which encompasses the long (L) and middle (M) wavelength sensitive opsin genes *OPN1LW* and *OPN1MW*, respectively. An interchange mutation in one of these genes leads to a depletion in spliced transcript levels and consequently a reduction in photopigment in photoreceptors expressing the variant gene[1]. Phenotypic variation has been shown in patients with the same mutation[2]. While one interchange mutation has been linked with later onset cone degeneration, there is need for further longitudinal evaluation to elucidate this[1].
The cone mosaics of three brothers were imaged using confocal and non-confocal split detection adaptive optics scanning light ophthalmoscopy (AOSLO). Total retinal thickness and outer nuclear layer plus Henle fiber layer (ONL + HFL) thickness was measured using spectral-domain optical coherence tomography. Previous data was assessed from a visit 21 months prior for longitudinal analysis.
Cone density measurements revealed a significant difference between confocal cone density measurements (but not those from split detection) when comparing data from 22 months apart. Total retinal thickness or ONL+HFL did not change significantly over time. Interfamilial variation was observed in cone density and visual acuity.
This suggests that while cone reflectivity changes significantly over time as observed in confocal images the data from split-detection images reveals that underlying structure remains constant. Longer follow up is needed in these patients to further understand progression of this disease.
Acknowledgement:
We would like to thank the Eye Institute & the Medical College of Wisconsin for funding for this research.
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Presenting Author: Amy Ward
Supervisor: Prof Joseph Carroll
Co-Supervisor: Prof David Keegan

42. NEUROINFLAMMATION AND NEUROPLASTICITY IN THE SPINAL CORD AND SUBSTANTIA NIGRA FOLLOWING CHRONIC HYPERCAPNIA IN GOATS

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Hypercapnic patients in respiratory disease have worse prognoses than those with equal impairment without hypercapnia. Time-dependent physiologic effects of chronic hypercapnia that correspond to glutamatergic and inflammatory changes in the brainstem respiratory nuclei (BRN) have recently been characterized[1]. Elevated steady-state ventilation was observed, during 30 days of chronic hypercapnia in goats; due to an unknown stimulus[2].
The aims of this research were to explore the involvement of: (1) the spinal cord; being the major output to the muscles of respiration, (2) the substantia nigra; a dopaminergic population of neurons that is connected to the retrotrapezoid nucleus (RTN) through the periaqueductal grey (PAG).
Tissue was obtained from healthy goats after 24 hours or 30 days of chronic exposure to 6% $InCO_2$ or room air. Spinal cords and brains were rapidly extracted and flash frozen for western blot analysis to assess inflammation and glutamate receptor expression.

In the spinal cord, results show no significant differences between hypercapnic and control goats, neither at 24hours, nor at 30 days. However, in the substantia nigra, results show a 60% decrease of the AMPA receptor subunit GluR2 after 24 hours, that returns to near control levels at 30 days; it is also apparent that there is a 52% increase of the inflammation marker IL1β at 30 days.
Damage to AMPA receptors indicates decreased excitability and connectivity. An increase of inflammation at 30 days is unusual, and suggests long-term rewiring within the substantia nigra that may contribute to the concomitant physiologic changes that occur during chronic hypercapnia.
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Presenting Author: Raghad Alshammasi
Supervisor: Dr Hubert Forester

43. A NEW THERAPEUTIC TARGET FOR AML: INVESTIGATING THE INTERPLAY BETWEEN NUCLEOPHOSMIN AND CASPASE-2 IN DETERMNING CHEMOSENSITIVITY IN CHILDHOOD AML

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Acute myeloid leukaemia (AML) lacks targeted therapies for most subtypes. This combined with frequent relapse (30%) and long-term treatment toxicities delineate a dramatic clinical need for new therapeutic target[1]. In cytogenetically normal AML, 20% possess mutated nucleophosmin (NPM1) causing NPM1 to be cytoplasmic (NPM1c+) instead of nucleolar (NPM1 wild type (wt)), contributing to leukemogenesis and increased chemosensitivity[2]. NPM1 activates caspase-2 but the resultant cell-fate is unknown. We hypothesise that this cell-fate differs depending on NPM1 localisation. Our aims were i) determine how NPM1 activates caspase-2 to modulate sensitivity to apoptosis in AML and ii)explore non-apoptotic functions of caspase-2.
OCI-AML2(NPM1wt) and OCI-AML3(NPM1c+) cells, +/- caspase-2 knock-out, were seeded and treated with daunorubicin(0.25uM) for 18h. Caspase-2 activation was assessed by image flow cytometry. Apoptosis was assessed by measuring annexin V by flow cytometry. Immunoblotting was used to analyse the signalling pathway and the bromodeoxyuridine assay was performed for cell-cycle analysis.
Caspase-2 activation occurred in the same cellular compartment as NPM1 localisation. Immunoblotting revealed that caspase-2 cleavage only occurred in NPM1c+ cells and that MDM2 cleavage (caspase-2 substrate) occurred post DNA-damage in NPM1c+ cells. Caspase-2 protected against apoptosis in NPM1wt cells but induced apoptosis in NPM1c+ cells. Caspase-2 differentially regulated the cell-cycle, inducing cell-cycle arrest in NPM1wt cells but allowing cell-cycle progression in NPM1c+ cells.
Our findings support our hypothesis that NPM1-mediated regulation of caspase-2 pathway is a critical node in AML cell-fate regulation, providing a key determinant of chemosensitivity. Our long-term goal is to discover how NPM1 can be targeted to improve survival for children with AML.

Acknowledgements:
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Supervisor: Dr Lisa Bouchier-Hayes

44. ANALYSIS OF PAIN CHARACTERISTICS AMONG PALLIATIVE CARE PATIENTS: A CASE STUDY OF HOSPICE AFRICA UGANDA

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Physical pain is a dominant complaint among palliative care patients in developing countries[1, 2]. As the primary goal of palliative care is the alleviation of pain, accurate documentation of pain by healthcare professionals is paramount to providing adequate care. The characteristics of pain that patients present with at Hospice Africa Uganda (HAU) has not been described in the recent past.
This study utilised a chart review method to perform a retrospective, cross-sectional study of recorded pain characteristics among patients enrolled during 2018 at HAU's Kampala site. The average primary pain score and average number of pains were analysed per gender, age range, disease diagnosis and social class. Groups were compared using t-tests and Kruskal-Wallis tests.
70 of the 78 (89.7%) charts reviewed reported pain. The most commonly reported primary pain score was 3 out of 5 (moderately severe pain), and the most commonly reported number of pains was 1. Three statistically significant results were observed. Prostate cancer and "other" cancers (standalone cases present that did not fit into the other categories; including abdominal, skin, renal and bladder cancer) exhibited the highest average number of pains compared to other disease categories (p=0.0368). Among gastrointestinal tract cancers, rectal cancer exhibited the highest average primary pain score (p=0.0048). Patients with tertiary level education exhibited the highest average primary pain score compared to other levels of education (p=0.0312).
These results can be used to identify specific patient attributes with statistically higher pain scores to improve pain management among patients at HAU.
Acknowledgements:
The author would like to acknowledge funding from the Dean's Summer Research Scholarship at UCD and hosting from Hospice Africa Uganda.
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Presenting Author: Joseph Taylor
Supervisor: Dr Doreen Agasha Birungi

45. DOCUMENTATION OF PAIN ASSESSMENT FOR PATIENTS RECEIVING PALLIATIVE CARE: A CASE STUDY OF HOSPICE AFRICA UGANDA

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Hospice Africa Uganda (HAU) operates a palliative care service that offers regular pain assessments, and pain relief to patients. This cross-sectional study aimed to determine the percentage of patients assessed for pain at initial, second, and third consultations; to identify the average progression/regression of pain scores following their initial consultation; to identify the average change in pain scores; and to determine the percentage of patients who received three consecutive pain assessments.
The study sample consisted of 64 patient records from patients admitted to HAU during 2018. Data was extracted using Excel, a descriptive analysis was performed using SPSS Statistics Software.
The study revealed that 21.3% patients received three consecutive pain assessments. 90.6% of patients were assessed for pain on their first consultation, 56.3% of patients were assessed on their second consultation, and 25% on their third consultation. A Kruskal-Wallis test revealed an insignificant difference of mean pain scores [$p>.05$]; with a decrease in mean pain scores from 3.22 at the first consultation to 2.13 at the third consultation. Data analysis displayed that 34.3% of patients reported no change in pain scores, 51.5% of patient reported regression in pain scores, and 14.4% reported progression in pain scores.
The study suggests that there is a decrease in the documentation of pain assessments between a patient's first and third consultation. Furthermore, the results of the study display that current practices are not effective in decreasing patients' reported pain scores. By improving compliance to documentation, patients' pain scores can potentially be reduced between consultations.
Presenting Author: Susie Phelan
Supervisor: Dr Doreen Agasha Birungi

46. PAEDIATRIC LIAISON PSYCHIATRY SERVICES (PLPS) AT OUR LADY'S CHILDREN'S HOSPITAL CRUMLIN (OLCHC) – WHO ARE THEY SEEING?

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Paediatric Liaison Psychiatry Services (PLPS) is a specialized tertiary service aimed at addressing co-morbid mental health (MH) difficulties with medical illnesses.
Prior audits conducted in 2016 and 2018 showed that the majority of cases seen by PLPS were acute MH presentations to the emergency department (ED) as opposed to the classic liaison cases[1]. A six-month retrospective audit was conducted using anonymized referral letters of all children and adolescents who presented to PLPS (N=118) in January-June 2019.
Patients presenting ranged from 5-18 (M=13.6, SD=2.53) and predominantly female (67, 57%). The majority of cases were acute psychiatry presentations to the ED (75, 66%), 26 (23%) were referred by college paediatricians as true liaison cases, 5 (4%) were eating disorder cases, and 8 (7%) were seen as outpatients. 90 (80%) had an Axis 1 diagnosis, most commonly depression (30%), ADHD (32%), Anxiety (14%). Of acute MH presentations to the ED, 45% (34) presented out of hours, 51% (38) were admitted with a mean length stay 4.9 days. 62% (69) of patient were referred to Child and Adolescent Mental Health Services (CAMHS), 6% (7) to a specialized inpatient psychiatry unit, and 26% (29) back to the medical team/GP.
The majority of the cases seen by the PLPS were acute MH presentation to the ED, with a smaller focus on true liaison cases. Of these, 43% (31) were previously known to CAHMS. Sourcing an emergency and 'out of hours' CAMHS service is supported by this audit.
Acknowledgments:
The author would like to acknowledge the support given by Professor Fiona McNicholas, Dr. Gadancheva and the staff in the department of Child and Adolescent Psychiatry at Our Lady's Children's Hospital Crumlin.
Reference:
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Presenting Author: Alix Petit
Supervisor: Prof Fiona McNicholas

51. IMPROVING THE COMMUNICATION OF DIAGNOSTIC CHANGES IN CHILD & ADOLESCENT PSYCHIATRY

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The PAEDS (Prevalence and Experience of Diagnostic Shifts) project explores the frequency with which psychiatric diagnoses are changed in Child & Adolescent Mental Health Services (CAMHS) and the implications of this for the young person and their family. PAEDs found that 19% of CAMHS attendees had undergone diagnostic transitions. Quantitative and qualitative data has already been collected revealing the typical patterns of diagnostic changes and the challenges they can pose for young people. One of the challenges identified was how these diagnostic changes were communicated to patients and their families[1].
The aim of this study was to draw on this data to develop resources that help clinicians and parents (i) anticipate likely patient responses to diagnostic changes and (ii) effectively communicate diagnostic changes to children and their families. Once these resources were developed an evaluation of their effectiveness was completed.
A literature review on how to communicate these diagnostic changes to children was completed and identified the lack of research carried out in this area. Data was extracted from interviews conducted with children and parents across Ireland who had experienced diagnostic changes. Qualitative analysis of this data revealed a range of recommendations for parents on how to communicate diagnostic changes to their child and how healthcare professionals should communicate diagnostic changes to their patients and their families.
The clinically relevant resources developed in this project address a long-standing difficulty in clinical practice and aim to improve the communication of diagnostic changes in a sensitive, patient- centred clinical manner.
Acknowledgments:
The author would like to acknowledge funding by the European Commission.
Reference:
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Presenting Author: Claire MacBride
Supervisor: Dr Clíodhna O'Connor
Co-Supervisor: Prof Fiona McNicholas

52. DEVELOPING ANTIVIRAL THERAPIES TO TARGET EQUINE ENCEPHALITIS VIRUSES: STUDYING THE EFFECT OF INHIBITION OF 2PK CHANNELS ON ALPHAVIRUS REPLICATION

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Alphaviruses comprise the most pathogenic causes of encephalitis in both human and equine populations. Western equine encephalitis (WEEV), Eastern equine encephalitis (EEEV) and Venezuelan equine encephalitis (VEEV) have a mortality rate in horses between 30-90%, and the animals that do recover often suffer long-term neurological impairment[1,2]. There are currently no treatments available, however previous work in the Barry Lab demonstrated that general inhibition of 2-pore-potassium (2pK) ion channels of the mammalian host cell disrupts alphavirus replication. Therefore, this project aims to determine the specific 2pK channels essential for alphavirus replication.

Of the fifteen channels of the 2pK family, five were targeted: 2pK- 3, 5, 6, 10, and 16. Specific short interfering RNAs (siRNAs) were used to create RNA interference (RNAi). The RNAi led to channel neutralization, which targeted individual 2pK channels of the 3T3 host cell. Cells were then infected with the model virus, Semliki Forest Virus, and viral replication was quantified by a TCID50 assay.

The use of siRNA to target 2pK-6 resulted in less viral replication, although, the results were inconclusive. This may be due to the siRNA not sufficiently lowering the protein level or may suggest redundancy in channel function. These results will be followed up in the future by using a western blot to measure protein expression.

The influence of 2pK channels on alphavirus replication remains of interest, although, further tests will be needed to determine the role of specific channels.

Acknowledgement:
The author would like to acknowledge funding from the Morris Animal Foundation Veterinary Student Scholars Program.

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Presenting Author: Brittany Rampersad
Supervisor: Dr Gerald Barry

54. ECM-BASED INJECTABLE HYDROGEL SYSTEM FOR THE REGENERATION OF CARTILAGE

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Osteoarthritis leads to degeneration and destruction of the cartilage in the joint cavity. It affects 10% of men and 18% of women over 60. 80% will have movement limitations, while 25% cannot perform daily activities[1]. Current treatment is mainly via weight loss and pain management and is not curative. This study evaluates the benefits of encapsulating cartilage progenitor cells in an injectable hydrogel hybrid structure resembling extracellular matrix, to help stem cells differentiate into chondrocytes and regenerate damaged cartilage.

The mechanical properties of the HA-SH and HB-PEG hydrogel system were evaluated using a rheometer. Rat cartilage-derived progenitor cells were divided into experimental (encapsulated in hydrogels) and control groups. Chondrogenesis (collagen type II, aggrecans, SOX-9) and inflammatory reaction (IL-1β and IL-6) levels were assessed at 2- and 4-weeks using RT-qPCR.

Results show a short hydrogel gelation time, and stable mechanical properties (stiffness and viscoelasticity) compatible with injection. The gene expression levels of collagen type II were greatly increased, and IL-6 lowered as expected. However, the expression of SOX-9 was fluctuant and the aggrecans were lower in the hydrogel groups than in the controls, while IL-β1 was higher.

This experiment shows encapsulation in a hydrogel structure does stimulate production of cartilage ECM components and reduced expression of IL-6. It also points to areas of improvements, such as further boosting cartilage-specific ECM production and reducing inflammation, in order to be of proper assistance to stem cell therapy, which can provide a true cure to osteoarthritis.

Reference:
1. Osteoarthritis Research Society International. Osteoarthritis: A Serious Disease. Osteoarthritis Research Society International. 2016; 9–18

Presenting Author: Pierre Albert
Supervisor: Prof Wenxin Wang
Co-Supervisor: Mrs Xiaolin Li

55. THE COLLECTION, USE AND SHARING OF PERSONAL HEALTH INFORMATION: PUBLIC OPINIONS IN IRELAND AND THE UK

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An individual's health information can be used for more than direct care. Academics, researchers and governments use health data for audit, research and service planning. However, the care.data scheme in England demonstrated that the secondary use of health data may not always be supported by the general population[1]. Governing bodies need to understand public attitudes towards the sharing of health information before legislation in this area is put in place.

This literature synthesis aims to outline public opinion regarding the use of personal health information for secondary purposes in Ireland and the UK.

A comprehensive search was conducted using Pubmed and Embase (2009-present) for journal articles and systematic reviews examining public opinion towards the secondary use of health information. Empirical articles were included if they reported on the outlook of the patient or the owner of the data towards the use or exchange of health information for reasons other than direct care. Reference lists and suggested articles were investigated for relevant literature. A grey literature search was conducted on Google.

The synthesis of the literature suggests that there is widespread support for the sharing and use of health information. This support cannot be assumed to be unconditional, and depends on the assurance that there are procedures in place protecting the citizen and that consent for the use of this information can be withdrawn upon request.

The results of this study should be considered by countries, such as Ireland, that are trying to implement an integrated Electronic Health Record (EHR).

Reference:
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Presenting Author: Joseph Kerins
Supervisor: Dr Barbara Foley
Co-supervisor: Ms Catherine Duggan

60. EARLY CAREER TRAINING IN ADDICTION MEDICINE: A QUALITATIVE STUDY WITH EARLY-CAREER LEARNERS

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There has been a noticeable deficiency in the implementation of addiction science in healthcare practice and many physicians and healthcare providers feel unprepared to treat addictions following their training[1]. While the inadequate education has been well documented, the perceptions of learners in early-career health professions have not been fully investigated. Therefore, this study sought to explore the perceptions of early-career addiction medicine training among learners in health professions in a Canadian setting.
From April 2015 – August 2018, individual semi-structured interviews were conducted with 62 early-career healthcare professionals. This included 47 early-career physicians, social workers and nurses trained in the Canadian Addiction Medicine Fellowships along with 15 medical students who participated in the Flexible Enhanced Learning Curriculum offered by the British Columbia Centre on Substance Use in Vancouver, British Columbia. All interviews were transcribed and underwent content analysis. Transcripts were coded inductively using qualitative data analysis software (NVivo 11.4.3).
The findings related to early-career training in addiction medicine revealed six key issues: (1) A need for structured addictions training, (2) Insufficient time spent on addiction education, (3) Insufficient clinical training and clinical skill development, (4) Lack of patient-centeredness and empathy in training environment, (5) Insufficient implementation of evidence-based medicine, and (6) Prevailing stigmas towards addiction medicine.
Training in addiction medicine early career professionals appears insufficient, unsupported and lacks a focus on etiology of addiction and evidence for subsequent care. Educators should include addiction medicine in the early career health professions curricula to improve addictions treatment and attitudes towards patients.
Acknowledgements:
This research was undertaken, in part, thanks to funding from the World Health Organisation that supported Dr. Jan Klimas work on this project and European Commission grant (701698) – supported Dr. Jan Klimas. The UCD SSRA office supported Mohjevan Lail to work on this project.
Reference:
1. National Advisory Commission on Addiction Treatment. Addiction medicine: closing the gap between science and practice. New York: The National Centre on Addiction and Substance Abuse at Columbia University; 2012.
Presenting Author: Mohjevan Lail
Supervisor: Dr Jan Klimas

61. "MY FEELINGS FORM": A VALIDATION STUDY IN A SAMPLE OF THE GENERAL POPULATION OF PRIMARY SCHOOL CHILDREN

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[4]*School of Psychotherapy, St Vincent's University Hospital Elm Park, Dublin 4, Ireland.*

The "My Feelings Form" (MFF) is a new colorful psychotherapeutic self-report assessment form for children age 4-13 years old developed in UCD. There is a prior self report form for adolescents, namely the Young Persons CORE Form (YP-CORE), with the purpose of monitoring progress in response to therapy through adolescent-led feedback[1]. The MFF was developed in conjunction with child art psychotherapists to assess primary school-aged children.
This study aimed to evaluate the validity and reliability of the MFF in assessing child emotional distress by gathering and analyzing sample data from a general population of primary school children.
Two MFF copies were distributed morning and afternoon to each attending students from 1st to 6th Class in a complete mixed national primary school, with responses from 314 of 360 total students. Results showed varied distribution in total form scores, with an average mean of 16.8 and range of 4 to 38 out of a maximum of 56. There were no significant differences in total scores between age groups, gender and time of completion, suggesting strong test-retest reliability between all age groups. Mood-related responses also generally skew towards positive emotions. Furthermore, the study found over 23% of students reported to have "hurt themselves on purpose" at least a little, with a significant negative correlation to the ability to "tell someone how [they] feel".
In future, the study is planned to be conducted additionally in junior and senior age groups, as well as in clinical populations for comparison.
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Presenting Author: Natthaphol Sresthaporn
Supervisor: Assoc Prof Aisling Mulligan

62. RETROSPECTIVE ANALYSIS OF PAEDIATRIC RENAL TRANSPLANT BIOPSY DATA IN IRELAND: A 15 YEAR REVIEW

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Renal transplantation is the first choice in treatment of paediatric patients with end stage renal disease (ESRD) [1]. Renal biopsies are a well-established tool in assisting diagnostic decisions and treatment plans, with some centres performing protocol biopsies and others "for cause" biopsies (post-transplant) [2].

The purpose of this study is to profile therapeutic and graft outcomes in post-transplant patients who have undergone a "for cause" renal biopsy in a national single centre in Ireland.

A retrospective analysis of 138 paediatric renal transplants at Temple Street Children's Hospital over a 15 year period (2003-2019) was analysed. Of these 138 transplants, 43 (39 patients) had one or more biopsies taken. The median age of patients receiving a renal transplant was nine years (range: 5-12) with the first biopsy taken at 12 years (range: 8-14). The major cause of ESRD was renal dysplasia (32.6%) and the predominant indication for biopsy was elevated creatinine (46.5% of biopsies). The most common biopsy finding was acute tubular necrosis (27.9%), followed by acute cell-mediated rejection (20.9%), and acute and chronic antibody-mediated rejection (14.0%). Nine patients (23.1%) lost their graft, of which 4 (44.4%) had a re-transplant.

Renal transplantation in paediatric patients has delivered similar results when compared to other single centre experiences around the world (India, China). This study provides data on the epidemiology of renal disease in paediatric Irish patients and can be helpful in formulating guidelines in the future.

Acknowledgments:
The author would like to acknowledge funding from the Temple Street Foundation.

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Presenting Author: Nithya Sridhar
Supervisor: Dr Tara Raftery
Co-supervisor: Prof Atif Awan

63. THE EFFECT OF MUSHROOM β-GLUCANS ON THE CAECAL MICROBIOTA IN THE POST-WEANED PIG

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Zinc-oxide supports gut homeostasis during the abrupt weaning practices common on commercial pig farms[1]. It will, however, be phased-out by 2022 due to antimicrobial resistance concerns. Indigestible polysaccharides, such as mushroom β-glucans, are prebiotics that may provide an alternative to zinc in supporting piglet gut health post-weaning[2]. However, a comprehensive understanding of the impact of this supplement on the porcine intestinal microbiome is unknown. The aim of this research was to quantify the abundance of commensal and pathogenic microbial families in supplemented (mushroom & zinc) groups compared to control.

At 28 days of age, newly weaned pigs (n=36) were assigned to one of three diets: 1) basal diet, 2) basal + 3000ppm zinc-oxide, 3) basal + 250ppm mushroom powder (β-glucan). On day 45, caecal digesta samples were collected for high-throughput sequencing of the V3-V4 hypervariable region of the bacterial 16S rRNA gene. The resulting sequences were analysed using the open-source software package Quantitative Insights into Microbial Ecology.

Irrespective of diet, the dominant phyla were Firmicutes, followed by Bacteroidetes and Proteobacteria, collectively representing 99.2% of the gut microbiota. Within Bacteroidetes the abundance of *Prevotellaceae* was reduced in all diets compared to control. Notably, within the phylum Proteobacteria the abundance of *Enterobacteriaceae* increased with the mushroom diet (0.33%) compared to zinc (0.03%) and control (0.02%) diets.

The mushroom supplemented group displayed increased colonization by potentially pathogenic bacteria from the *Enterobacteriaceae* family of the phylum Proteobacteria. These results demonstrate that unpurified mushroom β-glucans may not be a suitable replacement for zinc-oxide.

Acknowledgments:
The author would like to acknowledge funding from UCD School of Veterinary Medicine Thomas O'Hanlon Grant.

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Presenting Author: Alexandra Klimovitz
Supervisor: Prof Torres Sweeney
Co-Supervisor: Assist Prof Stafford Vigors

64. SPREADING THE WORD : USING STAKEHOLDER ENGAGEMENT FOR EFFECTIVE APPROACHES TO INCREASE AWARENESS OF INFLAMMATORY ARTHRITIS OF DOWN SYNDROME

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Children with Down syndrome (DS) are at increased risk of developing inflammatory arthritis. Inflammatory arthritis of DS (IADS) is a clinically distinct form of arthritis with a higher prevalence rate (20 per 1000) compared to the rate of juvenile idiopathic arthritis within the general population (1 per 1000)[1,2]. IADS is often under-reported and diagnosis is often greatly delayed. As a result, children with IADS present with significant joint damage and disability at diagnosis[1].

The aim of this research was to increase knowledge translation of the novel findings of recent research to the gatekeepers of early intervention: primary caregivers, carers, parents and people with DS.

We worked with two parents of children with IADS to discuss challenges and identify which communication tools would be most useful to raise awareness of those key challenges of IADS. Involvement partners were part of the project from conception to dissemination. In response, a video and an information brochure were designed. For both resources, we used an iterative design process with multiple review rounds from both the target audiences and the clinical professionals.

Production of an information animation video designed for social media circulation, primarily aimed at people with and carers of those at risk of IADS. Also, we created an information brochure targeted to primary care

professionals, patients, their families, tertiary care professionals who do not know IADS well, the R&D community and the general population. Overall, parents greatly favoured an easily sharable resource (the video) and a visual brochure with easy to remember facts.

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Presenting Author: Amirah Alzaki
Supervisor: Dr Emma Dorris

67. PROGNOSTICATION OF RENAL FUNCTIONAL DECLINE BY PLASMA STNFR1 IN PATIENTS WITH DIABETES MELLITUS

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Several international observational studies have indicated that elevated plasma soluble tumour necrosis factor receptor-1 (sTNFR1) levels can predict long-term progression of chronic kidney disease (CKD) and all-cause mortality in patients with diabetes mellitus (DM) [1]. The aim of this study is to validate these findings in an Irish population.
Four year prospective observational follow-up was performed for relevant renal outcomes on a previous audit validating the association between sTNFR1 levels and renal injury in patients with DM (n=763)[2]. 22% of this cohort (n=171) had an estimated glomerular filtration rate (eGFR) of less than 60mL/min/1.73m^2 (Stages 3-5 CKD) at baseline, which formed the population of this study. In this re-audit, clinical characteristics at baseline and follow-up were recorded and longitudinal laboratory data was collected to assess longitudinal renal functional decline. Plasma sTNFR1 was not re-measured.
Preliminary results are presented for n=105. The mean age (± SD) of this population at baseline was 71.8 (± 10.79) years; 64 patients were male (61%). The cohort was categorised according to baseline sTNFR1 quartiles: Q1-3 (low sTNFR1) was defined as <3330pg/mL (553pg/mL to 3330pg/mL), and Q4 (high sTNFR1) ranged from 3330pg/mL to 9355pg/mL. The mean rate of renal functional decline (eGFR decline) for the cohort was calculated to be -2.95 ± 5.79 mL/min/BSA/year.
Data collection is ongoing to maximise the sample size, followed by multivariable regression analysis to determine the ability of plasma sTNFR1 to prospectively identify patients with DM at increased risk of renal functional decline, independently of conventional clinical variables.

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Presenting Author: Colm Tuohy
Supervisor: Dr William Martin
Co-Supervisors: Dr Neil Docherty
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68. DEFINING PEDIATRIC ECZEMA IN CANADIAN PRIMARY CARE PRACTICES

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Eczema is a chronic, inflammatory skin condition with a prevalence of 10-20% in children[1]. In children a history of eczema predicts increased risk of other atopic conditions such as asthma, food allergy and rhinitis[1] and severe eczema has been recorded as a significant risk factor for the development of peanut allergy[2].
The aim of this project was to develop and validate an algorithm to flag patients with eczema using data from the Manitoba Primary Care Research Network (MaPCReN). The MaPRCeN is part of the Canadian Primary Care Sentinel Surveillance Network, a multi-system database in Canada that collects de-identified Electronic Medical Records (EMR) from consenting primary care providers. To create the reference dataset of confirmed positive and negative cases of eczema we reviewed free-text encounter notes derived from participating providers between 2004 and 2018. Three case definitions were created using structured data within the EMR (billing, health conditions, and medication records). Patient charts meeting criteria for each of the structured case definition were flagged for validation through comparison to the reference standard. A combination of agreement statistics, and manual subject matter expert review was used to determine the most appropriate case definition for capturing patients with eczema in an EMR data repository. Our validated case definition was applied to the MaPCReN population to determine the prevalence of eczema in Manitoba, and characteristics of the patients with eczema including descriptive statistics of the pediatric population with eczema.
An improved understanding of eczema prevalence in children predicts the likelihood of other atopic conditions such as asthma and has additional tangible health outcomes.

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Presenting Author: Khadijah Jilani
Supervisor: Dr Alexander Singer
Co-Supervisor: Dr Elissa Abrams

69. A PILOT STUDY: PEANUT ALLERGY VIA ENDOTHELIUM STUDY (PAVES)

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Peanut allergy (PA) is a common food allergy that is an important cause of morbidity and mortality. In a Canadian PA GWAS study, single nucleotide polymorphisms in three endothelial associated genes (*CTNNA3, ARHGAP24, ANGPT4*) were detected[1]. The role of these genes in PA are unknown, however differences in gene expression in patients with PA compared to hyper-controls (without PA) may contribute to endothelial permeability and development of PA. The purpose of this pilot study was to investigate gene expression and monolayer integrity in blood outgrowth endothelial cells (BOECs) from patients with and without PA.

This study aimed to (a) generate BOECs from peripheral blood, a valuable tool for studying vascular endothelium, (b) develop a protocol for VE-cadherin via immunocytochemistry, and (c) determine the gene expression of *CTNNA3*, *ARHGAP24*, and *ANGPT4* in BOECs from patients with and without PA via quantitative polymerase chain reaction.

BOECs were generated for three hyper-controls and four patients with PA. BOECs were seeded and VE-cadherin was detected in the endothelial monolayer in both groups. In terms of gene expression, neither BOEC groups expressed *CTNNA3* or *ANGPT4*, however, there was at least a two-fold higher baseline *ARHGAP24* expression in BOECs without PA than BOECs with PA.

The differences in gene expression may suggest that BOECs from patients with PA have increased barrier permeability, as downregulation of *ARHGAP24* has been shown to increase permeability in human endothelial cells via formation of cytoskeletal stress fibres[2]. To assess permeability, the Boyden chamber assay should be conducted in future.

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Presenting Author: Daniela Cino
Supervisor: Dr Yuka Asai
Co-supervisor: Dr Mark Ormiston

70. HEALTH PROMOTING EFFECTORS IN PROBIOTIC BACTERIA

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Probiotic bacteria provide many health benefits. These bacteria play a beneficial role in gastrointestinal inflammation, metabolic disease and disorders associated with the gut-brain axis. However, how these bacteria or their secreted metabolites interact with the host to exert gut health promoting effects is largely unknown. The Knaus laboratory reported that hydrogen peroxide (H_2O_2) produced by *Lactobacillus* strains is important for maintaining intestinal barrier integrity, providing host defense against infection and accelerating wound healing in mouse models of colitis[1, 2].

My project aimed to compare probiotic *L. plantarum* strains with well characterized *L. johnsonii* wildtype and mutant strains.

Growth curves of *Lactobacillus* strains were performed in both aerobic and anaerobic conditions and CFU per OD was calculated. H_2O_2 generation by these strains was determined by using homovanillic acid (HVA) assays.

In aerobic conditions *L. plantarum* ATCC 1024 initially showed a prolonged lag phase compared to *L. plantarum* ATCC BAA793, but growth was similar after 10 hours of culture. In anaerobic conditions the two strains displayed comparable growth rates, suggesting that BAA793 is more oxygen stress resistant. *L. plantarum* 1024 generated H_2O_2 in a similar fashion as *L. johnsonii* wildtype. H_2O_2 production by BAA793 was negligible, likely due to the presence of Mn-catalase.

H_2O_2 production by *L. plantarum* 1024 suggests a potential use in treating gastrointestinal tract illnesses. Since using nitrate as an electron acceptor coupled with H_2O_2 production could lead to more efficient probiotics, further characterization of nitrate utilization should be examined in the future.

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2. Singh AK, Hertzberger RY, Knaus UG. Hydrogen peroxide production by lactobacilli promotes epithelial restitution during colitis. Redox biology. 2018 Jun 1;16:11-20.

Presenting Author: Wyatt Dougherty
Supervisor: Prof Ulla Knaus
Co-Supervisor: Dr Ashish Singh

71. REDUCING READMISSIONS IN OLDER ADULTS: A SCOPING REVIEW IN PRIMARY CARE

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Hospital readmission is an important challenge for health services and is associated with increased healthcare costs and adverse health outcomes[1]. Increased time spent in hospital results in a functional decline for older adults. The objective of this scoping review was to examine the effectiveness of primary care interventions to reduce readmission rates among older adults.

The scoping review framework comprised a five-stage process developed by Arksey and O'Malley[2]. The search process was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Each of the studies included involved an intervention aimed at older adults and patients with specific chronic diseases which are prevalent in the elderly population.

A total of 22 studies published between 2009 to 2019 were included in the review. These were conducted in a rage of settings (most commonly in primary care) and adopted a range of methodologies (most commonly randomised control trials). Interventions reported included primary care physician visits, case management of post-discharge patients by a primary care team, patient education and telemedicine. Outcome measures reported included hospital readmission rates, control of medication, emergency department visits and mortality. Post discharge visits were associated with reduced readmission rates in older adults.

Our findings suggest that out of all the interventions, post-discharge visits may be the most effective in reducing readmission rates in older adults., although further trials of primary care interventions to reduce hospital readmission rates in this cohort are warranted.

Acknowledgements:
We are grateful to Ms Patricia O'Kelly and the family of the late Dr Mary J Farrell (MB BCh BAO 1916, MD, MAO, DPH), who funded a Summer Studentship in GP Research at UCD School of Medicine on 'enhancing integration and access to care'.

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Presenting Author: Mary Ellen McMahon
Supervisor: Dr Geoff McCombe
Co-supervisor: Prof Walter Cullen

72. TRANSITION FROM PAEDIATRIC TO ADULT CARE IN RENAL TRANSPLANT PATIENTS: A REVIEW OF PRACTICE AND OUTCOMES

Coleman J[1], Kinlough M[2], Dolan N[2], Stone G[2], Costigan C[2], Keating K[2], Povey K[2], Stack M[2], Sweeney C[2], Riordan M[2], Awan A[1,2] Raftery T[2]

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Transition from paediatric to adult services is a significant time-point for transplant recipients. A step-wise transition programme (TP) is recommended[1]. The literature describes a high-risk 3-year window post-transition for graft-loss[2].
The aim of this study was to perform a retrospective review of the TP (introduced in 2014) and outcomes of paediatric renal transplant recipients within 3 years of transition. Data was analysed using SPSS v24 and tests included independent samples T-tests, Chi-square crosstabs and frequencies.
Sixty/135 transplanted patients have transitioned to adult services. Eighteen patients participated in the TP. Median age of transition was 16 (range:15–19yrs). Twenty-four patients transitioned at >16yrs. At transition, psychosocial issues were identified [26/60 (43%)], 9 (7%) relating to medication non-adherence. Follow-up data was available on 39 patients. Nineteen/39 patients (49%) had a reported medical/psychosocial concern at transition. Significant increases in creatinine were observed in this group [37 (19-409)μmol/ml], compared to those without concomitant concern(s) [25 (15-57.8)μmol/ml, p=0.043]. The change in creatinine between TP participants [26 (13-53.5)μmol/ml, n=16] and non-participants [25 (14-82)μmol/ml, n=27] was not significantly different (p=0.915). Six patients resumed dialysis <3yrs post-transition, none of whom participated in TP. Non-adherence contributed to 3 of these cases.
Psychosocial concerns, including non-adherence, persist in this group and may be associated with graft-loss. A TP provides an opportunity to work closely with patients and should be individualised to meet specific needs. Close monitoring within 3yrs of transitioning is essential amongst this group. The TP at Temple Street now commences at age 12-14, in line with the recommendations[1].
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Presenting Author: Jane Coleman
Supervisor: Dr Tara Raftery
Co-Supervisor: Prof Atif Awan

75. ADHERENCE TO IRON CHELATION THERAPY, HEALTH-RELATED QUALITY OF LIFE AND OTHER PATIENT-REPORTED OUTCOMES AMONG PARENTS OF CHILDREN RECEIVING CHRONIC BLOOD TRANSFUSIONS: A CROSS-SECTIONAL STUDY

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Children with inherited red blood cell disorders need chronic blood transfusions, which can lead to iron overload. Iron chelators (IC) help remove excess iron from the body, but adherence is suboptimal. Our study objective was to examine the relationship of IC adherence rates to quality of life (QOL) and patient-reported outcomes (PROs) in this population.
Parents completed a cross-sectional proxy-report survey that was administered on tablets using REDCap in the ambulatory infusion center. Study measures included Morisky Medication Adherence Scale 8-items (©MMAS-8), Visual Analog Scale (©VAS) and Patient Reported Outcomes Measurement Information System (PROMIS®).
Thirty-one parents participated (median age 38 years; 68% females; 52% black). Using ©MMAS-8 and ©VAS, 55-78% reported low adherence rates, and both scales significantly correlated (R=0.62, *P*=0.0007). Parents reported impairment in several QOL domains (median, IQR): fatigue (50.5, 37.7–59.6), pain (50.8, 42.7–57.9), mobility (47.9, 42.6–60.2), anxiety (50.1, 41.3–56.3), depression (44.7, 36.4–53.5) and social isolation (44, 40.6–50.8). QOL domains significantly inter-correlated with each other (Table 1), but not with IC adherence rates. Parents reported worsening in other PROs (median, IQR): self-efficacy (49.3, 42.3–62.8), positive affect (56.5, 48.6–66), meaning and purpose (50.7, 41–55.85) and cognitive function (47.55, 42.55–52.45). IC adherence rates significantly correlated with self-efficacy and positive affect (R=0.46, *P*=0.01; R=0.45, *P*=0.01), respectively.
We conclude that low adherence to IC is common and behavioral interventions targeting self-efficacy and positive affect could help improve IC adherence. Longitudinal study of the relationship between IC adherence, QOL and PROs is warranted.

Table 1: Inter-correlations between several QOL domains

	Fatigue	Pain	Mobility	Anxiety	Depression	Social Isolation
Fatigue	1.000					
Pain	0.77 (<0.001)	1.000				
Mobility	–0.66 (<0.001)	–0.58 (0.001)	1.000			
Anxiety	0.77 (<0.001)	0.66 (0.0001)	–0.50 (0.007)	1.000		
Depression	0.68 (<0.001)	0.57 (0.0016)	–0.36 (0.06)	0.80 (<0.001)	1.000	
Social Isolation	0.61 (<0.001)	0.49 (0.008)	–0.46 (0.01)	0.70 (<0.001)	0.63 (<0.001)	1.000

Data are presented as spearman correlations with p-values in parentheses; p-values <0.05 statistically significant

Presenting Author: Mary Therese Forsyth
Supervisor: Assist Prof Sherif M Badawy

77. AUDIT OF H. PYLORI ERADICATION RATES IN DUBLIN

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Helicobacter pylori is a major cause of chronic gastritis and peptic ulcer disease, resulting in high healthcare costs. It is for this reason that a continuous assessment of treatment strategies is required.
We performed a retrospective clinical audit of H. Pylori treatment in a Pan-European H. Pylori Registry. The aim was to analyse the success rates of the therapies employed and to note the incidence rate of the local population. A total of 156 patients were seen and treated for H. pylori over a period of 6 years (Jun 2013 – Jun 2019) at Beacon Hospital. Our data indicated a declining incidence of 18.58% to 5.74% over 3 years, obtained from endoscopic biopsies.
The most common 1st line strategy used was a 14-day Triple Therapy regime utilizing Esomeprazole/Clarithromycin/Amoxicillin, employed for 119 patients. The male and female success rates stood at 79.63% and 89.23% respectively, giving an 84.87% overall success rate. For patients who had failed 1st line therapy, the most common 2nd line therapy employed was a 14-day regime of Esomeprazole/Amoxicillin/Levofloxacin. 12 patients were prescribed this regime, showing a 100% success rate.
Our findings show a downward trend in H. pylori prevalence in South Dublin over the last 3 years. Of those diagnosed to be infected with H. pylori, the optimum 1st line strategy would be a 14-day regime utilizing Esomeprazole, Clarithromycin and Amoxicillin, with 2nd therapy being a 14-day regime of Esomeprazole, Amoxicillin and Levofloxacin. Hence, these results suggest that compliance is most important for treatment success.
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Presenting Author: Nicholas Zhang
Supervisor: Prof Colm O'Morain

80. CHARACTERISTICS AND OUTCOMES OF PAEDIATRIC PATIENTS WITH CHRONICALLY HIGH EBV LEVELS POST RENAL TRANSPLANT

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Epstein Barr Virus (EBV) is a major cause of morbidity and mortality for recipients of solid organ transplantation and increases risk of lymphoma[1]. The study profiled EBV Loads (EBVLs), medical management and clinical outcomes in a cohort of paediatric kidney transplant recipients with chronically high EBVLs.
A retrospective chart review was performed. Chronically high EBVLs were defined as $>10^5$ copies per/ml whole blood for >6 months in >50% of samples tested. Statistical tests included Mann-Whitney test and correlation coefficient tests [SPSS (v24)], with a p value of <0.05 considered significant.
Twenty six patients were followed up for between 3-5 years. At transplant median age was 5.7(4.09-9.47) years and 23 patients were EBV naïve. Time to activation/reactivation of the virus was 42(33-51) days, time to peak EBVL was 245(94-523) days and peak levels were log 5.6(5.3-6.1) copies/ml whole blood. 22 patients were symptomatic and 4 asymptomatic with EBV. Immunosuppression was reduced using standard protocols, two patients had acute rejection and 1 patient developed PTLD (after 7 years). IVIG (n=4) and anti-viral therapy were used (n=12) with no change in viral loads. Rituximab was used (n=2) and resolved the viral load for 3months and >18 months respectively. No correlation between EBVLs and renal function was identified.
The clinical efficacy of antiviral therapy in this patient group is unconfirmed. Larger studies examining the efficacy of rituximab in this patient group are warranted. The current reduced immunosuppression regimen appears protective against rejection compared to higher rates reported in the literature.
Acknowledgment:
The author would like to acknowledge funding from the Temple Street Foundation.
Reference:
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Presenting Author: Sorcha O'Rourke
Supervisor: Dr Tara Raftery
Co-supervisor: Prof Atif Awan

82. THE USE OF VEGF ON OVARIAN TISSUE IN VITRO TO ENHANCE THE VASCULARIZATION OF CRYOPRESERVED OVARIAN TISSUE

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Ovarian tissue cryopreservation is an innovative method of fertility preservation for women at risk of infertility following gonadotoxic treatment. The ovarian cortex is cryopreserved allowing preservation of primordial follicles. Following tissue transplantation a large number of follicles undergo atresia due to ischemia as a result of slow graft revascularisation[1]. Improving blood flow to the grafted tissue is vital in order to optimise the transplantation procedure[2]. The aim of this study was to determine the effect that VEGF tissue culture has on follicle viability and tissue revascularisation in an attempt to reduce ischemic damage caused by transplantation and thereby improve the follicle conservation rate.
Bovine ovary (n=3) tissue pieces were cryopreserved using controlled slow rate freezing. Following thawing the tissue pieces were cultured with VEGF at concentrations of 5ng/ml, 10ng/ml and 15ng/ml for 72 hours. The effect of VEGF culture on follicle conservation was determined using histological staining and its effect on angiogenesis was assessed by von Willebrand Factor immunostaining and microvessel density. Data was statistically analysed by performing a two-way ANOVA test and a P-value of < 0.05 identified statistical significance.
Culturing the cryopreserved ovarian tissue with 5ng/ml of VEGF appeared to be the optimal concentration for follicle survival however there was no statistical significance. Culturing the tissue with 15ng/ml significantly increased microvessel density indicating an improved blood vessel growth.

This study shows that using exogenous VEGF to stimulate angiogenesis in ovarian tissue is effective and therefore could have clinical significance regarding improving revascularisation and the transplantation procedure.
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Presenting Author: Hayley Jackson
Supervisor: Dr Helen O'Neill
Co-supervisor: Dr Natalie Getreu

83. DEMOCRATISING SCIENCE: DEVELOPMENT OF LOW-COST, FLEXIBLE AND OPEN-SOURCE LAB TOOLS

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Many modern research and analytical tools are characterised by high purchase and running costs, putting them out of reach of many, particularly in developing countries. However, the advent of recent technologies, such as 3D printing and inexpensive microcontrollers (Arduino) and single-board computers (Raspberry Pi, RPi) allows the deployment of low-cost, simple yet powerful tools
To test the principal of low cost manufacture, we developed three prototypes of commonly used analytical equipment. The first device was a portable centrifuge based on a brushless DC motor with 3D printed rotor in an extruded aluminium frame. The second was a water quality monitor capable of long term logging of pH, temperature, and volume with remote wireless monitoring. The third was a dual view automated microscope, based on the 3D printed open flexure design which allowed simultaneous low and high magnification viewing of the same sample, utilising 3D gesture control to minimize vibration.
All three devices were manufactured at significantly lower cost than commercial devices (~€30:centrifuge, ~€150: microscope, ~€50: water monitor), and all devices were shown to be functional with performance comparable to commercial devices.
We present a group of lab tools that are affordable and adaptable, and easily made without specialised skills. All three systems can be easily customised to suit the users' needs, including battery operation for diagnostic and research use in the field. This approach may place laboratory tools in the hands of many users for the first time, opening science to a new and diverse population.
Presenting Author: Niamh Burke
Supervisor: Dr Mark Pickering
Co-Supervisor: Ms Amy Courtney

84. CHARACTERISTICS OF AN IRISH IPF POPULATION AND THE IMPACT OF COUGH ON QUALITY OF LIFE

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Idiopathic pulmonary fibrosis (IPF) is a rare, chronic and progressive lung disease that reduces lung compliance, resulting in respiratory failure and death[1].
The project aimed to characterise an Irish IPF population including symptoms, diagnostic approaches, outcome predictors and cough prevalence and burden. Data was retrieved from St. Vincent's University Hospital ILD registry, and self-completed (18 patients) visual analogue scales (VAS) and Leicester Cough Questionnaires (LCQ: 3-21), which assess cough impact with higher scores corresponding to greater quality of life (QoL) [2].
Data for 87 patients enrolled from 2009–2017 was analysed. At diagnosis, the mean age was 69 years and the prominent symptoms were dyspnoea (72%, n=52) and cough (60%, n=43). 32(37%) patients had lung biopsy at diagnosis, however, this decreased with time from 39% undergoing biopsy prior to 2013 to 30% between 2013 and 2017. On CT, 62%(18) had honeycombing and 45%(13) had traction bronchiectasis. Patients were grouped according to the Gender-Age-Physiology index (table 1). 42(48%) patients died during the follow-up period. The VAS ranged from 0 (no cough) to 100 (worst cough) with a mean of 41. The mean LCQ score was 16 in total and 5 in each of its domains.

Table1: Patients' IPF stages according to their Gender-Age-Physiology index results

Stage	Percentage/frequency
1	23(39%)
2	25(42%)
3*	11(19%)

*immediate listing for transplant/palliative care.
While biopsy rates were high, there was a slight decrease over time. Most patients were diagnosed at stage 2, requiring close monitoring. LCQ scores demonstrate the importance of measuring cough severity, and not just its presence, as it significantly impacts QoL in this cohort.
References:
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Co-supervisor: Dr Alan Kelly

85. CONCENTRATION DEPENDENT INDUCTION OF CELL STRESS IN RAT RENAL TUBULAR CELL CULTURE IN RESPONSE ROSUVASTATIN TREATMENT

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HMG-CoA reductase inhibitors (statins) are a cornerstone of cardiovascular risk reduction. The benefits of statin use can be tempered by side effects. In this regard, rosuvastatin (Ros) results in proteinuria at higher doses. In the present study, evidence for a direct cytotoxic effect of Ros on renal tubular cells was investigated.
Normal rat kidney epithelial cells (NRK52E) were cultured to confluence and exposed to 1,10 or 50μM Ros or vehicle for 24 hours in the presence or absence of foetal bovine serum (FBS-10%). Succinate dehydrogenase

activity was assessed as an indicator of cell stress using the MTT assay. Parallel experiments are underway to assess mRNA expression of statin pathway genes and recognized biomarkers of renal tubular cell stress (NGAL and KIM-1).

No cytotoxic effects of Ros were observed in 10% FBS treated cultures. A dose dependent decrease in succinate dehydrogenase activity was observed in growth arrested cultures (0% FBS). A maximal 60% reduction in mean enzyme activity was recorded at the highest dose of Ros (50μM $p<0.001$). RNA studies are ongoing.

Cytotoxic effects of Ros are observed within the micromolar range in NRK52E cells. Ros-induced proteinuria may reflect stress associated tubular cell dysfunction. Biomarker expression analysis will be forthcoming to corroborate these data.

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Presenting Author: Oisín Pennycook
Supervisor: Dr Neil G Docherty
Co-Supervisor: Prof Francisco J Lopez-Hernandez

86. MENTAL HEALTH PSYCHO-EDUCATION: ARE WE MAKING THE GRADE?

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With mental health services under-resourced and underfunded in Ireland today, clinicians are under pressure to find innovative means of delivering care. Psychoeducation is an evidence based therapeutic intervention for patients and families, providing information and support to better cope with illness[1, 2]. In Child and Adolescent Mental Health Services (CAMHS), parent psychoeducation is offered alongside traditional interventions, and empowers families to support optimised mental wellbeing in their young person. Since 2006, parent psycho-education, along with clinician training has been an aim of the Lucena Foundation. The aim of this study is to evaluate recent psychoeducation events organised by Lucena CAMHS. The study will reveal aspects of the sessions which appeal to attendees and will shed light on some of their limitations.

At 7 events *overall satisfaction*, along with *interest* and *relevance* were rated on a Likert scale of 1-5. Three events were open to the public, while 4 were targeted at particular cohorts. Anonymous data were input into SPSS for analysis and descriptive and correlational statistics obtained. Qualitative feedback was also collected.

	Eating Disorder Awareness Evening	TICS, Tourette's and OCD Evening	ADHD Evening	22q Behaviour Management Drop-In	ADHD Masterclass	Eating Disorder Masterclass	Catatonia Masterclass
Number of respondents	35	14	14	7	20	20	12
Type of event	Public parents' evening	Public parents' evening	Public parents' evening	Invite-only parents' afternoon	Day-long clinician training	Day-long clinician training	Day-long clinician training
Attendance Fee	Free	Free	Free	Free	€100	€100	€100

Response to all events was overwhelmingly positive, with high mean *overall satisfaction* scores (*Parents = 4.36 / Clinicians = 4.46)*. Most notably at the public Eating Disorder evening, there was a strong correlation *(Pearson's r = 0.78, p = 0.003)* between *relevance of topic* and *overall satisfaction*.

Psychoeducational events are being perceived by attendees as relevant and informative, with high satisfaction ratings. These preliminary results suggest that psychoeducation events are feasible, cost-effective and should be offered alongside traditional treatments.

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Presenting Author: Dara Friars
Supervisor: Prof Fiona McNicholas

88. INVESTIGATION OF ANTIBIOTIC RESISTANCE IN THE INTESTINAL TRACTS OF FREE-RANGE PIGS

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Antimicrobial resistance (AMR) is one of the greatest threats to both human and animal health. While estimates of annual mortality caused by resistant pathogens vary, it is estimated that over 33,000 people in the EU and EEA died as a result of AMR in 2015[1]. Although antibiotics as feed additives are banned in the EU, many conventionally reared pigs are exposed to high levels of antimicrobials through in-feed prophylactic use, leading to selection of resistant bacteria. The aim of this project was to examine the levels of AMR in free-range pigs, to see if the lower amounts of antimicrobials used would have an impact on the degree of resistance in *E. coli* and *Salmonella* isolates.

Faecal and soil samples were collected from all available age groups on 4 farms and were cultured on selective and non-selective media. Fluoroquinolone and cefotaxime were included in selective media to promote the recovery of small numbers of resistant bacteria. *E. coli* isolates were tested against a panel of 6 antibiotics using standard disc diffusion methods.

Salmonella serovars were not recovered. Approximately 80% (27/33) of *E. coli* from non-selective media were susceptible to all 6 antibiotics tested; one isolate (3%) was multi-drug resistant (resistant to at least 3

classes of antibiotics). Conversely, 85% (18/21) of colonies from selective media were multi-drug resistant. Extended-spectrum Beta-lactamase -positive *E. coli* were isolated on farms 2 and 3.
These results indicate that even with little or no antibiotic exposure, resistant *E. coli* were detected. This further confirms the challenge AMR poses to farming.
Reference:
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Presenting Author: Martha Crowe
Supervisor: Assoc Prof Finola Leonard

89. COGNITIVE IMPAIRMENT IN MULTIPLE SCLEROSIS

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Cognitive impairment in Multiple Sclerosis (MS) has been reported in the literature since the 1980s, yet it is not fully understood. Cognitive, behavioural, and psychological changes have a detrimental effect on patients' overall health, well-being, quality of life, with higher rates of cognitive impairment known to be negatively prognostic.
This scoping review explored the literature published on cognition in MS following the review by McNicholas et al. in 2017. Papers which discussed the prevalence of impairment, the reliability of assessment tools known as the Patient Multiple Sclerosis Screening Questionnaire (MSNQ-P) and the Informant Multiple Sclerosis Screening Questionnaire (MSNQ-I) and their correlation with other tools in the Brief International Cognitive Assessment Tool for Multiple Sclerosis, such as the Symbol Digit Modalities Test were prioritized.
The search yielded 273 studies, of which 32 met the inclusion criteria.
The results indicate that there is no strict cut-off score for the MSNQ-P and MSNQ-I screening tools as of yet. The next step would be to conduct a validation of these measures while screening for the prevalence of cognitive deficits among MS patients in Ireland, as there is limited data available on this. What is not yet clear in relation to these self- and screening-measures is their sensitivity and specificity to a gold standard assessment. Based on the literature further research on the behavioral and cognitive changes in patients with MS is needed to better categorise patients to ensure better trial selection for personalized medicine, and also better understanding of complex cognitive systems and processes.
Presenting Author: Ao Sasame
Supervisor: Prof Orla Hardiman
Co-Supervisor: Mr Mark Heverin

91. HIV CURE: NEW DRUG COMBINATION FOR HIV LATENT RESERVOIRS REVERSAL

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Until today, no compounds can eradicate the Human immunodeficiency virus (HIV) due to the persistence of long-lived viral latent reservoirs[1]. The "Shock-and-Kill" is introduced as a strategy towards HIV Cure. "Shock" is achieved by forcing the HIV reactivation in latent reservoirs using Latency Reversing Agent (LRA), and "kill" means demolishing the now visibly infected cells via viral cytopathic effects (CPEs) or host immune system[1].
Dr Gautier's previous work has shown a metabolic modulator triggers HIV gene expression in latently infected primary CD4 T cell, suggesting the metabolic modulator could be a potential LRA. The aim of my study is to test the metabolic modulator together with TNFa and SAHA in J-lat T cell line, a well-characterized HIV latency cellular model. J-lat is derived from Jurkat leukemic T cell line, comprising epigenetically silent yet inducible integrated HIV-1 promoter, driving the GFP reporter gene expression[2].
By analysing the GFP expression, we measured the activity of HIV-1 promoter to monitor the impact of each drug combination[2]. TNFa is a TNF receptor agonist while SAHA is classified as histone post-translational modulator and it inhibits histone deacetylase (HDAC)[1].
The results show that the metabolic modulator itself and each drug combination did not significantly promote HIV gene expression which could due to the specific metabolic cellular environment of the J-lat. Indeed, J-lat and primary CD4 T cell display distinct metabolic profiles whereby during aerobic conditions, J-lat still favours glycolysis, known as the Warburg effect, whereas resting memory CD4 T cell relies more on the oxidative phosphorylation.
References:
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Presenting Author: Ch'ng Chyi Yang
Supervisor: Dr Virginie Gautier

92. 22Q11 DELETION SYNDROME (22q11DS) – REVIEW OF THE MENTAL HEALTH PROFILES OF CHILDREN REFERRED TO A SPECIALIST CLINIC FOR A PSYCHIATRIC ASSESSMENT

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Di George syndrome or 22Q11DS is the most common micro-deletion syndrome in humans. Children with 22Q11DS may present with a range of congenital abnormalities and developmental delay[1]. Psychiatric conditions such as autistic spectrum disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), anxiety and psychosis are prevalent in this group[2]. The Child Behavioral Checklist (CBCL), completed by a caregiver, and the Teacher's Report Form (TRF) are commonly used to evaluate children's and adolescents' emotional and behavioral difficulties (1). Based on CBCL and TRF scores, children could be screened for a spectrum of mental health difficulties.
This study aims to establish mental health profiles of children with 22q11DS, referred for a psychiatric assessment, based on CBCL and TRF questionnaires. Anonymous data were extracted and analysed with SPSS.
A total of 35 children (20 males; 15 females) aged 4-16 (mean age 9.11, SD=3.26) were seen in the clinic. Based on the CBCL score for Internalising Problems N=20, 69% of the children were within the borderline/ clinical range. N=13, 45% scored in the borderline/ clinical range for Externalising Problems. TRFs were available for 23 children.

N=13, 59% of children had borderline/ clinical scores on internalising problems. The externalising score was in the borderline/ clinical range for N=3, 13% of the young people. Following an assessment N=21, 60% out of 35 children were given a clinical diagnosis predominantly anxiety disorder and ADHD.
Interestingly, more Externalising Problems were reported by parents than teachers. CBCLs and TRS are useful tools contributing to a detailed clinical assessment.
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2. Briegel W, Schneider M, Schwab K. 22q11.2 deletion syndrome: behaviour problems of children and adolescents and parental stress. Child: Care, Health and Development. 2008.
Presenting Author: Maryam Albreiki
Supervisor: Prof Fiona McNicholas
Co-supervisor: Dr Veselina Gadancheva

93. CHARACTERISATION AND PROFILING OF EXTRACELLULAR VESICLES/EXOSOMES (EVS): A COMPARATIVE ONCOLOGY APPROACH

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Comparative Oncology integrates the study of cancer biology and therapy across species and is an important aspect of the "*One Health"* initiative. Importantly, in comparative oncology, the disease is never induced in the animals being treated; the cancer has occurred spontaneously. Triple negative breast cancer (TNBC) is characterised by a lack in expression of oestrogen receptor (ER), progesterone receptor (PR), and HER-2. In feline patients there is a high incidence of basal-like feline mammary adenocarcinomas, that have a similar clinical pathogenesis to human TNBC[1]. Importantly, cancer cells release more extracellular vesicles (EVs) than non-cancer cells, with these EVs involved in chemoresistance and the development of metastases[2].
EVs were isolated from the plasma of human age-matched controls and feline patients, using size-exclusion chromatography (IZON) qEV columns. Nanoparticle tracking analysis (NTA) (NS300), determined the modal size and concentration of the EVs. Western blot analyses confirmed that these EVs were enriched for the exosome markers CD63 and negative for Calnexin and were subsequently profiled using FTIR spectroscopy.
Our data shows the successful enrichment of EVs from human and feline plasma-derived sources using NanoSight NS300 and Western Blot analyses. Moreover, FTIR spectral profiling generates unique patient-specific profiles of plasma-derived EVs.
In summary, EVs were successfully isolated from the plasma of felines and humans and differential FTIR spectra generated. This pilot data, has contributed to the establishment of a longitudinal comparative oncology study recruiting feline and human patients with "basal-like" TNBC with the view to aligning FTIR profiles with chemoresponse and the presence of distant metastases.
Acknowledgements:
The UCD School of Medicine for funding the NanoSight (NS300) instrumentation used in this work. NUI Galway, Discipline of Surgery Bio Bank, Lambe Institute for Translational oncology, for supplying us with the control age-matched human plasma samples. 'Funding is also acknowledged from the UCD Wellcome Institutional Strategic Support Fund, which was financed jointly by University College Dublin and the SFI-HRB-Wellcome Biomedical Research Partnership (ref 204844/Z/16/Z).
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Presenting Author: Ellen O'Beirne
Supervisor: Prof Amanda McCann
Co-Supervisor: Ms Sinéad Lindsay

94. A DATABASE OF DISEASE-PATHOGENS OF THE GULLS OF IRELAND

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Emerging infectious diseases (EID) are a significant burden on public health and global economies[1]. With increased urbanization, it is crucial to understand the interactions between wildlife and human populations via the One Health approach in order to predict the emergence of zoonotic diseases[1].
Behaviors typical of wild birds such as movement, distribution, and large colony formations create ideal conditions for the spread of pathogens[2]. Therefore, migrating birds could both pose a zoonotic threat to the human population and play an important epidemiological role in the spread of antimicrobial resistance[2]. An important contemporary example is the observed increased interactions of the human population with gull populations in urban settings; an increasingly common occurrence across the coastal communities of Ireland.
The goal of this project will be to create a database of diseases carried by gull species present within Ireland and their potential risk to human health. This database will be created by further expanding the Enhanced Infectious Diseases (EID2) database developed by the University of Liverpool. Online academic search engines such as Google Scholar will be used to obtain relevant literature published between 1945 and 2018.
It is hypothesized that gull species present in Ireland would carry similar diseases to the ones reported in gull populations found elsewhere in the world, an example being antibiotic resistant human phenotypes of Escherichia Coli[2].Given the increase in public discourse on the impact of gulls, this database could contribute to potential policy changes in regards to wild bird management within Ireland.
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Presenting Author: Fiona Sahyoun
Supervisor: Assoc Prof Barry John McMahon

95. UNDERSTANDING HOW ALPHAVIRUSES MANIPULATE THE IMMUNE RESPONSE IN MAMMALIAN CELLS

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Alphaviruses such as Chikungunya Virus infect thousands of people across the equatorial regions of Australia, India, South East Asia and the Americas annually, causing diseases such as arthritis and arthralgia. There are currently no treatments or vaccines available.
Semliki Forest Virus (SFV) is a model alphavirus. Primarily affecting rodents and spread by mosquito bites, SFV doesn't generally cause disease in immunocompetent humans. The SFV protein, nsP2 has been shown previously to trigger a reduction in the phosphorylation of the cellular protein STAT1. STAT1 is a transcription factor, upregulating numerous immune related defence proteins when phosphorylated in response to infection.
The mechanism of how the phosphorylation of STAT1 (P-STAT1) is reduced by SFV is unexplained. However, previous work in the Barry Lab has shown that nsP2 can interact with the cellular protein IGBP1, IGBP1 is known to affect STAT1 phosphorylation. We hypothesised that the interaction of nsP2 with IGBP1 causes a reduction in STAT1 phosphorylation. The aim of my study was investigate whether STAT1 phosphorylation is affected by the under expression or overexpression of IGBP1 when cells are infected.
Cells, in vitro, with an induced knockdown of IGBP1 and overexpression of IGBP1 were infected with SFV or mock infected. Western Blotting was used to confirm the knockdown or overexpression of IGBP1 and measure STAT1 phosphorylation. Immunofluorescence was then used to examine the localisation of the STAT1 protein in the cells, as STAT1 should relocate to the nucleus when phosphorylated. Results from my work will be resented in my poster.
Presenting Author: Eimear Bruton
Supervisor: Dr Gerald Barry

96. A RHEOMETER-ON-A-CHIP TO ASSESS MUCOPERMEATION OF THE ENGINEERED NANOPARTICLES WITH THE HELP OF ADVANCED MICROSCOPY

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Mucus, a natural hydrogel found within the gastrointestinal tract, is quintessential for our survival. It has an important property of serving as a physiological barrier against foreign pathogens and toxins, such as bacteria, viruses, and even as a vector for oral DDS (drug delivery system), such as the NPs (nanoparticles), which intend the deliver therapeutically relevant biomacromolecules.
Due to its composition (water >90%, while mucin, DNA, RNA, proteins, and cellular debris making most of the solid matrix), the mucus harbors an overall/net negative charge under physiological pH (7.4). This poses a challenge for drug delivery using cationic nanoparticles, which tend to stick to the mucus and thereafter cause disruption of the mucus matrices reflected thereafter in the irreversible aggregation of mucus.
In this project, well-characterized and rhodamine-tagged cationic PSNPs (polystyrene NPs) of 100 nm sizes were used to permeate through agarose gel—an *in vitro* mimic of physiologically relevant hydrogels, such as mucus—of precise viscoelastic properties prepared by using known concentrations (1–8% in water).
Oscillatory rheometry was conducted to measure the viscoelastic parameters, viz., G′ (elastic modulus); G″ (viscous modulus); tan δ (damping factor), and viscosity. Real-time multiple particle tracking coupled with inverted epifluorescence microscope were used to measure the velocity (m/h) and linearity of the PSNPs permeating through the agarose gel encased within optically translucent microfluidic channels in order to develop calibration curves, with the goal to realize a rheometer-on-a-chip device, which in future will be used to calculate the viscoelastic attributes of unknown hydrogels.
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Presenting Author: Ming Yu Chew
Supervisor: Assoc Prof Sourav Bhattacharjee

97. EGFR MUTATED LUNG ADENOCARCINOMA AND TUMOUR STAGING

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Lung cancer was responsible for 2.09 million deaths in 2018 globally. Adenocarcinoma of the lung is the most common type and accounts for 45% of all lung cancer cases[1]. Mutations in genes encoding components of Epidermal Growth Factor Receptors (EGFR) can be present and may dictate personalised therapy approaches.
The aim of this study was to determine whether there were differences in staging at diagnosis between EGFR and non-EGFR mutated adenocarcinoma. Data was extracted, for the period June 2016 to June 2019, from the National Cancer Clinical Pathway Rapid Access Lung Cancer Clinic at St Vincents' University Hospital.
730 patients were diagnosed with lung cancer over this 3-year period. 678 (93%) of patients had non-small cell lung cancer and 46(6.3%) were small cell lung cancer. Of 678 patients, 221 (32.5%) were squamous cell carcinoma and 447 (61%) were adenocarcinoma. EGFR mutations were present in 36 (8%) of adenocarcinoma cases. 24% of EGFR positive cases presented with advanced stage IV disease compared to 12% of EGFR

negative cases., however this was not statistically significant (chi-square = 3.5157. p=0.318).
EGFR mutated adenocarcinoma may be associated with more advanced stage lung adenocarcinoma, however larger studies are needed to clarify this and mechanistic studies are needed to understand the pathobiology underlying this.
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1. Paul A. Bunn Jr. Worldwide Overview of the Current Status of Lung Cancer Diagnosis and Treatment. 2012; 136(12):1478-1481.
Presenting Author: Hawra Abuali
Supervisor: Dr Alan Kelly
Co-Supervisor: Assoc Prof Cormac McCarthy

99. OUTCOMES OF PRE-EMPTIVE RENAL TRANSPLANTATION COMPARED TO TRANSPLANTATION POST-DIALYSIS: A PAEDRIATRIC PERSPECTIVE

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Kidney transplantation is the optimal treatment for end stage renal disease in paediatric patients. Whether pre-emptive transplantation (i.e. without dialysis) is superior to transplantation post-dialysis is unclear[1]. This study aims to examine the 4 year/48 month outcomes of pre-emptive and dialysed patients transplanted between 2004-2019.
One hundred and thirty-eight patients received a transplant. Data was available on 120 transplants (performed on 114 patients). Twenty-eight transplants (23%) were pre-emptive and 92 (77%) were performed post-dialysis. Outcomes examined include serum creatinine levels, estimated glomerular filtration rate (eGFR), rejection episodes (antibody mediated/cell mediated) and graft loss. Data was analysed using SPSS v24 (independent T-test or chi-square test).
Pre-emptive patients were more likely to have elevated creatinine at 12 months, (37% v 14%; p=0.021), However at 24, 36 and 48 months the differences were not significant. There was no difference in eGFR (48mo; p= 0.418) or CKD stage between the groups at these timepoints (48mo; p=0.815). The number of rejection episodes in the dialysed and pre-emptive groups (13% v 21%, p=0.227), and graft loss at 4 years were similar (10% v 5%, p=0.327). A deceased or living related donor did not alter this outcome.
Unlike similar studies, there was no significant difference between the outcomes of pre-emptive and dialysed patients. In contrast to other studies, the length of chronic dialysis did not affect graft outcomes[2]
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Presenting Author: Christine McCaffrey
Supervisor: Dr Tara Raftery
Co-Supervisor: Prof Atif Awan

101. CHARACTERISATION OF EXOSOMES FROM LUNG CANCER PATIENTS

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Lung cancer boasts the highest mortality globally in males and is second only to breast cancer in females[1]. Exosomes, a class of extracellular vesicles 30-100 nm in size, are emerging as important mediators of cancer progression. Cancer cell derived exosomes may promote angiogenesis, invasion, and proliferation in recipient cells to promote tumour growth and pro-metastatic phenotypes[2]. This study aimed to characterise exosomes from the serum of lung cancer patients.
Exosomes were isolated from serum using ultracentrifugation. Expression of positive exosomal marker CD81 and negative marker calnexin was studied using western blot analysis. A549 cell lysate was used as a control. Nano-tracking analysis was carried out to characterize particles by size.
We confirmed the exosome isolation from serum by western blot (with CD81 expression and absence of calnexin) and by nanotracking analysis (mean size = 87.9 nm). Lung cancer patients released 2.8 times more exosomes when compared to healthy patients (p = 0.0270). More precisely, squamous cell carcinoma and adenocarcinoma patients released respectively 4.1 and 2 times more exosomes than healthy patients (p = 0.0024 and p = 0.0897 respectively). Furthermore, we observed that patients with stage 3 and 4 cancer release respectively 4.5 and 3.2 times more exosomes than healthy patients (p = 0.0024 and p = 0.0102 respectively). The smoking status and sex of patients does not seem to influence particle numbers.
The higher number of particles in certain stages and types of lung cancer suggest that exosomes may be playing a role in its development or progression.
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Presenting Author: Khadija Gull
Supervisor: Dr Amina Jouida

102. IN VITRO TRACKING OF ENGINEERED NANOPARTICLES IN THE MONOLAYERS OF HUMAN COLONIC ADENOCARCINOMA CACO-2 CELLS

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The knowledge of intracellular trafficking of nanomaterials including NPs (nanoparticles) is crucial toward developing nanomedicinal theranostic platforms. However, despite significant literature available

on cell-NP interactions including cellular internalization based on physico-chemical attributes of the NPs, such as surface charge and particle size, sparse amount of data exist on the exact nature of such interactions due to the experimental challenges. Advanced microscopic tools fortunately provides with an opportunity toward addressing the gamut of such problems, especially the logistic ones.

In this project, monolayers of human colonic adenocarcinoma-derived Caco-2 cells—a popular *in vitro* model for gut barrier—grown over a period of ~3 weeks in DMEM (Dulbecco's modified Eagles medium) culture medium with its viability confirmed by Hoechst nuclear stain (λ_{ex}=470 nm, λ_{em}=525 nm), were exposed to well-characterized, rhodamine-labeled and cationic PSNPs (polystyrene NPs) of 100 nm sizes (100 μg/ml), while being imaged live in an inverted epifluorescence microscope (λ_{ex}=545 nm, λ_{em}=605 nm) with the focal plane roughly intersecting through the middle of the monolayer.

The cationic PSNPs started interacting with the cellular monolayer instantly after exposure, as also noticed from the emission, which spiked shortly indicating cellular internalization of the NPs in pulses. A wide-field view also showed the front of nanoparticulate uptake propagating in waves through the monolayer with appearance of visible agglomeration of the PSNPs over time.

Integratedly, the data highlights the intricacies of how engineered NPs interact with cellular monolayers and prioritizes relevant issues to clarify the lesser known domains of cellular uptake or toxicity of NPs.

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Presenting author: Ee Xin Chen
Supervisor: Dr Sourav Bhattacharjee

103. IDENTIFICATION OF IN-VIVO SKIN MECHANICAL PROPERTIES (VISCOELASTICITY AND ANISOTROPY) AND RESIDUAL STRESSES

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The skin is a complex tissue; it is anisotropic, viscoelastic and its mechanical properties depend on several factors like age, gender, ethnicity, location on body, and lifestyle[1]. The Cutiscan CS100 is a new commercial device that performs in-vivo suction and relaxation tests while measuring displacement of the skin. This study aims to use the Cutiscan to determine the in-vivo mechanical properties of the skin (anisotropy and viscoelasticity) and how they are affected by age and gender.

Male and female volunteers (ages ranging 20-70) were recruited for the test. The test involves applying a negative pressure of 400mbar to a small area of skin (15mm diameter) while recording a video. Subsequently, the video is analysed to determine the displacement of each pixel over 360 degrees during 2 seconds of negative pressure and for 2 seconds as the pressure is released. The resulting data provides information on the viscoelasticity and anisotropy of the skin.

Preliminary results (Table 1) suggest that the average maximum displacement of skin decreases with age. 'Range' indicates the difference between the largest and the smallest maximum displacement, which acts as a measure of anisotropy when expressed as a percentage of the mean. Anisotropy scores are expected to show an increasing trend with age but more subjects need to be tested to confirm this.

Table 1. Maximum Displacement of skin in 3 subjects (Age)

	F (22)	B (41)	G (59)
Mean (pixels)	248.46	163.74	143.50
Range (pixels)	58.24	14.91	21.45
Range/Mean (%)	23.44	9.11	14.95

Reference:
1. A. Ní Annaidh , M. Ottenio , K. Bruyère *et al.* Mechanical Properties of Excised Human Skin. Lim C.T., Goh J.C.H. (eds) 6th World Congress of Biomechanics 2010

Presenting Author: Conor O'Brien
Supervisor: Dr Antonia Trotta
Co-Supervisor: Dr Aisling Ní Annaidh

104. THE IMPACT OF CNS INFECTIONS: CLINICAL PRESENTATION, TREATMENT AND OUTCOME IN A TERTIARY NEUROHABILITATION CENTER

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Central nervous system (CNS) infections are an important health concern as they are associated with high rates of mortality and morbidity. The purpose of the study is to identify the different types of CNS infection and the impact on patients admitted to the National Rehabilitation Hospital between 2008-2018

Retrospective review of hospital inpatient healthcare records in a National Tertiary Rehabilitation Hospital. All patients discharged from the inpatient service at the NRH with a ICD 10 coded diagnosis of G00–G09 (Inflammatory diseases of the central nervous system) from 2000-2018 were included.

There was an initial total of 584 cases identified. 520 did not meet the inclusion criteria.

The total number of healthcare records analysed systematically using a standardised proforma was 64. 31 (48%) were male and 33 (52%) were female. Mean age was 47yrs (range 19-79yrs).

The commonest CNS infections were brain infections resulting in acquired brain injury (34 [53%]). 30 [46%] were spinal cord injuries as a result of myelitis or spinal abscess. There was insufficient information documented about the causative organism.

Most patients had a moderate disability on admission and all had improved on discharge.

Neurological sequelae occur in a substantial number of patients following CNS infection resulting in activity limitation and participation restriction. These patients require timely access to complex specialist rehabilitation services to optimize recovery. To facilitate future research, better documentation of admission and discharge outcome measures and improvement in referral information (causative organism) would be helpful to assess effectiveness of rehabilitation in these patients.

Presenting Author: Sharon Omiwole
Supervisor: Prof Áine Carroll
Co- Supervisors: Dr Eimear Smith
Dr Ameya Jagtap

105. CONSERVATION IMPLICATIONS OF INTER-ANNUAL VARIATION IN REPRODUCTIVE PHENOLOGY AND SEASONAL BODY CONDITION OF WRINKLE-LIPPED FREE-TAILED BATS (CHAEREPHON PLICATUS) IN CAMBODIA

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Cave-roosting bat populations (Chaerephon plicatus) in Cambodia are subject to increasing pressure from a range of anthropogenic threats; therefore, research to inform conservation efforts of these bat colonies is vital. Furey et al. (2018) identified specific times of year when cave-roosting populations are particularly vulnerable to anthropogenic disturbance due to their reproductive phenology. The aim of this study was to investigate if these findings would be supported by subsequent investigation.
Live trapping of bats was conducted using a single mist net at two regions in Cambodia in March, April, June, and July 2019. A total of 282 bats were assessed, all of which were measured for forearm length, weighted to the nearest 0.5g, and examined to determine their sex, age, and reproductive status.
Consistent with Furey et al. (2018) [1], pregnancies were recorded in March and lactation in April and July, although lactating females were not encountered in June. Juveniles were found primarily in July, one month later than previously observed. There was no significant difference in the body condition of the mature male bats between the late dry season (March/April: M= 80.25, SD= 9.97) and early wet season (June/July: M= 148.6, SD= 43.56) ($t= -2.163$, $p > 0.05$).
To conclude, preliminary findings suggest that reproductive phenology for cave-roosting bats in Cambodia is consistent annually, with timepoints particularly vulnerable to human disturbance. However, to confirm if the findings of Furey et al. (2018) are supported data would need to be collected across an entire year, with comparable sample sizes.
Acknowledgement:
The author would like to acknowledge funding from the British Veterinary Association.
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Presenting Author: Kate Toland
Supervisor: Dr Neil Furey

107. DENTATE GYRUS VOLUME IS ASSOCIATED WITH MEMORY PERFORMANCE IN PEDIATRIC-ONSET MULTIPLE SCLEROSIS

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Selective disruption of the dentate gyrus (DG) subfield of the hippocampus has been associated with memory impairment in mice at the early stage of experimental multiple sclerosis (MS)[1]. Such relationship has not been investigated in humans. This study aims to investigate the association between DG volume (DGv) and episodic memory in pediatric-onset MS (poMS) patients.
15 poMS patients and 28 HC were included. Participants underwent standardized research MRI and completed 3 episodic memory sub-tests included in the Penn Computerized Neurocognitive Battery. Composite memory (CM) scores for accuracy or reaction time (RT) were obtained by averaging scores from the 3 sub-tests. The DG was automatically segmented and manually edited using dedicated softwares. The association between DGv and memory scores were modelled in each group using generalized linear models (GLMs) adjusting for age, sex, and intracranial volume. Results were Bonferroni adjusted for multiple comparisons.
DGv did not differ between groups (HC +9.2 mm^3 *vs* poMS, p=0.7). CM-RT and nDGv were positively associated in the poMS group (68 mm^3/unit-increase of MC-RT score, p=0.003). HC experienced smaller changes of DGv with increasing memory compared to poMS (-6.8 mm^3 DGv/unit-increase of MC-RT score, p=0.0011).
DGv is positively associated with CM-RT in youth with poMS. Reasons for weaker association in HC are unclear, although possibly explained by a decreased functional reserve with higher dependence of memory performance on hippocampal integrity in poMS. Future steps involve increasing sample size and continuing to investigate the association of memory outcomes with all hippocampal subfields.
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Presenting Author: Nilaksa Sivanenthiran
Supervisor: Dr Giulia Longoni

111. CHARACTERISTICS AND OUTCOMES OF PATIENTS WHO ARE RESOLVERS OF EBV INFECTION: DIFFERENCE BETWEEN THOSE EBV NAÏVE VS. EBV+ AT TRANSPLANT

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Viral infections are serious complications in kidney transplant recipients[1]. This study profiled the EBV loads (EBVLs), medical management,

clinical outcomes in a cohort of paediatric kidney transplant recipients who are resolvers of EBV infection.
A retrospective chart review was performed. Patients were divided into two groups based on viral status pre-transplant. Statistical tests (e.g. one-way ANOVA, independent samples t-test) were performed using SPSS (v24) [p value <0.05 considered significant].
Fourteen patients (10 males) were followed up for 2-5 years.

	EBV naïve (n=4)		**EBV+ (n=10)**		**P values**	
Age at Tx:	5.65 years		8.50 years		0.283	
Symptomatic:	n=3 (75%)		n=7 (70%)			
Time (re)activate:	55 days		15 days		0.568	
Time to peak:	131 days		90 days		0.565	
Peak:						
- ***Log***	4.78		3.45		**0.021**	
- ***No. copies***	62273.50		3085.5		**0.022**	
Time to seroconvert:	(n=4 seroconverted)		(n=1 seroconverted)			
- ***EBNA***	425.5 days		370 days		0.655	
- ***VCA***	340 days		-		-	
****Delta change:***	**eGFR**	**Cr**	**eGFR**	**Cr**	**eGFR**	**Cr**
- ***9***	20.40 (n=4)	-10.00(n=4)	-14.55(n=8)	10.50(n=10)	**0.029**	0.074
- ***12***	11.44 (n=4)	-1.00 (n=4)	-20.90(n=8)	12.00(n=10)	0.093	0.137
- ***24***	14.33 (n=4)	-2.00 (n=4)	-26.79(n=8)	18.00(n=10)	**0.048**	0.123
- ***36***	-8.22 (n=3)	17.00 (n=3)	-34.58(n=9)	20.00 (n=9)	0.310	0.504
- ***60 (months)***	-25.80(n=2)	85.50 (n=2)	-39.31(n=4)	37.50 (n=6)	0.625	0.630

* Delta changes in eGFR and creatinine were calculated from Day 30 post-transplant to the time points listed above.
EBV naïve patients have a better eGFR at 9 and 24 months with no significant difference in creatinine levels between the two groups at any time point. Immunosuppression was reduced using standard protocols. Antiviral prophylaxis used in 5 high risk patients (CMV D+/R-) with no impact on clinical outcomes.
The effect of viral status pre-transplant on graft function is not well documented. In this study, it appears to have little impact over maximum follow up. Future, larger studies are warranted.
Reference:
1. Kotton CN, Fishman JA. Viral infection in the renal transplant recipient. J Am Soc Nephrol 2005; 16:1758–74.
Presenting Author: Alannah Dolan
Supervisor: Dr Tara Raftery
Co-supervisor: Prof Atif Awan

112. X-RAY AND ART EXPLORATION OF PLANT ACCUMULATION OF SOLUBLE TOXINS

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Hyperaccumulator plants are increasingly important because of their ability to translocate toxins from the soil, allowing for a measurable reduction in soil pollutants[1]. Studies analysing the rate of uptake of metal solutions in plants are not apparent in literature. Digital imaging technology using region of interest (ROI) analysis of plant radiographs can potentially quantify differences in opacification in the transport system[2]. The current project applied ROI analysis with the aim of comparing uptake between different plants and different toxins.
A variety of hyperaccumulator plants were watered with selected toxin solutions over several weeks. A range of controlled variations in exposure on selected plants produced six images suitable for visual grading analysis (VGA) by three independent observers. This VGA established the optimal exposure factors for visualisation of the plant reticular systems. Three groups of plants were watered with one of 1) zinc sulphate, 2) iron chloride, 3) water (control group) and re-imaged at optimal settings.
Mean pixel value in consistent ROIs on the resultant images indicated the level of opacification at the same point in each plant. Statistical comparison of mean pixel values indicated whether toxin uptake varied between plant species or between toxin solutions. The study is a useful pilot project for further imaging analysis of hyperaccumulator plant uptake.
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2. Yaffe. M, Rowlands.J, (1996), X-ray detectors for digital radiography, Physics in Medecine & Biology,42. doi.org/10.1088/0031-9155/42/1/001.
Presenting Author: Laura Cleary
Supervisor: Assoc Prof Kate Matthews

113. ISOLATED ARTERIOVENOUS MALFORMATION - ASSESSEMENT OF A RARE RETINAL CONDITION USING SWEPT-SOURCE OCT ANGIOGRAPHY

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An arteriovenous malformation refers to a congenital abnormality of the retinal vasculature with arteriovenous shunting and the capillary system being bypassed. This can cause a significant reduction in visual acuity. This abstract presents the case of an atypical unilateral developmental retinal vessel anomaly.
The goal of this research is to compare retinal blood perfusion between eyes in a patient with arteriovenous malformation. Optical coherence tomography angiography (OCTA) and ImageJ were used to quantify blood perfusion at three different locations.
The 16-year-old female patient had a history of right iris heterochromia and right anisometropic amblyopia but was otherwise healthy. Fundoscopy revealed an abnormality in the right retinal vasculature and the patient was diagnosed with an arteriovenous malformation. OCTA showed large tortuous veins in the right eye, whereas an OCT B-Scan showed that the same eye had significantly higher retinal blood perfusion than the unaffected eye. The percentage difference of blood flow between eyes was on average 710% and the greatest blood flow occurred in the superior arcade.
The results demonstrate that arteriovenous malformations can cause greater blood perfusion in the affected eye. OCTA is a valuable, non-invasive imaging modality for evaluating patients with arteriovenous malformations. The patient had a unique unilateral presentation of a developmental anomaly, without evidence of progression or other systemic vascular malformations.
Presenting Author: Ethan Waisberg
Supervisor: Prof Michel Michaelides

114. TRIPLE ASSESSMENT BREAST CLINICS: THE VALUE OF CLINICAL CORE BIOPSIES

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Triple Assessment Breast Clinics are designed for patients with breast lumps for rapid diagnosis. When there is no concordance between clinical and radiological assessment, clinicians perform clinical core biopsies. The aim of this research was to assess the diagnostic value of clinical core biopsies in non-suspicious palpable breast lesions where image guided cores were not indicated.
The cohort consisted of patients undergoing clinical core biopsy at a Symptomatic Breast Unit from January 2014 to 2019. Data regarding patient demographics, outcome of triple-assessment and incidence of malignancy were obtained from a prospectively maintained database and results were analysed using Minitab 2018.
Three hundred and sixty patients had a clinical core biopsy performed in this period. Clinical examination scores for these patients were S1/S2 (66), S3 (277), S4 (15), S5 (2). Radiology Scores were R1/R2 (355), R3(5). Four (1.1%) patients were diagnosed with a breast cancer due to their clinical cores. Of these, three patients had normal imaging. There was no association between uncertain palpable breast lesions (S3) and atypia or malignancy on biopsy results when breast imaging was normal ($\chi 2$ P=0.62).
Despite clinical core biopsies being part of triple assessment, there is no certainty in their value except that there is a high clinical suspicion. Imaging modalities are constantly improving and are already well established. When the patient is assigned a clinical score of S3 and has normal radiology, a clinical core biopsy is not required in most cases.
Presenting Author: Maha Rahmani
Supervisor: Dr Manvydas Varzgalis

116. GESTATIONAL FOLATE AND FOLIC ACID INTAKE ACROSS FIVE COUNTRIES: A SECONDARY ANALYSIS OF THE FOLIC ACID CLINICAL TRIAL (FACT)

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Folic acid supplementation is widely recommended to prevent fetal neural tube defects. The objective of this study was to evaluate differences in dietary food folate intake and folic acid supplementation amongst pregnant women in Canada, Australia, Argentina, Jamaica and the United Kingdom (UK).
The study was nested in FACT[1], an international multi-centre, randomized, double-blinded, placebo-controlled, phase III trial investigating folic acid for the prevention of pre-eclampsia in high-risk pregnancies. Participants completed the Block dietary folate equivalent (DFE) screener at 8-16 weeks of gestation. Differences in natural food folate intake, early gestational folic acid supplementation and total DFE were assessed. Statistical associations were assessed by Kruskal-Wallis rank-sum tests for continuous data, and chi-square test or fisher's exact test for categorical data.
2440 women completed DFE screener surveys. 81.4% (n=1987) participants reported taking folic acid supplements. Folic acid intake from supplements was highest in Canada (med:1000ug/day, IQR:1000-1000) and lowest in Argentina (med:150ug/day, IQR:0-1000). Natural food folate intake was highest in Argentina (med:154.7ug/day, IQR:106.1-198.0) and lowest in the UK (med:118.1ug/day, IQR:84.0-157.6). Total DFE levels were as follows: Canada (med:1835.7ug/day, IQR:1783.7-1897.1), Jamaica (med:1159.8ug/day, IQR:300.7-1486.6), Australia (med:1056.37ug/day, IQR:892.4-1480.3), UK (med:769.1ug/day, IQR:160.4-821.5) and Argentina (med:452.5ug/day, IQR:163.3-1833.5).
The majority of women in our cohort received above recommended daily levels of folate intake (400ug/day). Our data do not consider national folic acid fortification programs in Canada, Australia and Argentina. Given that many women exceeded the upper tolerable limit of folate (1000ug/day) from natural food sources and supplements alone, re-examination of common supplementation practices is warranted.

Acknowledgement:
The author would like to acknowledge funding from the Canadian Institute of Health Research (FDN 148438).
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Presenting Author: Elaine Rose
Supervisor: Dr Mark Walker
Co-supervisor: Dr Malia Murphy

117. AN EXAMINATION OF BASELINE SOCIAL SKILLS LEVELS IN YOUNG ADULTS WITH 22Q11.2DS PRIOR TO PEERS TREATMENT PROGRAMME INTERVENTION

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Children born with 22Q11.2 deletion syndrome (1/4000) experience a myriad of medical problems such as developmental delay, intellectual disability and psychiatric disorders such as Autism Spectrum Disorder (ASD) and Social Anxiety Disorder at a much higher rate than the general population. These individuals tend to have limited social skills knowledge and difficulties with empathy. These deficits can result in peer rejection and self-isolation, which can cause debilitating loneliness and other mental health issues[1]. The Programme for the Education and Enrichment of Relational Skills (PEERS) is an evidence based social skills programme for populations with ASD and similar symptomologies. PEERS offers structured behavioural interventions throughout which these individuals are taught various social skills[2].
The aim of this research is to describe and examine the pre-intervention levels of social functioning among a cohort of young adults with 22q11.2DS.
Six young adults with 22Q11.2DS participated in the study with their caregivers. Outcome measures were divided into participant and caregiver questionnaires. The means and standard deviations of the questionnaire scores were calculated in SPSS and compared to a similar study involving young adults with ASD who completed the same questionnaires prior to PEERS intervention. This comparable study saw statistically significant improvements in social functioning.
This is the first study to evaluate the effectiveness of PEERS in a population with 22Q11.2DS in Ireland. It is hoped that the improvement seen in young adults with ASD as a result of PEERS will be transferable to young adults with 22Q11.2DS.
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2. Laugeson E, Frankel F. Social skills for teenagers with developmental and autism spectrum disorders: The PEERS Treatment Manual. New York: Routledge; 2010.
Presenting Author: Robert Doyle
Supervisor: Prof Fiona McNicholas
Co-Supervisors: Dr Veselina Gadancheva
Ms Elisha Minihan
PEERS Group Facilitator: Ms Lorna Kerin

119. INVESTIGATING ANTIMICROBIAL RESISTANCE IN HEALTHY MARES AND FOALS

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Use of antibiotic agents in veterinary practice has lead to a significant rise in antibiotic resistance[1]. Extended spectrum β-lactamases (ESBLs) hydrolyze important antimicrobial agents[2], and increased levels of resistant bacteria, especially ESBL-carrying bacteria, influence patient mortality and transfer of resistant bacteria[1,2].
The aim of this study was to assess levels and patterns of antibiotic resistance in Escherichia coli (E. coli) from equine faecal samples, including samples from healthy mare-foal pairs.
E. coli were isolated from 71 of 73 faecal samples using standard selective and non-selective agars. Screening for ESBL production and fluoroquinolone resistance was completed using MacConkey agar No. 3 with added cefotaxime or ciprofloxacin. Disc diffusion methods were performed to assess resistance to five antibiotic classes.
A total of 59% of E. coli were resistant to ≥1 antimicrobial classes, and 8% of E. coli isolated from non-selective agar were multi-drug resistant (MDR). Cefotaxime-resistant E. coli were isolated from 45% of samples, 61% of which were MDR. Fluoroquinolone-resistant isolates were recovered from 9.5% of samples, 57% of which were MDR. Randomised ESBL testing of isolates from cefotaxime-supplemented agar indicated that 92% of the isolates had the AmpC phenotype and 6% the ESBL phenotype. Antimicrobial resistance patterns from 44% of mare-foal pairs suggested transmission of E. coli strains between dam and offspring.
This study indicates high levels of resistance in animals sampled, including a high occurrence of E. coli positive for β-lactamases. Resistance transfer analysis in healthy mare-foal pairs was not conclusive, but suggested transfer between pairs occurred.
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1. Bryan J, Leonard N, Fanning S, Katz L, Duggan V. Antimicrobial resistance in commensal faecal Escherichia coli of hospitalised horses. Ir Vet J. 2010; 63(3): 373-379.
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Presenting Author: Ellen Nugent
Supervisor: Assoc Prof Finola Leo