RESEARCH WEEK
5-9 OCTOBER 2020
INSPIRED RESEARCHERS
Northern Health

ABSTRACT BOOK






Our Vision

A healthier community, making a difference for every person, every day.

Our Values

safe

We provide safe, trusted care for our patients.
We are inclusive and culturally safe, celebrating the diversity of our staff and community.

kind

We treat everyone with kindness, respect and empathy.
We provide patient-centred and compassionate care.

together

We work together with our staff, patients, consumers and health system partners.

Our Priorities

- A safe, positive patient experience
- A healthier community
- An innovative and sustainable future
- Enabled staff, empowered teams
- Engaged learners, inspired researchers

Together, with our community,
#WeAreNorthern

RESEARCH LEAD'S YEAR IN REVIEW

This year has demonstrated, like no other, the importance of research for advancing our society. Who could have imagined that only six months ago that we would be hosting Research Week 2020 as a purely virtual event as we continue to transition a large proportion of our services towards digital health via telehealth, in-hospital monitoring and home-based healthcare solutions. This has been spurred on in response to a global pandemic and underpinned by research and evaluation. Research will lead the way on our journey to a 'new normal' – new treatments and a potential vaccine will likely dominate headlines but it is the new ways of doing many of the things we have taken for granted that is already advancing healthcare, delivery and consumer-led experience.

It is proven that a health service which commits to, and nurtures, a research culture has happier and more satisfied staff and better patient outcomes. We should all be proud of the clinical care we deliver and strive to underpin this with education and research. This will ensure we evaluate and question everything we do, leading to continuous improvement in the way we deliver trusted care to our community and, importantly, educate our staff and our students, Northern Health's workforce of the future.

Despite the challenges that COVID-19 presents, we continue to expand our research portfolio thanks to the extraordinarily dedicated staff in our research team. The response to fast-track ethics and governance approvals for COVID-19 related research has recognised the importance of not losing focus on non-COVID-19 research and helping facilitate opportunities that will shape the 'post COVID-19' world in which we will continue to meet our mission of a healthier community, making a difference for every person, every day.

The events during Research Week 2020 have been organised in a very different way with virtual presentations, posters, guest speakers and workshops. They will highlight the quality of research occurring across the spectrum that are being driven by an increasing number of our Northern Health staff. Highlighted is the increasing volume of projects being conducted with our academic partners; Melbourne, La Trobe, RMIT and Swinburne Universities.

We are privileged to have an exciting range of speakers at this year's Research Week. They will encourage us to reflect upon our current practices and challenge us to explore how we can rise above the increasing demands we will continue to face. Future service challenges are not to be underestimated, but by reviewing and evaluating what we do, and how we do it, we will have the opportunity to change things for the better and to deliver trusted care for our community, now and into the future.

Research at Northern Health is not just about Research Week, and here are just a few of the highlights during the year:

- Our Research Leads, Divisional Directors and Principle Investigators led a phenomenal response to keep our community safe in developing and enacting contingency plans for all research projects and clinical trials throughout the pandemic. We are grateful to all staff who helped support these activities.
- Our Low Risk Human Research Ethics Committee celebrated its first-year anniversary back at Northern Health. Chaired by Professor Bill van Gaal, the adaptability, flexibility and support this team has provided to streamline applications during this dynamic period has been exceptional.
- RedCAP went live as a tool for our researchers to use greatly enhancing data capture and analysis.
- The 2nd annual *Digital Health Futures @ Northern* event brought together expertise from around the globe including Finland, India and the United States.
- Associate Professor Lisa Hui was awarded a $1.28m Medical Research Future Fund (MRFF) investigator grant for her project 'closing the critical knowledge gaps in perinatal genomics'.
- The recruitment of Adam Semciw, Associate Professor of Allied Health Jointly appointed with La Trobe, Adam has in partnership with Dr Rebecca Jessup significantly increased support and provided leadership across the various disciplines. Together they have established the Allied Health Research Clinic to help enhance research across Allied Health.
- Research Grand Rounds are now running weekly and have been successful in stimulating research discussions. Guests to date include Tilman Ruff, Terry

Nolan, Malcolm Dobbin, Liam Caffery, Helen Haydon, Doug Crompton, Darren Lowen, Zoe Wainer and Marie Bismark. Keep an eye out for more events to come.

- Two new PhD scholarships were awarded to Natali Cvetanovska and Dr Julie Wang, and $50,000 worth of Small Research Grants were awarded to researchers thanks to the generosity of the Northern Health Foundation and our community donors.
- The growth of clinical trials with a focus on good governance and rapid response. These included Oncology, Cardiology, Anaesthetics, Intensive Care, Paediatrics, Obstetrics and Surgery. Industry sponsored and investigator-led studies offer our community access to new and novel therapies they may not have otherwise been accessible.
- The expansion of Diagnostic Services which not only undertakes their own research but also underpins many other trials and research projects across the organisation. They continue develop strong research links with other laboratories across Melbourne.
- The ever increasing growth of opportunities for simulation research under the leadership of Dr Nancy Sadka and Mr Krinal Mori.
- Appointing our first research midwife, Eleanor Johnson, to support the newly created Reproductive Health Biobank led by Associate Professor Lisa Hui. Lisa is Chief Investigator on an important collaborative project monitoring outcomes of mother and babies during the pandemic.
- Participation in a number of COVID-19 research activities and clinical trials under the stewardship of Associate Professor Craig Aboltins and Dr Angaj Ghosh. These include ASCOT, CHARTER, SPRINT-SARI and participating in our first phase I study evaluating a protection device for our clinical staff caring for unwell patients in ICU.
- The *NHMRC Centre of Research Excellence in Interactive Digital Technology to Transform Chronic Disease Outcomes* launched officially in 2020. Directed by Professor Brian Oldenburg from the Melbourne School of Population and Global Health and co-directed by Professor Vas Kostakos from the School of Computing & Information Systems, this Centre aims to transform Australia's digital health ecosystem by undertaking research that will leverage the ubiquitous availability of smart devices and digital technology to improve the health and wellbeing of people with chronic conditions.
- Our close involvement with the Melbourne Academic Centre for Health (MACH) with various special interest groups and the financial support provided to seed a variety of projects.

We can only speculate on the future but what is clear is that research will always be key to getting us there. Funding for research is always competitive and we are grateful of the continuing support that is provided by the Northern Health Foundation.

Our staff and community should be proud of the research contributions in what has been an extraordinary year. Congratulations and thank you to all who have contributed to research at Northern Health.

Professor Peter Brooks AM
Research Lead – Northern Health

RESEARCH WEEK 2020 EVENT SCHEDULE
Monday, 5 October 2020

Grand Opening & Keynote

12.00 pm – 1.30 pm

Webinar

Professor Peter Brooks

Please join us for the opening of Research Week 2020 at Northern Health where Research Lead Professor Peter Brooks will welcome you and formally open Research Week. Professor Brooks will talk to the research highlights and achievements at Northern Health in the past 12 months and introduce our guest speaker Professor Sir John Savill.

Topic: What can the Melbourne Academic Centre for Health offer clinical research at the Northern

Northern Health is a partner in the Melbourne Academic Centre for Health (MACH). This 19 member joint venture brings health researchers in the University of Melbourne and 8 affiliated Medical Research Institutes together with 10 large health services to promote translation of research into improved healthcare and economic growth. La Trobe University has recently joined MACH as an affiliate member. Around 25% of Australia's publicly-funded medical research is hosted by MACH partners. This presentation will explain how clinical research at the Northern can benefit from the hospital's membership of MACH.

Professor Sir John Savill, BA, MBChB, PhD, FRCP, FRCPE, FRCSEd(Hon), FRCPCH(Hon), FASN, FRSE, F.MedSci, FRS

John Savill has been Executive Director of the Melbourne Academic Centre for Health since July 2019, having served in the UK as an honorary consultant in renal and acute medicine from 1990 to 2018. John graduated in Physiological Sciences from Oxford in 1978 and in Medicine from Sheffield in 1981. He received a PhD (London) in 1989. He spent seven years in the Department of Medicine at the Royal Postgraduate Medical School, Hammersmith Hospital, with spells as an MRC Clinical Training Fellow and Welcome Trust Senior Clinical Research Fellow.

His work has been recognised by fellowships of the Royal Colleges of Physicians of London and Edinburgh, the Academy of Medical Sciences and the American Society of Nephrology. He was a member of the Medical Research Council from 2002 to 2008, and was knighted in the 2008 New Year's Honours List for services to clinical science.

Symposium

3.30 pm – 5.00 pm

Webinar

Topic: Can new technologies reduce the KNOW-DO gap in order to optimise chronic disease management in Australia?

Hosted by Professor Brian Oldenburg

Professor Brian Oldenburg

Topic: A new national research collaboration with Northern Health to improve the use of new technologies to transform Australia's chronic disease outcomes

Synopsis: Brian will overview a new research program with Northern Health and other health services around Australia which aims to improve the application and widespread use of new information, communication and monitoring technologies to improve the management of heart disease, diabetes, mental health and other conditions, thereby transforming Australia's health outcomes.

Bio: Brian is a Professor of Public Health and Head of the Noncommunicable Diseases Unit at the University of Melbourne. He is a behavioral medicine and implementation scientist and a global expert in the prevention and control of chronic diseases in low and middle-income countries. He is also the director of the NHMRC Centre for Research Excellence in Digital Technology to Transform Chronic Diseases.

Dr Dominika Kwasnicka

Topic: A digitally enabled, transformative approach to prevent and treat chronic and mental health conditions in populations

Synopsis: The COVID-19 crisis has significantly increased levels of psychological and social distress in the community and in people with chronic conditions who often avoid using face-to-face services. This presentation will describe the methods our team is using to develop and evaluate an e-hub to help such individuals to navigate to existing digital and human resources and supports. This approach will serve as a model for the contemporary, data driven approach to the implementation of evidence-based guidelines and interventions in healthcare.

Bio: Dominika (Dom) is a research fellow at the University of Melbourne; she is a behavioural scientist who has diverse interests in health psychology, digital health and research methods focusing on individuals. Before joining the NHMRC CRE earlier this year, Dom studied and lived in Scotland and England before re-locating to Australia. She continues to collaborate extensively with colleagues in Europe.

RESEARCH WEEK 2020 EVENT SCHEDULE
Monday, 5 October 2020

Dr Tilman Dingler

Topic: Let's Talk about Health: The Use of Conversational Agents in Digital Health

Synopsis: Technological developments in ubiquitous sensing, data source integration, and machine-learning offer new opportunities for patient care outside the hospital. This presentation will cover the development of systems that engage patients via text interfaces–i.e., chatbots–or via spoken language–i.e., voice assistants. These conversational agents present a natural interface to help patients navigate health services and manage chronic conditions. Together with unobtrusive and continuous collection of health data, conversational agents provide a novel and deeply personalized access to digital health care.

Bio: Tilman Dingler is a Lecturer in the School of Computing and Information Systems at the University of Melbourne. He obtained a PhD in Computer Science from the University of Stuttgart (Germany). Currently, he builds and investigates systems that sense, model, and adapt user context and develops conversational interfaces that provide natural ways of interacting with systems via text and voice in the context of digital health. Before his academic career, Tilman worked as an engineer at Yahoo! Inc. and several technology startups.

Associate Professor Jo-Anne Nankervis

Topic: Optimising care in general practice using digital tools

Synopsis: Jo-Anne will briefly introduce three digital tools: Future Health Today, CovidCare and an app for collecting Patient Reported Outcomes Measures from people with type 2 diabetes, which aim to provide new pathways for optimised care in general practice.

Bio: Jo-Anne is an academic general practitioner (GP) at the Department of General Practice, Melbourne Medical School. She leads innovative research into the development and implementation of technology to inform decision making in general-practice, and the use of data to describe and improve general-practice activity, with a focus on chronic disease management and antimicrobial stewardship. She co-leads the Future Health Today program with Associate Professor Craig Nelson at Western Health, a new technology platform for identification and management of chronic disease in general practice.

NORTH Link Northern Health Foundation Virtual Business Breakfast

8.00 am – 9.00 am

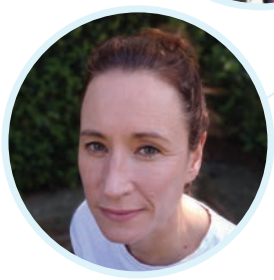
Webinar

Topic: Patient care in the community: COVID-19 and beyond

Professor Don Campbell

Bio: Professor Don Campbell is Medical Director Hospital Without Walls and Staying Well Program, Northern Health, Adjunct Professor of Medicine and Professor (Research) in the Faculty of Art Design and Architecture at Monash University, and President of the Adult Medicine Division of the Royal Australasian College of Physicians.

He is a member of the Clinical Expert Advisory Group (Covid19 Response) for the Department of Health and Human Services, Victoria.



Dr Rebecca Jessup

Bio: Dr Rebecca Jessup is the Allied Health Research Lead at Northern Health, and an Adjunct Research Fellow at La Trobe University School of Allied Health, Human Services and Sport. Rebecca has a clinical degree in Podiatry, a Master of Public Health and a PhD in Health Literacy for which she received an NHMRC post-graduate scholarship. Rebecca's research interest areas include health literacy and communication, health equity, and alternative models of service delivery to improve health system sustainability.

Oral Presentations (Session 1)

12.30 pm - 1.30 pm

Webinar

MC: Associate Professor Lisa Hui

- Dr Julie Wang — Rivaroxaban and apixaban anti-Xa levels correlate poorly with degree of thrombin suppression
- Dr Thomas Boland — Assessment of wound closure techniques in total hip arthroplasty at Northern Health
- Dr David Crosbie — So many Code Blues, so few arrests, why?
- Benjamin Hargreaves — Retrospective evaluation of preoperative anaemia management at a Melbourne metropolitan hospital

Symposium

3.30 pm – 5.00 pm

Webinar

Topic: "Students: Benefit or burden to hospitals?"

MC: Professor Stephen Trumble, Head, Department of Medical Education, Melbourne Medical School, The University of Melbourne

Associate Professor Robyn Woodward-Kron

Topic: Students value-adding to health services during clinical placement

Synopsis: This presentation draws on a Medical Deans of Australia and New Zealand funded study that examined the bi-directional benefits to learning and to health services of medical student clinical placements. The study has been replicated in nursing and primary care

Bio: Robyn is Director of Research and Research Training in the Department of Medical Education in Melbourne Medical School. She researches health communication to inform health professions education and to improve patient outcomes.

Dr Leonie Griffiths

Topic: How do we teach patient centred care?

Synopsis: Post graduate medical students from University of Melbourne participate in the Patient Partner Program (PPP) which sees them accompany a patient with a chronic health condition through the health care system over a minimum of 6 months. The PPP aims to bring the patient agenda into focus while promoting empathic and reflective practice. The presentation will highlight key evaluation findings relating to student contribution to patient care and reflections on the challenges patients face, living with a chronic disease and navigating a complex healthcare system.

Bio: Leonie has a background in General Practice and is the Director of Medical Student Education Northern Clinical School and the Director of Work Integrated Learning for the Melbourne Medical School. Her research interests revolve around curriculum design that fosters students' understanding of patient centred care through authentic meaningful engagement with patients.

Ms Nadia Levkut

Topic: Paid employment for medical students in hospitals. Does it work?

Synopsis: Historically, medical students have sought paid employment in hospitals to finance their medical education and gain additional exposure to the healthcare system. Little is known about what students can learn in this setting. This project aimed to investigate the experiences of medical students who undertake paid employment within the hospital and to explore hospital staff perspectives on the feasibility and acceptability of medical students undertaking paid hospital employment. This presentation will discuss the bidirectional benefits and barriers to the employment of medical students in a hospital setting.

Bio: Nadia Levkut is a final year medical student at the University of Melbourne. She has completed her clinical training at the Northern Clinical School and this is her first research experience.

Oral Presentations (Session 2)

10 am – 11 am

Webinar

MC: Associate Professor Doug Crompton

- Anna Kwok — Evaluation of global coagulation assays and endothelial biomarkers in patients with diabetes mellitus
- Dr Zarna Solanki — Role of delirium screening tool in Fractured Neck Of Femur pathway for geriatric patients
- Mark Tacey — Using propensity score matching to retrospectively evaluate the effectiveness of the Health Independence Program
- Dr Rowena Brook — Treatment of Isolated Distal Deep Vein Thrombosis- Northern Health Experience in the DOAC Era

Oral Presentations (Session 3)

12.30 – 1.30 pm

Webinar

MC: Associate Professor Hamish Ewing

- Dr Rebecca Jessup — How do health consumers interpret and apply health information during a pandemic?
- Dr Robert Phan — The effects of COVID-19 lockdown on Plastic and Reconstructive Surgery emergencies – can we do better?
- Dr Alistair Tinson — Assessment of healthcare workers' mental health during COVID-19 at a large tertiary hospital
- Dr Paul Viray — Early removal of index COVID-19 positive resident in residential aged care – a recipe for success?

Workshop

4 pm – 6 pm

Webinar

MC: *Professor Peter Brooks*

Topic: How to keep up to date in an era of information overload

Nursing skill mix refers to the number, type and educational preparation of nurses. There are a number of studies that have demonstrated a clear association between nursing skills mix and patient outcomes. However, there are important methodological limitations to many of these studies that need to be considered when appraising this body of work. In this presentation I will discuss these methodological challenges and consider how these may be overcome.

Professor Paul Glasziou

Professor Paul Glasziou is Professor of Evidence-Based Medicine at Bond University was a part-time General Practitioner for 20 years. He is currently the Director of the Centre for Research in Evidence-Based Practice at Bond University and previously the Director of the Centre for Evidence-Based Medicine in Oxford from 2003-2010. He has authored over 300 peer-reviewed journal articles, and his key interests include identifying and removing the barriers to using high quality research in everyday clinical practice and more specifically on improving the clinical impact of publications by reducing the more than $85 Billion annual loss from unpublished and unusable research (Chalmers, Glasziou, Lancet 2009).

Research Grand Rounds

8.00 am – 9.00 am

Webinar

MC: *Associate Professor Craig Aboltins*

Topic: How can we reduce waste in research?

A 2014 Lancet series on adding value and reducing waste in research has documented that over 85% of research is wasted. This occurs of 5 stages of research production: question selection, study design, research conduct, publication, and reporting. For design, publication, and reporting there is a "loss" of around 50%, which implies a total waste of 85%, which suggests a global loss of around $170 Billion per year. Much of this waste appears to be remediable, and represents an opportunity for research organisations to improve their quality, productivity, and impact of research investments.

Professor Paul Glasziou

Professor Paul Glasziou is Professor of Evidence-Based Medicine at Bond University was a part-time General Practitioner for 20 years. He is currently the Director of the Centre for Research in Evidence-Based Practice at Bond University and previously the Director of the Centre for Evidence-Based Medicine in Oxford from 2003-2010. He has authored over 300 peer-reviewed journal articles, and his key interests include identifying and removing the barriers to using high quality research in everyday clinical practice and more specifically on improving the clinical impact of publications by reducing the more than $85 Billion annual loss from unpublished and unusable research (Chalmers, Glasziou, Lancet 2009).

Research Highlights & Awards presented by Northern Health Foundation

12.30 pm – 1.30 pm

Webinar

MC: *Mr John Molnar, Chair of Northern Health Foundation Board*

Presentations from Northern Health Foundation PhD Scholarship recipients and Small Research Grant Recipients.

Chris Lynch

Topic: The effectiveness of Fitness Trackers in Changing the Physical Activity of Breast Cancer Survivors

Synopsis: Physical activity is central to the aetiology and management of many cancer outcomes and improving physical activity among breast cancer survivors with low levels of activity is crucial. Popular emerging mobile technology such as the fitness tracker, has prompted the investigation of their potential application in clinical and public health settings, including the improvement or maintenance of health in oncology practice. The aim of this thesis was to investigate how effective fitness trackers are in changing the physical activity behaviour of inactive breast cancer survivors.

Bio: Chris has recently submitted his PhD thesis at RMIT University. His research focused on wearable technology and physical activity behaviour, specifically how fitness trackers could be used to increase the physical activity of breast cancer survivors. Publications from his PhD include a systematic review and meta-analysis as well as quantitative, and qualitative research articles.

Dr Julie Wang

Topic: Prospective serial evaluation of new biomarkers of thrombosis in patients with newly diagnosed venous thromboembolism.

Synopsis: Dr Wang will provide a brief overview of PhD project and progress so far.

Bio: Dr Julie Wang is a haematologist who has an interest in thrombosis and haemostasis. She is a PhD candidate at the University of Melbourne and recipient of a Northern Health Foundation PhD Scholarship.

Natali Cvetanovska

Topic: Patient initiated teach back to overcome low health literacy and improve recall and retention of health information

Synopsis: An individual's health literacy affects their ability to engage with and navigate health services, understand health information and implement health decisions. An important factor in health literacy is communication between health professionals and patients. This research will explore how patients can be empowered to take a more active role in their communication with health professionals.

Bio: Natali has worked for Northern Health for over 12 years and her research interest is improving the health literacy of the people in Melbourne's north.

RESEARCH WEEK 2020 EVENT SCHEDULE
Thursday, 8 October 2020

Mr Justin Wong

Topic: Use of novel device to decrease complications during ACL reconstruction

Synopsis: During ACL reconstruction, the graft is pulled into bone tunnels in the femur and tibia and then fixed in place. The sutures used to pull the graft into place can rupture which can lead to increased surgery time or incorrect positioning of the graft. We are testing the use of a custom designed instrument and a modified pulling technique to see if it reduces the risk of suture rupture. Grafts will be pulled into bone tunnels in cadaveric cow knees and a tensiometer will record the tensions in the sutures using the standard technique and comparing them to tensions when using the novel device and modified technique.

Bio: Mr Justin Wong is the Director of Research for the Northern Health Orthopaedic Unit an orthopaedic surgeon specialising in knee surgery. He has an interest in registrar teaching and is currently the Director of Training for the orthopaedic registrars at Northern Hospital.

Dr Sanjeevan Muruganandan

Topic: Research in Pleural Medicine at Northern Health

Synopsis: In Australia, pleural disease affects 60,000 patients per annum. Pleural malignancies and infections are the commonest causes of exudative pleural effusions, and their incidence, mortality and health-care costs continue to rise. The STOPPE study is a pilot, multicentre, double-blinded, placebo-controlled randomised controlled trial to establish the feasibility and safety of adjunct corticosteroid therapy in patients with pneumonia and associated pleural effusions. The PLEASE-2 is a multicentre prospective study investigating the importance of the diaphragm in the mechanism of breathlessness and enable us to predict which patients are likely to benefit from drainage procedures.

Bio: Dr Sanjeevan Muruganandan is the research and the pleural lead for the Department of Respiratory Medicine at Northern Health. He has a keen research focus and his goal is to translate his research work into clinical practice to help reduce the mortality, morbidity and health care costs of patients with pleural diseases.

Dr Rebecca Jessup

Topic: How do health consumers interpret and apply health information during a pandemic?

Synopsis: The COMmunication during COVID-19 (COM-VID) study is a two phase study that aims to understand how patients who are high hospital users are accessing, interpreting and applying information during the pandemic. The study seeks to better understand how COVID-19 has influenced this cohorts health seeking behaviours.

Bio: Dr Rebecca Jessup is the Allied Health Research Lead at Northern Health, and an Adjunct Research Fellow at La Trobe University School of Allied Health, Human Services and Sport. Rebecca has a clinical degree in Podiatry, a Master of Public Health and a PhD in Health Literacy for which she received an NHMRC post-graduate scholarship. Rebecca's research interest areas include health literacy and communication, health equity, and alternative models of service delivery to improve health system sustainability.

Women & Children's Research Seminar

2.30 pm – 4.30 pm

Webinar

Kristina Edvardsson

Topic: Severe mental illness and pregnancy outcomes in Victoria. A population-based study of 1 229 777 singleton births 1999-2016

Synopsis: This talk will focus on a study that explores the associations between Severe Mental Illness (SMI) (schizophrenia, bipolar disorder and severe depression), health and lifestyle factors, and pregnancy outcomes in Victoria. The study is based on a population-based sample of all reported singleton births in the state 1999-2016 (N=1 229 777). We identified 3 496 mothers with a SMI diagnosis, and findings show that SMI increases the odds for a range of adverse maternal and neonatal outcomes, also after adjustment for key confounders such as sociodemographic factors, lifestyle factors and comorbidities, including any other documented mental illness. Next step of the research will be to explore ways to address the health and wellbeing for women with SMI prior to and during pregnancy

Bio: Kristina is a Senior Lecturer at the School of Nursing and Midwifery at La Trobe University and her primary research interest is in the area of mother and child health.

Associate Professor Lisa Hui

Topic: Throwing the baby out with the bath water? Monitoring the impact of lockdown restrictions on maternal and newborn outcomes in Melbourne

Synopsis: Pregnancy and childbirth have their own timelines and do not pause for pandemics. International reports suggest that pandemic lockdown restrictions are having more adverse health effects on pregnant women and their babies than direct harm from the virus itself. Lisa Hui is leading a collaboration of Melbourne maternity services, including Northern Health, to monitor the maternal and newborn outcomes during the pandemic period so that hospitals can make data-informed decisions during a public health emergency.

Bio: Lisa is a maternal fetal medicine specialist and associate professor in the Department of Obstetrics and Gynaecology at the University of Melbourne.

Dr David Tran

Topic: A prospective observational study of COVID-19 transmission and disease course (multi-centres)

Synopsis: A multicentred prospective study looking at both acute and short-medium term outcomes for children who have tested positive for COVID-19.

Bio: David is a consultant paediatrician, Clinical Director of Paediatrics and clinical lecturer at Northern Health and the University of Melbourne

RESEARCH WEEK 2020 EVENT SCHEDULE
Thursday, 8 October 2020

Associate Professor Wei Qi Fan

Topic: Postnatal breastfeeding telephone support significantly improves rates of breastfeeding

Synopsis: Breastfeeding has multiple benefits both to mother and infant. However, there are many factors which lead to breastfeeding cessation well before the WHO minimum recommended 6 months duration of exclusive breast feeding. A large randomised controlled trial was conducted at TNH with 765 mothers were enrolled soon after birth. The results showed that a lactation consultant led telephone program to provide early and regular support for new mothers not only significantly improves exclusive breastfeeding rates but promotes breastfeeding in general.

Bio: Wei Qi is a consultant neonatologist, head of neonatal unit and Associate Professor in paediatrics at Northern Health and the University of Melbourne.

Natasha DeAlwis

Topic: New generation antiplatelet agents to treat an ancient disease of pregnancy: evidence from human and animal models of preeclampsia

Synopsis: Preeclampsia remains one of the most common causes of maternal mortality globally, and despite decades of research, no proven therapy has yet been discovered. The Therapeutics Discovery and Vascular Function in Pregnancy Group is an internationally-renowned team that is dedicated to finding a treatment for preeclampsia. Recent work with new generation antiplatelet agents shows that prasugrel reduces hypertension and vascular constriction in human and animal models of preeclampsia, and could be the next promising candidate for clinical trials.

Bio: Natasha is a doctoral candidate in the Therapeutics Discovery and Vascular Function in Pregnancy Group at the University of Melbourne, and honorary researcher at Northern Health.

Dr Liz Green

Topic: Diagnosing paediatric anaphylaxis in the emergency department - why is it so challenging?

Synopsis: Anaphylaxis is a potentially life-threatening type of allergy which is diagnosed on the basis of clinical symptoms and signs. Studies have shown historically low sensitivity rates in diagnosing anaphylaxis in children in paediatric Emergency Departments. This clinical audit examined sensitivity and specificity of anaphylaxis diagnosis in an outer metropolitan mixed adult and paediatric Emergency Department, with a particular focus on patient and clinician features that influenced the variability of diagnostic accuracy.

Bio: Liz is an Advanced Trainee in General Paediatrics with an interest in allergy and anaphylaxis.

RESEARCH WEEK 2020 EVENT SCHEDULE
Thursday, 8 October 2020

Dr David O'Keefe

Topic: Harnessing novel coagulation assays to understand the relationship between clotting function, body mass index and venous thromboembolism risk in pregnant women at term gestation.

Synopsis: Venous thromboembolism is a leading cause of maternal morbidity and mortality in high income countries, responsible for one in five direct maternal deaths in Australia. Our current practice of prescribing thromboprophylaxis during pregnancy and the puerperium is based on poor quality evidence. With the increasing prevalence of common risk factors for thrombosis in our pregnant population, such as obesity, better selection of women who would benefit most from pharmacological anticoagulation is urgently needed. In this Northern Health project, we utilised three novel global coagulation assays to understand of the hypercoagulability of pregnancy and the influence of maternal obesity and clinical risk factors on clotting function.

Bio: David is an intern at Northern Health whose MD research project won the best poster award at the 2019 annual scientific meeting of the Society for Obstetric Medicine of Australia and New Zealand.

Daniel Ng

Topic: Does early antibiotic therapy in neonatal sepsis (proven or presumed) negatively impact enteral feeding and neonatal hyperbilirubinaemia?

Synopsis: Early onset sepsis (EOS) impacts the morbidity and mortality of preterm infants. However, management with broad-spectrum antibiotics disrupts the neonatal microbiome and predisposes infants to feeding intolerance (FI) and hyperbilirubinemia. In a retrospective study on infants < 37 weeks admitted to the SCN at TNH between 2016 and 2019, we compared rates of FI and hyperbilirubinemia between those with EOS (n=357) and those without (n-289). Multivariate analysis revealed that antibiotic use for 5 days or more significantly increased the odds of FI, hyperbilirubinemia and SCN length of stay. EOS management requires judicious use of antibiotics in order to minimise challenges to neonatal morbidity.

Bio: Daniel is a final year University of Melbourne medical student based at The Northern Hospital with clinical interests in paediatric infectious disease and the role of the gut microbiome in shaping human health and wellbeing.

Chiara Marshal

Topic: Does a hypoglycaemic episode for small for gestational age preterm infants further disadvantage their neonatal outcomes?

Synopsis: Preterm small for gestational age babies, with a birthweight below the 10th percentile, have a high risk of poor perinatal outcomes. Hypoglycaemia is more commonly experienced by small for gestational age infants than appropriate for gestational age infants. This talk will address whether a hypoglycaemic episode further worsens the neonatal outcomes of small for gestational age infants with a particular emphasis on preterm small for gestational age infants.

Bio: Chiara is a final year medical student from the University of Melbourne who has been based at The Northern Clinical School for her training since 2018.

RESEARCH WEEK
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Northern Health

ABSTRACTS

Improving Physical Activity of Cancer survivors through wearable Technology (IMPACT) Trial

Lynch C[1,2], Barnett FS[1], Bird S[2], Lythgo N[2], Selva-Raj I[2]

[1]Northern Health, Epping, Australia; [2]RMIT University, Melbourne, Australia

Cancer Services

Background: Increasing physical activity (PA) of post-treatment breast cancer survivors is essential. Survivors who are more physically active have a lower relative risk of cancer-specific mortality. Increasing PA is also an effective behavioural strategy for attenuating decline in physical functioning, enhancing the health-related quality of life (HRQoL), and mitigating cancer-related fatigue. The IMPACT Trial examined how using a fitness tracker changed PA behaviour of inactive post-treatment breast cancer survivors.

Method: Seventeen physically inactive post-treatment breast cancer survivors participated in a randomised cross-over controlled trial. Participants underwent a 12-week intervention of a fitness tracker combined with a behavioural counselling and goal-setting session or 12 weeks of normal activity. After a seven-day washout period, participant assignment was reversed. The primary outcome was change in PA, with secondary outcomes of change in HRQoL, breast cancer-specific concerns, and cancer-related fatigue. Self-efficacy for PA was also assessed.

Results: Intervention achieved a mean increase of 4.5 min/day of moderate-to-vigorous intensity PA, a small-moderate effect (d=0.34). Changes in time spent as a proportion of the day in light-intensity PA (-8.3%) and sedentary behaviour (7.9%), were both significantly different to baseline ($t(16)=3.522$, $p<0.01$; $t(16)=-3.162$, $p<0.01$). All HRQoL indicators, except for physical and emotional well-being subscales, increased significantly. Self-efficacy for PA increased significantly ($t(16)=-2.385$, $p<0.01$).

Conclusions: The interindividual differences in the patterns of PA behaviour change suggest that only for some, fitness trackers can achieve change in the level of moderate-to-vigorous intensity PA and the use of a fitness tracker may facilitate a more physically active lifestyle beyond an active intervention phase.

Acute respiratory distress syndrome precipitated by granulocyte colony-stimulating factor in undiagnosed Pneumocystis jirovecii pneumonia

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Cancer Services

Background: Adult respiratory distress syndrome (ARDS) is a rapidly progressive condition characterised by the development of dyspnoea and inflammatory alveolar infiltrates due to an inciting event. The rapid innate immune reconstitution and activation triggered by granulocyte colony-stimulating factor (G-CSF) has been linked to inflammatory complications but ARDS is uncommon.

Case report: A 62-year-old male with rheumatoid arthritis presented to the emergency department with symptomatic anaemia with painful mouth ulcers. Initial investigations showed pancytopenia, hepatocellular liver function test derangement and acute kidney injury. A diagnosis of methotrexate toxicity was made, and he commenced calcium folinate. He developed fever and respiratory symptoms and was given intravenous antibiotics and a single dose of filgrastim. The following day, he became increasingly unwell with persistent fever, escalation of respiratory support, and new alveolar infiltrates on chest CT imaging. Blood tests showed a dramatic acute phase response with marked hyperferritinaemia and a leukaemoid appearance on blood film and bone marrow biopsy; however, no significant blast population was identified. Pneumocystis jirovecii pneumonia was identified on induced sputum, and he was commenced on trimethoprim/sulfamethoxazole and corticosteroids. His clinical condition improved over the following week, as did his hepatic and renal function.

Conclusions: Exogenous G-CSF, while useful, should be treated with caution as the upregulation of cytokines that increase alveolar permeability or neutrophil influx (such as TNF-α, IL-1β and IL-8) can exacerbate acute lung injury, such as we have become familiar with in the era of COVID-19.

Treatment Refractory Immune Thrombocytopenia as a manifestation of Relapsed Chronic Lymphocytic Leukaemia

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Cancer Services

Background: Secondary immune thrombocytopenia (ITP) is a condition characterised by the autoimmune destruction of platelets, triggered by an underlying disorder of the immune system such as lymphoproliferative disorder or autoimmune disease.

Case report: A 79-year-old man presented with sudden onset of visual loss and was found to have multifocal intracranial haemorrhages and severe thrombocytopenia ($<5 \times 10^9$/L). He was known to have chronic lymphocytic leukaemia (CLL), but had been in remission after completion of a full course of immunochemotherapy nine months prior. He was commenced on corticosteroids and intravenous immunoglobulin (IVIg), and supported with platelet transfusions with no improvement in platelet count. Subsequently, rituximab, romiplostim (thrombopoietin agonist) and venetoclax (BCL-2 inhibitor) were administered without substantial improvement and he developed gastrointestinal bleeding, leading to the need to pursue a splenectomy despite high mortality risk. Patient survived surgery with intense IVIg and platelet transfusion support, yet there was no immediate improvement in platelet count. Pleasingly, with ongoing venetoclax, romiplostim and blood products support, his platelets finally recovered to 660×10^9/L, 18 days post splenectomy. He currently continues with venetoclax monotherapy.

Conclusions: This case highlights the deficiencies of conventional ITP treatments and the importance of treating the underlying disease in secondary ITPs. It also demonstrates that there is a lag time between targeted treatment such as rituximab and venetoclax taking effect, which leaves some patients vulnerable to life-threatening bleeding complications despite best medical therapy.

Unusual Case of an Isolated Prolonged Activated Partial Thromboplastin Time

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Diagnostic Services

Coagulation abnormalities can present as a diagnostic challenge during pre-operative workup. We report a case of a 71-year-old man with isolated prolonged activated partial thromboplastin time (APTT) noted in the setting of pre-proctocolectomy workup. There was no previous history of clinically significant bleeding apart from intermittent gastrointestinal bleeding in the setting of severe Crohn's disease. He had undergone previous laparoscopic high anterior resection of the bowel with no prolonged surgical bleeding. Extended special coagulation testing was not helpful in achieving a final diagnosis and we utilised a combination of multiple APTT reagents as well as global coagulation assays such as thromboelastography and thrombin generation for his peri-operative decision making.

Evaluation of global coagulation assays and endothelial biomarkers in patients with diabetes mellitus

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Diagnostic Services

Background: Diabetes mellitus is associated with increased risk of cardiovascular disease. Current coagulation studies are limited in their ability to predict thrombotic risks. Our study explores the use of global coagulation assays and endothelial biomarkers in diabetic patients and the role they play in predicting outcomes.

Method: 189 diabetic patients (21 Type 1 diabetes mellitus (T1DM), 8 Latent Autoimmune Disease in Adults and 160 Type 2 diabetes mellitus (T2DM)) were compared to 153 controls. Baseline tests and global coagulation assays (thromboelastography (TEG), calibrated automated thrombogram (CAT) and fibrin generation) and tissue factor pathway inhibitor (TFPI) were performed.

Results: Compared to controls, diabetic patients were more hypercoagulable on TEG with increased clot strength (maximum amplitude, 68.7 vs 60.5 mm, $p<0.01$), and reduced Lysis 30 (0.0 vs 0.5%, $p<0.01$) as well as on the overall haemostatic potential (OHP) assay with significantly higher fibrin generation and lower overall fibrinolytic potential (77.6 vs 81.1%, $p=0.02$). Thrombin generation as measured with CAT was interestingly comparable between diabetics and normal controls. TFPI was also increased in diabetic patients (39.6 vs 14.5 ng/mL, $p<0.01$). On follow up, OHP (13.8 vs 10.3 units, $p<0.01$) and TFPI (62.0 vs 36.9 ng/mL, $p<0.01$) were significantly elevated in patients that subsequently had a thrombotic event.

Conclusion: Our study demonstrates that diabetic patients have a hypercoagulable profile on global coagulation assays. Higher OHP and TFPI level were predictive of cardiovascular events on follow-up. Further studies with longer term follow up are needed in this area.

Evaluation of global coagulation assays and endothelial biomarkers in normal controls

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Diagnostic Services

Background: Current coagulation studies are limited in their ability to predict thrombotic risks. Our study explores how global coagulation assays and endothelial biomarkers may differ in normal healthy controls.

Method: Healthy controls (>18 years of age) not taking anticoagulation or antiplatelet agents and without known cardiovascular disease were recruited. Thromboelastography (TEG) was performed on citrated whole blood while calibrated automated thrombogram (CAT), P-selectin and TFPI were performed on platelet-poor plasma.

Results: 153 normal controls (mean age 42 years, 98 females) were recruited. Female controls demonstrated more hypercoagulable TEG and CAT parameters. However, controls over 50 years of age demonstrated comparable thrombin generation despite more hypercoagulable TEG parameters. Paradoxically, individuals with "flattened" thrombin curves (lower velocity index despite preserved endogenous thrombin potential) were more likely to be male (49% vs 20%, $p<0.01$) with increased low-density lipoprotein cholesterol (3.3 vs 2.6mmol/L, $p<0.01$) as well as increased endothelial biomarkers, P-selectin (54.2 vs 47.3ng/mL, $p=0.04$) and TFPI (18.7 vs 8.6ng/ml, $p<0.01$). Controls in the highest TFPI tertile also demonstrated a poorer lipid profile.

Conclusions: Our study demonstrates that global coagulation assays can detect subtle changes in the haemostatic profile and may have a role as an adjunct to cardiovascular risk assessment. Lower thrombin generation were associated with increased cardiovascular risk factors, possibly attributable to increased TFPI. A larger prospective study investigating the use of these assays in patients with cardiovascular risk factors is underway.

Treatment of Isolated Distal Deep Vein Thrombosis – Northern Health Experience in the DOAC Era

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Diagnostic Services

Background: Treatment of isolated distal deep vein thrombosis (IDDVT) remains controversial with major guidelines varying from observation to three months of therapeutic anticoagulation. Our local policy is to treat IDDVT patients with therapeutic anticoagulation using a direct oral anticoagulant (DOAC) in the absence of a contraindication. We aim to evaluate the efficacy and safety of IDDVT treatment of our Northern Health patients with DOAC and compare this to historical data from the warfarin era.

Method: A retrospective audit was performed of patients commenced on DOAC for treatment of IDDVT between 2013 and 2016. Information including patient demographics, treatment agent, duration of treatment and relevant safety outcomes were collected. This was then compared to a historical database of patients treated for IDDVT with warfarin between 2011 and 2012.

Results: 103 patients treated for IDDVT with DOAC with a median age of 53 years (range 22-85), rivaroxaban was most commonly prescribed. In the DOAC era rate of venous thromboembolism (VTE) extension/recurrence was 3.9% (n=4) and rate of clinically significant bleeding was 1.0% (n=1) while on treatment. There was no statistically significant difference in safety outcomes in comparison with the warfarin era.

Conclusions: Overall rates of clinically significant bleeding were low in both DOAC and warfarin era. Our local data suggests that DOAC are a safe and effective treatment option for IDDVT with similar safety outcomes to warfarin.

Rivaroxaban and apixaban anti-Xa levels correlate poorly with degree of thrombin suppression

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Diagnostic Services

Background: Rivaroxaban and apixaban specific anti-Xa levels may not correspond to the degree of in-vivo thrombin suppression due to inter-individual variations and wide range of on-therapy drug levels. We aimed to evaluate the use of the Calibrated Automated Thrombogram (CAT) to correlate thrombin generation with rivaroxaban or apixaban anti-Xa in patients receiving therapy for venous thromboembolic events (VTE).

Method: In this ongoing prospective study, citrated platelet-poor plasma from VTE patients were collected whilst anticoagulated with rivaroxaban 20mg daily or apixaban 5mg twice-daily. CAT and drug specific anti-Xa assays were performed on collected samples.

Results: 57 rivaroxaban and 56 apixaban patients were evaluated with anti-Xa ranging from 2ng/mL to 463ng/mL for rivaroxaban, and 1ng/mL to 354ng/mL for apixaban. Rivaroxaban anti-Xa 100ng/mL represented a threshold, above which the majority (n=26, 96.3%) displayed a thrombin peak (TP) less than 50nM. However, of those with rivaroxaban anti-Xa <100ng/mL, 4 patients (13.3%) demonstrated TP<50nM (median anti-Xa 53.5ng/mL). Apixaban anti-Xa poorly correlated with thrombin generation parameters and only 57.14% (n=12) of those with apixaban anti-Xa >100ng/mL, and 54.5% (n=6) of those with anti-Xa >150ng/mL displayed TP<50nM. Of those with apixaban anti-Xa <100ng/mL, 11.4% (n=4) showed TP<50nM (median anti-Xa 44.18ng/mL).

Conclusions: Rivaroxaban and apixaban anti-Xa levels correlate poorly with thrombin peak, especially for apixaban. Low anti-Xa levels cannot reliably be equated with low risk of bleeding, due to inter-individual differences in drug metabolism and pharmacokinetics. On an individual level, thrombin generation assays may correlate more closely with suppression of thrombin generation and hence bleeding risk.

Global coagulation assays and association with increased risk of recurrent venous thromboembolism

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Diagnostic Services

Background: Current laboratory tests cannot reliably characterise prothrombotic states or predict recurrent venous thromboembolism (VTE). We aimed to evaluate the use of global coagulation assays - Calibrated Automated Thrombogram (CAT) and Overall Haemostatic Potential (OHP) during and after cessation of therapeutic anticoagulation and correlate findings with VTE recurrence.

Method: In this ongoing prospective study, citrated platelet-poor plasma from 136 VTE patients were collected whilst anticoagulated, and 4-6 weeks after cessation of anticoagulation. CAT and OHP were performed and results compared with 153 normal controls.

Results: Patients were followed up for median 20 months. Nine recurrent VTE events were recorded in those who ceased anticoagulation (n=90). Increased fibrin generation and hypofibrinolysis were observed in VTE patients in OHP during and after therapeutic anticoagulation when compared to normal controls, but did not correlate with future recurrence. Thrombin generation in those who developed recurrent VTE (n=9) displayed elevated peak thrombin (259 vs 214 nM, p=0.04) and velocity index (83.9 vs 60.3 nM/min, p=0.03) at one-month post anticoagulation cessation when compared to those without recurrence.

Conclusions: Elevated peak thrombin and velocity index post anticoagulation cessation were found to be

associated with VTE recurrence. No clear association between OHP and recurrence were found. However, study subjects displayed increased fibrin generation and hypofibrinolysis compared to normal controls, in keeping with a prothrombotic state. These interim results confirm the utility of global coagulation assays to determine a prothrombotic state in VTE patients and may be useful to determine patient groups at risk of future VTE recurrence.

Medical Emergency Team (MET) calls at Northern Hospital Epping (NHE)

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Emergency Services

Background: For more than 15 years, NHE has had a MET response. If a patient's clinical condition meets certain criteria the MET team can be called to provide rapid assessment and management.

Method: MET call data on all non-single day admitted adult patients over an approximately five year period was analysed. For the whole cohort we measured the number of MET calls, ICU admissions, hospital mortality and incidence treatment limitations being enacted. More detailed analysis including aetiology of calls was conducted for patients admitted under general surgical medical units.

Results: Whole cohort: Hospital mortality of patients having a MET call (7%) was significantly higher than the overall hospital mortality (0.99%). For patients having multiple MET calls that admission it increased to 10.76%, and 13.45% for patients having two or more MET calls in the same 24 hour period. The ICU admission rate was fairly constant over the period (approximately 5%). General medicine: Patients had a much higher rate of MET calls (per 1000 separations) than the whole cohort (190 vs 112) yet had a similar rate of ICU admission. The commonest aetiology of call was tachypnoea but hypotension was the most likely deterioration needing ICU admission. General surgery: Patients who had a MET call had a ten-fold higher mortality rate. 80% of surgical METs were in non-elective patients. 40% of MET calls were due to hypotension and hypoxia had the highest rate of ICU admission.

Conclusions: Mortality of MET call patients is significant, especially for patients having multiple calls or admitted for emergency surgery.

So many Code Blues, so few arrests, why?

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Emergency Services

Background: There is anecdotal evidence of an increased frequency of cardiac arrest (code blue) activations at the Northern Hospital. This audit aimed to examine the details of these calls as well as analyse the cardiac arrests in which advanced life support (ALS) was instituted.

Method: All "code blue non arrest" calls for adult patients collected by the medical emergency team were analysed from June 2016 – June 2020. Older code blue data prior to this was also examined. Separately all recorded cardiorespiratory arrests receiving ALS measures were analysed from June 2015 – June 2020.

Results: Code blues (non-arrested): There has been a marked increase in the incidence of code blue calls over the last 5 years. Of recent years less than 10% of these were actual cardiac arrests. The commonest aetiology was decreased conscious state. Cardiac arrests: The rate of actual cardiac arrests (approximately 1/1000 separations) is at the lower end of the rates reported in the literature and is even lower for unmonitored ward patients. The majority of arrests have non-shockable rhythms and the hospital survival is poor. Of concern nearly one third of ALS attempts were for patients with documented treatment limitations.

Conclusions: Despite a marked increase in code blue calls at the hospital there remains very few actual cardiac arrests. This may represent a culture change with an increase in staff comfort with calling for assistance early. The high prevalence of patients having resuscitative measures despite having treatment limitations highlights a need for improved documentation and communication of patient care goals.

Hospital-based interventions that reduce Ambulance Offload Delay: A rapid review of recent literature

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Emergency Services

Background: Ambulance offload delay occurs when patients arriving via ambulance cannot have their care transferred immediately to the hospital emergency department (ED), typically due to ED overcrowding. Visible consequences of ambulance offload delay include patient queueing and the use of ambulance diversion. In addition, ambulance offload delay has detrimental impacts on clinical outcomes for patients. The need for hospitals to implement interventions to prevent ambulance offload delay is critical for patient care.

Method: This study reviews recent literature which addresses hospital-based interventions targeting ambulance offload delay. Three databases were searched for recent studies related to the topic. Of the 91 articles reviewed, ten were identified as studies which investigated hospital-based interventions which impact ambulance offload delay. The review is organised by the following themes: bed management changes, bed capacity changes, ED model of care changes and ED staff role changes.

Results: Hospital-based interventions including changes to bed management strategies, ED models of care and ED staff roles can reduce ambulance offload delay and other time related patient metrics. Increasing bed capacity doesn't correlate in improvements in ambulance offload times.

Conclusions: The findings of this study can be used to support the implementation of hospital-based interventions to reduce ambulance offload delay. A number of recommendations for future research are made with respect to the topic of hospital-based inventions targeting ambulance offload delay. These include investigating the implementation of changes to hospital-wide bed management, ED models of care and ED staff roles in a variety of different ED settings.

Management of Continuous Renal Replacement Therapy in the Intensive Care Unit: a review post-introduction of citrate anticoagulation therapy

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Emergency Services

Background: Citrate anticoagulation was introduced as an alternative method of anticoagulation for Continuous Renal Replacement Therapy (CRRT) in August 2019. The aim of citrate anticoagulation was to improve the life of the filter cartridges to increase the efficiency and the treatment delivered to the patients. After the introduction of a new system, an analysis of the treatment modality is required to ensure the treatment is performing to an appropriate standard.

Method: Epidemiological data collected from hospital records combined with data collected directly from the filters by the TrueVue Analytics software were analysed and compared to data from 2018-19.

Results: Citrate anticoagulation was used in 45% of filters. Filter life for citrate filters was 25 hours, heparin filters were 21 hours and those run without any anticoagulation was 14 hours. Heparin filter life increased by two hours and no anticoagulation by one hour. The average filter life increased from 17 hours to 22 hours. Treatment time lost decreased to 22% from 27%, however the number of access alarms increased by 1.1 to 5.0 per treatment day. The number of filters that were ceased due to clotting decreased by 11% to 5%. Mortality rate of patients receiving CRRT was 43.83%.

Conclusions: An increase in average filter life hours and a reduction in filters retiring due to clotting indicates that the implementation of citrate anticoagulation potentially improved the quality of haemofiltration received by patients in the Intensive care unit. Further analysis of mortality data is required.

Epidemiology of patients receiving Continuous Renal Replacement Therapy in the Intensive Care Unit: a comparison between 2018-19 and 2019-20

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Emergency Services

Background: Continuous Renal Replacement Therapy (CRRT) is used to manage critically ill patients in the Intensive Care Unit (ICU) environment. Patients requiring CRRT generally have a higher mortality rate and can require this treatment for a number of conditions. The epidemiology of these patients were investigated.

Method: A retrospective analysis of 150 ICU patients admitted from July 2018 – June 2019 and August 2019 – July 2020 who received CRRT by two different methods of anticoagulation (Heparin vs Citrate, respectively) was completed, using data sourced from the ANZICS APACHE database and patient records.

Results: 2018-19 saw 4.91% of admitted patients requiring CRRT, compared with 5.71% in 2019-20. In 2018-19 mortality of patients in the ICU was 9.0%, with patients who received CRRT having a mortality of 55.84%. In 2019-20 it was 10.09% and 43.83% respectively. Across both years males received more CRRT treatment than females at 59.74% and 61.64%. Ages in the population ranged from 29-88 years in 2018-19 and 22-88 years. In 2018-19 38.96% of patients had sepsis as their discharge summary diagnosis whilst in 2019-20 26.03%.

Conclusions: CRRT is a valuable resource that ICUs provide to critically ill patients. Regular review of the data provides insight into the performance of ICUs and provides points for future discussion and learning opportunities. Whilst CRRT does not only account for the decrease in mortality rates in this ICU's CRRT patient population, it is worth noting and may warrant further investigation and monitoring.

Factors in Antibiotic Administration Delay in Sepsis

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Medicine

Background: Sepsis is a life-threatening syndrome, and delayed antibiotic administration (≥1 hour) is associated with increased mortality. We aimed to determine which patient, sepsis recognition, clinical practice, communication, and organisational factors are associated with delayed antibiotic administration for sepsis in adult patients across Northern Health.

Method: This was a retrospective cohort study using a prospectively compiled sepsis database of 156 adult patients treated for sepsis with antibiotics between 01/10/2017 and 30/6/2019 at Northern Health, a metropolitan teaching health service with a sepsis response program in Melbourne, Australia. Time to antibiotic administration was time from Medical Emergency Team (MET) call criteria to first antibiotic dose. Fisher's exact test and multivariable binary logistic regression were used.

Results: Median time to antibiotics was 60 minutes. Patient age of >75 years ($p=0.04$), lower acuity ED triage category ($p<0.01$), absence of fever 24 hours prior to antibiotic administration ($p<0.05$), waiting for investigation results before administering antibiotics ($p<0.01$), initially charting antibiotics in the regular medicines section ($p<0.05$), and having multiple teams involved in patient care ($p<0.01$) were associated with delayed antibiotic administration. Absence of fever (OR

2.48, 95%CI 1.25-4.94) and prescribing antibiotics in the regular medicines section (OR 3.39, 95%CI 1.45-7.96) were associated with delay to antibiotic administration in the multivariable binary logistic regression model.

Conclusions: There are multiple obstacles to time to first antibiotic dose in sepsis. Greater education regarding afebrile sepsis and best practice prescribing skills may be beneficial in improving outcomes for patients with sepsis.

Supplemental Oxygen Point Prevalence

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Medicine

Background: Supplemental oxygen is one of the most frequently used therapies applied to hospitalised patients. Previous audits of oxygen use and oxygen prescription have shown inconsistency with guideline recommendations. We measured the point prevalence of oxygen therapy and compared the adherence to local and international guidelines.

Method: A cross-sectional, observational study was conducted on 6 January 2020. All medical and surgical inpatients at Northern Hospital underwent a measure of pulse oximetry with documentation of their current supplemental oxygen therapy and mode of delivery.

Results: A total of n=271 patients were studied (n=186 medical, n=85 surgical). Supplemental oxygen was delivered to n=23 (8.5%) overall. Based on bedside SpO_2 measures, 86.3% of current inpatients had appropriate oxygen saturations according to the national oxygen guideline recommendations, however concordance with international recommendations was lower (86.3% vs 75.3%, p=0.002). Discordance with guidelines was mostly due to the measured SpO_2 being lower than target SpO_2 recommended, rather than excessive delivery of supplemental oxygen. Relatively few inpatients receiving supplemental oxygen had risk factors for hypercapnic respiratory failure (n=11), however, 36.4% (n=4) had SpO_2 values above target ranges using either guideline recommendation.

Conclusions: The point prevalence of supplemental oxygen use was low among medical and surgical inpatients at Northern Hospital. Adherence with national guideline recommendations was better than international guidelines, however underutilisation of supplemental oxygen appeared more frequent than over-utilisation.

Associations between patient characteristics and late referrals to palliative care

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Medicine

Background: Despite robust evidence of benefits of early palliative care involvement in advanced life-limiting illnesses, referrals still occur late. Whilst barriers to referrals are well-documented, specific associations between patient characteristics and late referrals remain largely unknown.

Method: In this single-centre retrospective cohort study, we aimed to explore associations between patient characteristics and late palliative care referrals. Retrospective data was collected from the Palliative Care Outcomes Collaboration (PCOC) database and Northern Health medical records from 2014 to 2018. Consecutive patients who were referred "late" (death ≤ 3 days of referral) were compared to a random sample of patients who were referred "early" (i.e. discharged or died > 3 days from referral).

Results: 651 patients who received late referrals were compared to 390 patients with early referrals. We observed an overall decline in rate of late referrals. Independent predictors for late referrals on multivariable analysis were: 1) younger age (p = 0.03), 2) male gender (p = 0.02), 3) non-cancer diagnoses (p = 0.04), 4) admission goals of care C/D (p <0.01) and 5) PCOC Phase ≥ 3, lower Australian-modified Karnofsky Performance Scale and higher Resource Utilisation Groups - Activities of Daily Living scores (all p <0.01).

Conclusions: The rate of late referrals to palliative care declined between 2014 and 2018. Younger age, male gender, non-cancer diagnoses, less aggressive goals of care and poorer functional status were independently associated with late referrals. Future research should aim to further explore these associations and use this knowledge to improve timeliness of palliative care involvement.

Diagnosing Dying: Perceptions among junior doctors in training

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Medicine

Background: Recognition of dying is an essential first step for providing quality end-of-life care. Junior doctors are often central to the diagnosis and management of dying in hospitals. This research explored junior doctors' perceptions of facilitators and barriers to diagnosing and managing dying in hospital patients.

Method: Exploratory mixed methods study. Doctors in training across two metropolitan Melbourne health services completed an anonymous online survey. Descriptive statistics was used to analyse quantitative data. Qualitative description was used for analysis of free text responses.

Results: Ninety-six surveys were completed by interns, residents and registrars. Findings showed that 67% of participants were somewhat confident, and 21% were very confident, in diagnosing dying. Confidence increased with experience. Interns relied most on clinical role modelling (86%) and registrars relied on personal experience (53%) for their learning. Diagnosis of dying and re-direction of treatment goals was reported to be largely the

responsibility of registrars (67%) and consultants (30%). Thematic analysis of free text responses is described under five themes: (i) Clinical experience and bedside learning; (ii) Formal education; (iii) Systems and culture; (iv) Disagreement; and (v) Emotional impacts on patient, family and clinician.

Conclusions: Findings from this study build upon existing evidence by identifying how junior doctors in the Australian hospital setting learn to diagnose and manage dying. Bedside experience and training, together with hospital systems and culture are important factors. This understanding is important for education of junior medical staff in order to optimise end-of-life care for hospitalised patients.

Early removal of index COVID-19 positive resident in residential aged care – a recipe for success?

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Medicine

Background: COVID-19 has disproportionately affected the frail elderly population in residential aged care facilities (RACF). It is speculated that removing the index COVID-19 positive resident at the onset of a RACF outbreak may reduce the risk of other residents being subsequently infected. We examined our data sets to evaluate if such an approach is likely to reduce the risk of infection.

Method: Data was collated from four separate RACF (A,B,C,D) outbreaks attended by the Northern Health Residential In-reach (RIR) service during July and August 2020. We observed the daily cumulative increase in case numbers (as defined by positive SARS-CoV2 PCR swab) for each RACF after the index case was identified.

Results: At the time of index case identification in each facility, there were already a significant number of incubating or infected residents. These were subsequently detected within the average COVID-19 incubation period of 5-7 days. The proportion of total residents positive in each facility seven days after index case identification were respectively 15%, 29%, 38%, and 70%. At day 14 the corresponding percentages were 34%, 31%, 68%, and 78%.

Conclusions: Extraction of the index case alone is unlikely to be effective at reducing the risk to other residents of becoming infected. Our data demonstrates that there are always other residents incubating disease at time of index case identification.

Frequency of Bronchodilator Response in those with Normal Baseline Spirometry

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Medicine

Background: Spirometry can be used to identify airflow obstruction and, when combined with bronchodilator responsiveness testing, can identify whether airflow obstruction is reversible. Few studies have identified how often a significant bronchodilator response is identified in those with normal baseline spirometry. This study aims to describe the frequency of a significant bronchodilator response in those with normal baseline spirometry in an Australian population.

Method: A retrospective analysis was conducted using spirometry data obtained over a five-year period. Only spirometry meeting the acceptability and repeatability criteria was included. Normal spirometry values were defined according to the Global Lung Initiative (GLI) 2012 predicted values and the frequency of a significant response to bronchodilator was examined along with other demographic attributes.

Results: There were n=4827 test occasions where spirometry results were within normal limits and the subject subsequently performed bronchodilator responsiveness testing. The median age of those undergoing testing was 59.0 years [IQR, 44.5-71.0] with 58.5% female and 85% Caucasian. Of these, n=201 (4.2%) had a significant response to bronchodilator. There were no demographic differences between those that responded to bronchodilator and those that did not, although patients >59.0 years were more likely to have a significant response to bronchodilator.

Conclusions: A significant bronchodilator response was observed in over 4% of those with normal baseline spirometry. The clinical significance of this finding is uncertain, however, these results indicate that even in those with normal baseline spirometry, bronchodilator responsiveness testing may be useful in identifying a significant bronchodilator response.

Role of delirium screening tool in Fractured Neck Of Femur pathway for geriatric patients

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Medicine

Background: This study compares the completion rate of 4AT (a clinical tool for screening cognitive impairment and delirium) before and after its incorporation into the new Fractured Neck Of Femur (#NOF) pathway and evaluates factors influencing its completion.

Method: A retrospective study was carried out on 267 orthogeriatric patients with fractured NOF. Comparison was made in the completion rate of 4AT before (pre-cohort: 01/09/2019 - 01/01/2020) and after (post-cohort: 01/03/2020 - 01/07/2020) the implementation of the NOF pathway. Patients who were admitted to the Northern Hospital (acute) for treatment of their NOF and patients who were transferred to subacute wards for rehabilitation post-surgery were evaluated.

Results: The 4AT was completed for 44% of patients in the pre-cohort, and in 64% of the post-cohort after implementation NOF pathway. This improvement was evident in both acute (41% to 69%) and subacute (from 49% to 57%) patients. We observed an improvement in completion rates of the 4AT in patients from culturally

and linguistically diverse backgrounds (41% to 72%), along with improved weekend completion rates. A higher proportion of 4AT were completed within eight hours in the post-implementation cohort (23% to 42%).

Conclusions: This study suggests that screening for delirium can be improved by the inclusion of the 4AT in clinical pathways for NOF.

Medication prescribing errors in the Cardiology department in a tertiary hospital: their incidence and clinical significance

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Medicine

Background: Medical errors occur commonly among hospitalized patients, with adverse events occurring in an estimated 3.7% to 16.6% of hospital admissions.

Method: We conducted a prospective observational study of all inpatients under the Cardiology teams of general cardiology and heart failure for a period of 30 days. Information was collected on a standard data form every day from the medication chart, pharmacist review chart and the hospital database

Results: There were total of 443 patient episodes in the 30-day period with 32 medication errors. In this cohort of patients, all patients had polypharmacy. The types of errors included medication not charted (n=12), frequency missing (n=12), overdose (n=3), under dose (n=2), duplicate therapies, wrong drug or dose (n=1). The most common medications omitted were inhalers and anti-hypertensives. Of these medication errors, there were 44% potentially serious, 38% potentially significant and 19% insignificant errors. There were no significant complications requiring further intervention from the medication errors for the 30 day period.

Conclusions: Medication safety in the acute care setting continues to be a significant challenge especially in Cardiology patients where polypharmacy is prevalent. Understanding where medication errors occur and the contributing factors can assist in the development of strategies to improve medication safety with coordinated efforts from government, health services and health professionals.

Patient outcomes post medical emergency team calls and user compliance of track and trigger based observation and response chart in cardiology patients

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Medicine

Background: Early recognition of clinical deterioration has been associated with a lower level of intervention and reduced adverse events. A widely used approach in Australia is the Medical Emergency Team (MET) system.

Method: We conducted a prospective observational study of all inpatients, using the observation charts and the hospital database under the general cardiology and heart failure teams for 30 days.

Results: There were 23 MET calls for total of 443 patient episodes for the indications as per the hospital policy. There were 20 episodes where there were appropriate modifications in place hence MET was not called. There was only one episode where MET call and four episodes where preMET call was inappropriately not called. Of the patients (n=27) who had met the MET call criteria, 63% were admitted under the heart failure team. 22% of the patients who met the MET call criteria required a procedure/device insertion, 15% required ICU admission and 15% died. There average length of stay was 6.41 days.

Conclusions: The higher MET call rate in heart failure vs general cardiology patients is expected. This reflects the difference in patient population and their co-morbidities. Most patients requiring activation of MET system were critically ill and needed emergency treatment or procedure highlighting importance of this system. Continued exploration of workplace issues influencing the recognition and responses to unmet needs of a deteriorating patient in cardiology ward is recommended.

Assessment of healthcare workers' mental health during COVID-19 at a large tertiary hospital

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Medicine

Background: Healthcare workers are at the forefront of the fight against COVID-19 and face enormous physical and psychological pressure. This study aims to assess the psychological distress of healthcare workers at a large Melbourne tertiary hospital at the centre of the pandemic to inform authorities on how to best support workers through this and future health crises. This will be a longitudinal assessment conducted at pre-determined points throughout the COVID-19 pandemic.

Method: The study uses a mixed-methodology research design using the validated Kessler Psychological Distress tool (K10) and a short questionnaire which is distributed electronically to all employees at Northern Health every six weeks. The study is ongoing at time of submission.

Results: We present preliminary data from the first survey. Participants included 285 respondents across medical, nursing, allied health, administration, and support departments from The Northern Hospital. 28% (81/285) reported high or very-high levels of psychological distress in the preceding four weeks as assessed by the K10 tool. Healthcare workers identified numerous stressors, which included feeling undervalued, inadequate communication, uncertainty, fatigue and non-work COVID related stressors. Acknowledgement of staff dissatisfaction, increased staffing support, and allowing working from home were suggestions of supports for workers.

Conclusions: There is a high level of psychological distress in healthcare workers at the centre of the COVID-19 pandemic response. Healthcare workers identified several stressors and ways of supporting workers at both the individual and system levels.

How do health consumers find, interpret and apply health information during a pandemic?

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Background: The coronavirus pandemic (COVID-19) has required individuals to find and apply health and behaviour information rapidly. There are many and varied sources of information, with differing levels of complexity and trustworthiness associated with this information. This project aims to understand how patients attending Northern Health, specifically those who have frequent ED presentations and admissions, are accessing, interpreting and applying information during COVID-19, and how this impacts on their decision making about managing their health.

Method: Interviews using a series of categorical and open ended questions. We conducted a thematic analysis of the interview data providing an overview of key challenges for patients in understanding and using information to manage their health during the COVID-19 pandemic. Medical histories of participants were audited to determine pre- and post- COVID-19 rates for hospital presentations, rates of unplanned hospitalisations.

Results: 201 patients participated (mean 66yrs, range 22 – 98). 115 interviews were conducted in a language other than English. Source, interpretation and application of information differs across age and population groups. Participants sourced information from two or more places (n=140, 70%), the most common was television (n=145) followed by internet (n=92 total, 62 from social media sources). Speaking a language other than English was associated with lower knowledge about preventative strategies and restriction requirements. There were themes of fear and misinformation leading to avoidance of hospital care, corresponding with a significant reduction in hospital use by this population pre- versus during the pandemic.

Conclusions: Age and language influences how information is sources and how it is interpreted and applied. Misinformation and fear appear to have impacted on hospital use during the pandemic.

Development of a care model for early supported discharge of patients with lower limb ulcerations: a co-design study

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Medicine

Background: Foot disease, including ulcers, infection, and lower limb ischaemia is a leading cause of hospitalisation, accounting for approximately 5% of hospitalisations. This project aimed to identify an optimal model of care of early supported discharge for individuals hospitalised with lower extremity conditions.

Method: A two phase, sequential exploratory design was employed. Phase one involved focus groups to identify components of an optimal model for early discharge home. Thematic analyses was conducted independently identifying components for an optimal model. A third investigator was consulted for consensus on components for inclusion. Phase two was a modified Delphi survey conducted with staff and patients with the aim of seeking input on additional components of a model were not raised in the focus groups, and prioritising the list of components for inclusion.

Results: 21 staff and two patients participated in the three focus groups. 21 people participated in round one and two of the Delphi. 19 inpatient components (care prior to discharge) and 17 outpatient components (care following discharge) were identified. The top highest rated inpatient component was consistency in medical teams during an inpatient stay while the top highest rated outpatient component was a dedicated multidisciplinary foot unit with a coordinator role.

Conclusions: Decisions for developing new models of healthcare are rarely made in a systematic or methodologically robust way. This study describes a method for co-designing and reaching consensus on an optimal model of early supported discharge for lower extremity ulceration. This research has the potential to make a significant contribution to the sustainability of our health system.

Aeroallergen Skin Prick Test patterns in suspected allergic patients in Northern Melbourne

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Medicine, Diagnostic Services

Background: Geographic and climate differences have been shown to affect patterns of allergic sensitisation. Recognising sensitisation patterns may guide the testing, identification and treatment of allergies. We sought to describe the aeroallergen sensitivity patterns for people with suspected allergic disease in Northern Melbourne and the relationship with age, gender and birth location.

Method: A retrospective analysis of the Northern Health Respiratory Function Laboratory reporting database was conducted. Those referred for skin prick testing (SPT) with a standard panel of aeroallergens between February 2018 and January 2020 were included. Sensitisation patterns were evaluated and the relationships between sensitisation patterns and gender, age and birth location.

Results: Over the 24-month period there were n=821 SPT tests with adequate response to control reagents. Those tested had a mean age of 46.3 (SD, 17.7) years, 64.8% were female and 67.6% of adequate tests showed a positive response for at least one aeroallergen. Most common identified allergens among atopic subjects were:

House dust mite (D. pteronyssinus) (70.1%), 7 Grass Mix (61.3%) and Rye Grass (44.1%). Acknowledging that mixed allergens were used, of the atopic subjects 25.4% were mono-sensitised, 24.7% were oligo-sensitised (2-3allergens), and 49.9% were poly-sensitised (≥4allergens). Factors associated with reduced frequency of sensitivity include increasing age and location of birth (particularly European born).

Conclusions: Half of atopic people referred for SPT at Northern Health were poly-sensitised and high rates of sensitisation to house dust mite and grass pollens were demonstrated. Improving the understanding regional sensitisation patterns may assist clinicians with allergy management strategies including avoidance and desensitisation.

Safety and effectiveness of low calorie diet for dialysis patients: a pilot interventional study

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Medicine, Other – Allied Health

Background: Low calorie diets (LCDs) including meal replacement products achieve significant weight loss results, however there is limited evidence examining safety with dialysis patients or effect on body composition. Our aim was to observe the safety of a LCD and its effectiveness in achieving weight loss and body composition change in dialysis patients requiring weight loss for kidney transplant eligibility.

Method: Prospective, pilot, open-label study of five participants prescribed a 12 week LCD incorporating three meal replacement products, 100g lean meat, 2 cups low-potassium, low-starch vegetables and 5mL oil daily (3.6MJ, 90g protein). Measures of safety (blood pressure, dialysis parameters, biochemistry, and medications) and effectiveness (dry weight after adjustment for over-hydration, fat mass and lean tissue mass with Fresenius Medical Care Body Composition Monitor) were monitored.

Results: Six participants were recruited, one self-withdrew, five completed the trial (mean 56 years [range 49 - 61 years], four male one female, mean BMI 40kg/m2 [30.6 - 47.9kg/m2]). Two required hospital admissions (fluid overload and atrial fibrillation) and three experienced hyperkalaemia (K+ 6.0 - 6.6mmol/L) but medical assessment deemed unrelated to prescribed diet. All achieved a reduction in dry weight [mean -4.5% (-2.0 to -9.3%)]. Change in fat mass [mean +1.2% (-14% to +21.1%)] and lean tissue mass [mean -8.8% (-29% to +2.9%)] varied. Dietary adherence varied between participants but related to greater fat and lower lean tissue loss.

Conclusions: Despite variable adherence, LCD appeared safe in dialysis patients. Further research is required to optimise LCD models, adherence and body composition outcomes.

Effect of metabolic syndrome on clinical and health service outcomes for people with osteoarthritis

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Sub-Acute Services

Background: Metabolic syndrome is the name for a group of risk factors that commonly occur together to raise the risk of heart disease and diabetes. Prevalence of metabolic syndrome is doubled for people with osteoarthritis, but we do not understand the impact of metabolic syndrome on outcomes in this population. This research aimed to determine whether having metabolic syndrome adversely effects patient and health service outcomes for people with osteoarthritis.

Method: Retrospective, cohort study of adults (n = 229, mean age 71±8 years) with osteoarthritis who attended the PRIME clinic prior to lower limb arthroplasty between 2010 and 2016. Presence of metabolic syndrome was determined from hospital records. Outcomes were compared for people with and without metabolic syndrome. Between group differences were calculated using the Kruskal-Wallis tests for non-normally distributed data. Risk ratios (RR) and 95% confidence intervals (CI) were used for dichotomous data.

Results: Participants with metabolic syndrome were more likely to have: 1) an adverse event during rehabilitation (RR 1.25, 95%CI 0.94 to 1.66); and 2) a potentially avoidable emergency department presentation in the two years following arthroplasty (RR 1.63, 95%CI 0.96 to 2.79). They also had more adverse events during their acute admission. There were no differences between groups for length of stay, discharge destination or number of readmissions.

Conclusions: The presence of metabolic syndrome may be associated with poorer outcomes for people with osteoarthritis. Further research is required to determine whether inventions to better address metabolic syndrome preoperatively may improve the patient experience following surgery.

The effects of coronavirus lockdown on Plastic Surgery emergencies – choice of anaesthesia and injury patterns

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Surgical Services

Background: Coronavirus-19 has had significant impact upon all health services, with anaesthesia guidelines revised to reduce the risk arising from aerosol generating procedures such as general anaesthesia. Clinicians have been compelled to alter their practice in order to reduce risk to health care workers and patients, whilst maintaining or increasing efficiency of theatre. This study aims to determine if changes in anaesthesia guidelines had impacted upon choice of anaesthesia in plastic surgery emergencies.

Method: A retrospective analysis of plastic surgery trauma and emergency patients presenting to our health service from 15 January to 14 May 2019 and 16 January to 14 May 2020 was performed, representing 60 days either side of lockdown measures. Data collected included region of body injured, structures involved requiring surgical intervention such as soft tissue, bone, artery, nerve and tendons, and choice of anaesthesia.

Results: 307 patients presented prior to lockdown and 307 presented after in 2019, with 307 and 287 patients presented in 2020 respectively. There were no statistically significant differences between region of body injured and structures involved when comparing 2019 to 2020 periods, and periods prior to and after coronavirus lockdown. There was a statistically significant reduction in proportion of general anaesthesia use after guidelines were revised.

Conclusions: There was a clear trend in de-escalation of anaesthetic modality in comparable cohorts of patients in terms of case load and pathology. It also suggests a potential for greater use of local anaesthetic or sedation combined with local anaesthesia in this cohort of cases.

The effects of coronavirus lockdown on Plastic and Reconstructive Surgery unit trauma workload

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Surgical Services

Background: Coronavirus-19 has had significant impact upon all health services. On 16 March 2020 the state of Victoria developed policies to reduce the risk of coronavirus transmission, such as banning congregations. This study aimed to determine if these measures have changed the presentation patterns in traumatic injuries and other emergencies for operative management at a single health service.

Method: A retrospective analysis of plastic surgery emergencies presenting to our health service from 15 January to 14 May in 2019 and 16 January to 14 May 2020 was performed, representing 60 days either side of lockdown measures.

Results: 307 patients presented prior to lockdown and 307 presented after in 2019, with 307 and 287 patients presenting in 2020 respectively. Prior to lockdown in 2020 and corresponding period in 2019, patients presented with similar age distribution, location of injury and region of injury, although less patients were injured with power tools and more injured by crush injury in 2020. When comparing after lockdown in 2020 and corresponding period in 2019, there was an increase in power tool related injuries and crush injuries, with corresponding decrease in sporting injuries. More injures occurred at work, however region of injury did not have a statistically significant change.

Conclusions: Although similar number of traumas cases requiring operative management presented in 2019 and 2020 periods either side of lockdown, the mechanism of injury, location and region of injury did show differing trends, which can be used for future risk education and resource allocation.

Role of pre-operative Very Low-Calorie Diet in obese general surgery patients

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Surgical Services

Background: Very Low-Calorie Diet (VLCD) is regarded as an effective short-term weight loss strategy for adults with obesity, and has been shown to increase weight loss and reduce surgery-related complications when used in conjunction with bariatric surgery. What remains unclear is how a VLCD program may affect similar parameters in obese patients undergoing non-bariatric general surgery. This study aimed to investigate whether a pre-operative VLCD program in this group of patients increased weight loss and reduced length of stay and post-operative complications, compared to generic weight loss advice.

Method: Body Mass Index (BMI) was measured for all participants at both their pre-operative booking appointment and on the day of surgery. Participants in the intervention group undertook a VLCD program in the 14 days preceding their operation. Participants in the control group received only generic weight loss advice at their pre-operative booking appointment.

Results: 16 participants were recruited. The mean (+/- standard deviation) weight change was +0.19 kg (1.7) in the control group compared to -2.8 kg (5.3) in the VLCD group ($P = 0.13$). Statistically significant differences were not identified between the groups for other outcome measures.

Conclusions: While not statistically significant, this study has identified that a pre-operative VLCD program may increase weight loss in obese patients undergoing elective major general surgery, compared to general weight loss advice.

Sodium glucose cotransporter 2 (SGLT2) inhibitors: risks in the perioperative period

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Surgical Services

Background: Safety of current recommended guidelines the cessation of sodium cotransporter 2 inhibitors before endoscopy is not known.

Method: Cohort study observing diabetic patients undergoing endoscopy comparing those on sodium glucose cotransporter 2 inhibitors and those on other oral hypoglycaemic agents. The primary outcome was rates of hyperglycaemia in the perioperative period. The secondary outcome was elevated ketone levels used as a surrogate marker for diabetic ketoacidosis.

Results: A total of 163 patients were observed over a 6-week period. Pre-operatively, the primary outcome of hyperglycaemia (>14.0mmol/L) was observed in 8 (4.9%) patients in the control group compared to 1 (2.9%; p= 1.0) in the sodium glucose cotransporter 2 inhibitor group. The secondary key outcome was blood ketone measurements and were elevated (>0.6mmol/L) in 4 (14.8%) patients in the sodium glucose cotransporter 2 inhibitor group compared to 4 (25.0%; p= 0.443) in the control group. Postoperatively, the primary outcome of hyperglycaemia was observed in 1 (2.9%) patient in the sodium glucose cotransporter 2 inhibitor group compared to 4 (3.5%, p= 1.0) in the control group. Postoperatively, blood ketones were elevated (>0.6mmol/L) for 3 (10.7%) of the patients on sodium glucose cotransporter 2 inhibitors compared to 3 (50.0%; p= 0.05) of patients not taking a sodium glucose cotransporter 2 inhibitor. No significant difference was observed between the two groups.

Conclusions: Patients with diabetes mellitus undergoing elective endoscopy who were taking sodium glucose cotransporter 2 inhibitors did not experience higher rates of hyperglycaemia or elevated ketones in the perioperative period.

Theatre efficiency 2020: evaluation and improvement of time efficiency in operating theatres

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Surgical Services

Background: Operating theatre efficiency is of critical importance to patients, hospitals and the healthcare system. Performance is conventionally tracked by staff who are involved in patient care, which is of unknown accuracy. This research uses independent observation to quantify efficiency in recognised metrics and identify delays.

Method: Observational data were collected at the Northern Hospital. A theatre was selected by the observer, who collected time and context data for sequential procedures. Hospital records supplied matching data for the observed cases. Duration of steps and metrics of efficiency were compared using non-parametric pairwise tests to identify differences in the mean.

Results: 139 procedures in 36 lists over seven weeks were observed. 14 cases (10.3%) were cancelled on the day of surgery. Mean list utilisation rate was 74.1% (IQR 12.0) and average changeover was 20.5 minutes (IQR 7.0), with no difference between specialties (p=0.15, p=0.53). Mean procedure utilisation rate was 74.4% (IQR 19.4) and mean overrun was 22.1 minutes (IQR 36.2). Hospital data showed higher efficiency than was observed, giving a mean procedure UR of 87.1% (p<0.01) and changeover of 30.0 minutes (p<0.01). Of lists 56% started late, 32.0% of which due to late staff, and 60% of procedures experienced an intraoperative delay, 39.0% due to replacing equipment.

Conclusions: Utilisation at the Northern Hospital is comparable to other public hospitals in state audit. Changeover and overrun compare favourably, while cancellation was much higher than average. The difference between staff and observer results suggests that greater accuracy in reported times can be achieved.

Sodium-glucose cotransporter-2 inhibitors and perioperative diabetes: Management and glycaemic control in elective surgery

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Surgical Services

Background: Sodium-glucose cotransporter-2 inhibitors (SGLT2i) have become a perioperative management issue due to their rare but critical risk of diabetic ketoacidosis (DKA). There is increased risk of DKA if SGLT2i are not ceased in a timely manner prior to surgery. However, there is also the risk of poor glycaemic control with any perioperative change to diabetic medications. The aim of this study is to determine if SGLT2i cessation prior to elective surgery is associated with (i) increased incidence of perioperative hyperglycaemia compared to patients treated with other antihyperglycaemics and (ii) reduced incidence of ketosis (marker of SGLT2i-associated DKA).

Method: This prospective, observational study included all adult patients with diabetes mellitus undergoing elective surgery over seven weeks (n = 146). Patient details, perioperative diabetes management and surgical outcomes were collected on day of surgery.

Results: 33/146 (22.6%) were on SGLT2i. 113/146 (77.4%) were on at least one non-SGLT2i antihyperglycaemic agent. There was no difference in hyperglycaemia incidence between patients on SGLT2i compared to non-SGLT2i patients pre-operatively (p = 0.16) and post-operatively (p = 0.21). There was no association between SGLT2i cessation timeframes (0–24 hours, 24–48 hours and ≥72 hours) and incidence of ketosis pre-operatively (p = 0.11) and post-operatively (p = 0.22).

Conclusions: Perioperative SGLT2i use and management was not associated with increased hyperglycaemia or reduced ketonaemia incidence before or after elective surgery. This information contributes to the growing body of evidence essential to guide safe SGLT2i use, providing data supporting a nuanced approach for perioperative SGLT2i management.

Retrospective evaluation of preoperative anaemia management at a Melbourne metropolitan hospital

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Surgical Services

Background: There is a strong evidence base supporting the implementation of patient blood management systems. The patient blood management practices at Northern Health are currently under review. This study evaluates the prevalence of anaemia in the Northern

Health surgical cohort and determines the current blood management practices of each surgical unit to create recommendations for a hospital wide implementation strategy.

Method: Preadmission and perioperative data was collected for adults undergoing elective major surgery patients from Orthopaedics, Gynaecology, Urology, Colorectal, and Hepatobiliary units between April 2018 and March 2019. Data was analysed using Shapiro-Wilk, Kruskall-Wallace, and Fischer's exact tests.

Results: A total of 697 patients files were analysed. 14.2% of patients were anaemic at preadmission clinic with 37% of these attributable to iron deficiency. Anaemic patients had a higher rate of transfusion ($p<0.05$), length of stay ($p<0.05$) and complications ($p<0.05$) when compared to non-anaemic patients. The Orthopaedic unit were the best performing in key areas of patient blood management. The Orthopaedic unit successfully treated 44% of patients with anaemia, which was more than Urology (33%; $p<0.05$), Colorectal (25%; $p<0.05$), and Hepatobiliary (0%; $p<0.05$).

Conclusions: The Orthopaedic unit have the most effective method for treating preoperative anaemia. We recommend that a hospital wide patient blood management system be implemented within Northern Health and be based on the current Orthopaedic model.

Impact of Metabolic Syndrome on the Perioperative Outcomes of Emergency Surgical Patients

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Surgical Services

Background: Metabolic Syndrome (MetS) is a constellation of cardiovascular risk factors including central obesity, hypertension, hyperglycaemia, hypertriglyceridaemia and hypo-HDL-cholesterolaemia. Greater prevalence of MetS is reported in various surgical populations and have been significantly associated with perioperative complications. Therefore, this study aims to evaluate the impact of MetS and its individual components on the perioperative outcomes and the use of hospital resources in emergency general surgical (EGS) patients.

Method: This prospective observational study included 230 inpatients who underwent 13 EGS procedures between March 2019 to March 2020 at The Northern Hospital. The 30-day perioperative outcomes and their severity were recorded using the Clavien-Dindo (CD) classification system. Univariate and multivariate analyses were performed using the chi-square and binary logistic regression models.

Results: Ninety patients in this study had Mets (39.1%). They were more likely to be older than 60 years ($P<0.01$), male ($P<0.01$) and American Society of Anaesthesiologist grade3 ($P<0.01$). MetS was associated with higher incidence of overall complications (CD I-IV; $P=0.03$) and longer duration of hospitalisation ($P<0.01$). There was an additive effect of the number of MetS components on the risk of postoperative complications (1: OR1.84, $P=0.24$; 4: OR5.84, $P<0.01$). On multivariate analysis, MetS ($P=0.03$), hyperglycaemia ($P=0.02$) and uncontrolled hypertriglyceridaemia ($P=0.024$) were significantly associated with major complications (CD III-IV; $P<0.01$).

Conclusions: MetS and its individual components demonstrated a significantly greater risk of postoperative complications and increased use of hospital resources in the EGS patients. These findings may guide the risk-stratification and optimisation of the perioperative management in these patient group.

The Cost-effectiveness of Interventions for Superficial Venous Insufficiency: A Systematic Review

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Surgical Services

Background: Superficial venous insufficiency (SVI) is extremely common and causes significant detriments to patients' health and quality of life. Intervention is effective in treating the symptoms and preventing disease progression. However, this can be associated with significant costs to health services. Cost-effectiveness evidence can help inform treatment modality choices and health resource allocation. This study assesses the existing evidence on the cost-effectiveness of interventions for SVI.

Method: A systematic review of published economic evaluation and modelling studies was performed using strict eligibility criteria and the PRISMA guidelines. Quality appraisal and data tabulation were performed using predetermined forms. Data were synthesised by narrative review.

Results: Fifteen studies met the inclusion criteria, including seven model-based and eight economic evaluations conducted alongside clinical trials. Current cost-effectiveness data is mainly based on monetary value and clinician-reported outcomes. Surgery and endovenous interventions, including endovenous laser ablation (EVLA), radio-frequency ablation (RFA), and ultrasound guided foam sclerotherapy (UGFS), were all more cost-effective than non-operative management. Five studies found endovenous interventions were more cost-effective compared to surgery. Studies were heterogeneous in regard to whether a specific intervention was most cost-effective.

Conclusions: Intervention for SVI is cost effective, regardless of the treatment modality chosen. An endovenous approach may be favoured where local practices allow. Further research is needed on how patient-reported outcomes can be incorporated in cost-effectiveness evaluation.

Non-operative management of cholecystitis and biliary colic

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Surgical Services

Background: At Northern Health, non-operative management of cholecystitis and biliary colic has been increasing over the last several years. Percutaneous cholecystostomy is an alternative management strategy emerging in this field. This audit aims to quantify patient factors and outcomes of these non-operative admissions.

Method: This is a retrospective analysis of all patients discharged from Northern Health between January 2013 – March 2017 with a diagnosis of biliary colic or cholecystitis, who did not undergo cholecystectomy during index admission. The electronic medical records of selected patients were reviewed through the Northern Health Clinical Patient Folder system. Demographic data, clinical/laboratory findings, imaging, complications, readmissions, operation rates and mortality data were collected.

Results: 633 patients were identified for inclusion. The average age was 54.3 (±22.1) years with 412 females (65.1%). 121 patients (19.1%) were readmitted through the Emergency Department, with 85 recurrent patients (70.2%) presenting within 90 days of index admission. 65 patients (10.3%) were readmitted for emergency cholecystectomy. Percutaneous cholecystostomy was performed in 31 patients (4.9%), with an average age of 76.3 (±9.9) years, which was 23.2 years older than those managed conservatively ($p<0.001$). 14 cholecystostomy patients (45.2%) had complications requiring procedural intervention, and 12 (38.7%) died within one year.

Conclusions: There are substantial readmission and emergency surgery rates, but more analysis is needed to comprehensively quantify recurrence of cholecystitis and biliary colic. Percutaneous cholecystostomy has not been widely implemented at Northern Health but could be a viable option for elderly patients with greater risk of complications.

The risk of operating: Do surgeons appreciate the role of patient frailty in general surgery?

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Background: Frail surgical patients have higher rates of postoperative complications and take longer to recover from surgery. Despite this, there is no clear consensus as to how to measure frailty, and clinicians' knowledge of frailty assessment appears to be lacking. This study assessed the knowledge and utilisation of frailty assessment methods among surgeons and anaesthetists at the Northern Hospital and compared the differences in management of frail patients.

Method: Anaesthetists and surgeons from the Northern Hospital were surveyed regarding their knowledge and utilisation of frailty scales, investigations ordered, and clinic referrals made for frail patients. Elective cancer resections treated by hepatobiliary and colorectal teams were followed up. Patients were divided into frail and non-frail groups and compared in terms of their postoperative outcomes, clinics attended, and preoperative investigations ordered.

Results: Clinicians had a limited knowledge of frailty scales and did not often use them in their preoperative assessment. Surgeons were very likely to refer frail patients to preadmission clinic. Anaesthetists had a varied likelihood of referring to other specialist clinics. Frail patients were significantly older (74.67y cf. 61.70y), had higher predicted mortality rates (10.27% cf. 1.13%), and were more likely to receive a preoperative echocardiogram (67% cf. 9%) and chest x-ray (83% cf. 27%).

Conclusions: Anaesthetists and surgeons at the Northern Hospital had limited knowledge of frailty scales and were not likely to use them when assessing frailty. Frail patients had largely similar surgical management during their admission and had surgical outcomes that were not significantly different from non-frail patients.

A Novel Approach of Intravascular Ultrasound-Guided Laparoscopic Median Arcuate Ligament Release

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Surgical Services

Background: Median arcuate ligament syndrome (MALS) is a rare condition that can have a significant impact on quality of life. Diagnosis is difficult and delayed due to the need to exclude other pathologies. Treatment strategies involve open or laparoscopic division of the median arcuate ligament, with or without vascular reconstruction. We described a novel hybrid technique using intravascular ultrasound (IVUS) technology to guide laparoscopic median arcuate ligament division.

Method: Our patient is a 42-year-old who was found to have MALS complicated by previous coeliac axis thrombosis and splenic infarct. She presented with worsening post-prandial abdominal pain and weight loss. Diagnostic angiography demonstrated an occluded coeliac axis due to compression.

Results: The use of IVUS significantly helped to guide laparoscopic division of the median arcuate ligament. It allowed for precise localisation of the point of compression and provided real-time feedback regarding the intraluminal effects of the release. Additionally, it demonstrated immediate confirmation of successful decompression. The patient later proceeded to have endovascular stent insertion in her coeliac artery. Her symptoms resolved following this procedure.

Conclusions: MALS is a distressing and debilitating condition. IVUS technology allows for real-time guidance of laparoscopic release of the median arcuate ligament. This, coupled with endovascular reconstruction, presents a hybrid, minimally invasive approach to the treatment of MALS.

Ligation of intersphincteric fistula tract and mucosal advancement flap: a retrospective review of a single centre experience

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Surgical Services

Background: Perianal fistula is a common pathology encountered by the colorectal surgeon. For simple subcutaneous fistulas or those with negligible sphincter involvement, fistulotomy often yields favourable results. However, for more complex fistulas, fistulotomy dramatically increases the risk of faecal incontinence due to disruption of the sphincter complex. Procedures such as mucosal advancement flap (MAF) and ligation of inter-sphincteric fistula tract (LIFT) are two sphincter sparing operations well described in the literature. This retrospective audit aims to generate the first Northern Health body of evidence to substantiate the role of sphincter sparing procedures as a form of definitive management for perianal fistulas.

Method: Patients who had "de-novo" LIFT or MAF procedures from January 2018 to December 2019 by the Northern Health colorectal unit were audited. Patients with fistulas resulting from Crohn's or malignancy, age under 18 and those without inter-sphincteric or trans-sphincteric fistulas were excluded. Medical health records were accessed to determine fistula recurrence and return to theatre rates.

Results: 14 patients underwent MAF and 21 underwent LIFT. Four MAF patients had fistula recurrence and subsequent return to theatre and five LIFT patients had fistula recurrence and returned to theatre. Success rates were calculated as 71.4% for MAF and 76.2% for LIFT.

Conclusions: Our study adds to the limited Australian data to support and validate the use of these sphincter sparing definitive fistula procedures.

To compare the accuracy of intraocular lens calculation formulae in the prediction of postoperative refraction device in eyes with short axial length (<22mm)

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Surgical Services

Background: Accurate intraocular lens (IOL) power calculation in cataract surgery is very important to achieve the postoperative target refraction and high patient satisfaction. For short eyes, the IOL power calculation formulas are less accurate than normal, which presents challenges for cataract surgeons. In this study, we aim to compare the refractive outcome using different IOL calculation formulas (Barrett Universal II, Haigis, Hoffer Q, Olsen, and SRK/T, Hill BRF, Kane and EVO)

Method: This was a retrospective chart review conducted for adult patients who underwent uncomplicated cataract surgery with implantation of monofocal posterior chamber intra ocular lens at Broadmeadows Hospital during January 2012 – January 2020. All patients received implantation of an Acrysof IQ SN60WF. Post op mean (ME) and mean absolute refractive error (APE) was calculated, before and after adjusting the mean to zero, for each formula and compared.

Results: Total 129 eyes were included. Mean post op refraction was 0.6D. Olsen formula had least ME (-0.13D) Mean APE was minimal for Olsen formula before and after adjusting mean to zero.(0.47 and 0.46 respectively)

Conclusions: The refractive outcome was significantly myopic than expected. EVO formula gave least error though there was no statistical difference among the formulae.

How are antibiotics prescribed for Open Reduction Internal Fixation procedures?

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Surgical Services

Background: Surgical antibiotic prophylaxis (SAP) is a common indication for antimicrobial use in Australia, however inappropriate use can contribute to antimicrobial resistance and increase costs. New SAP recommendations in the Therapeutic Guidelines (published April 2019) suggests the use of single dose prophylaxis for internal fixation. The prescribing pattern for patients undergoing open reduction internal fixation (ORIF) of upper and lower limbs at Northern Health following guideline update is unknown, thus, the aim of this study was to determine how antibiotics are prescribed.

Method: A retrospective audit was conducted for patients who underwent ORIF of closed fractures between July and December 2019. Medical records were reviewed for antibiotic choice, dose, route and time of administration and duration of prophylaxis.

Results: 209 patients were included in this study. Pre-operative antibiotic administration was documented in 96% of patients. Whilst cefazolin 2g was commonly administered pre-operatively as per guideline recommendations (94% of cases), the majority of patients (79%) received post-operative antibiotics. An extended duration of prophylaxis (>24 hours) was observed in 11% of cases.

Conclusions: Variability exists as to whether antibiotics are administered post-operatively, with a need to determine the factors that contribute to an extended duration of prophylaxis. Further research is also required to understand what influences prescribing practice in this setting.

Assessment of wound closure techniques in total hip arthroplasty at Northern Health

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Surgical Services

Background: Choosing staples over subcuticular sutures (SS) for skin closure in total hip arthroplasty (THA) is shown to increase the risk of infection 4-fold. Our aim was to ascertain whether the use of SS in THA at Northern Health (NH) has led to fewer wound complications, reduced infection rates and re-admissions for IV antibiotics/washout when compared to staples, and to determine if tranexamic acid (TXA) is associated with reduced rates of wound ooze (WO) and subsequent infection.

Method: We conducted a retrospective audit of consecutive primary THA recipients closed with either 3-0 subcuticular monocryl or staples at NH (November 2009 – July 2017). Primary outcome was readmission for IV antibiotics/washout. Secondary outcome was WO measured by dressing changes (DC).

Results: From 545 primary THA patients identified, 294 were closed with staples and 251 with monocryl. Readmission for IV antibiotics/washout was more common among patients with staples [OR 10.67 (1.38-82.7, p=0.02)]. More DCs were observed in these patients [1.58 (1.38-1.78, p= 0.05)] compared to those with monocryl [0.60 (0.51-0.71, p=0.05)]. At least one DC was more likely in patients with staples who did not receive TXA [OR 5.46 (3.20-9.34, p<0.0001)] however, this did not translate to reduced infection rates [OR 0.88 (0.26-3.00, p=0.83)]. There was no correlation between TXA and DCs for monocryl closure [OR 0.91 (0.56-1.52, p=0.74].

Conclusions: Using staples for skin closure in THA was associated with higher rates of infection and WO. TXA was shown to decrease WO with staple closure however, this was not associated with a reduction in infection rate.

Does early antibiotic therapy in neonatal sepsis (proven or presumed) negatively impact enteral feeding and neonatal hyperbilirubinaemia?

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Women's and Children's

Background: Empirical antibiotic therapy is frequently observed in preterm infant care particularly for the treatment of early-onset sepsis (≤ 72-hours of life). Of major concern are its potentially deleterious effects on the gut microbiome which may predispose towards neonatal hyperbilirubinaemia and feeding intolerance.

Method: A retrospective cohort analysis of preterm infants (<37 weeks gestation) admitted to the Northern Hospital's Special Care Nursery (SCN) between January 2016 to December 2019 was conducted. Rates of hyperbilirubinaemia, feeding intolerance and SCN admission length were analysed between infants requiring antibiotic therapy for signs of sepsis (n=357) compared to a control group of infants not requiring antibiotic therapy (n=289). Multivariate regression analyses were then performed to determine whether differences in outcomes between groups were directly attributable to neonatal antibiotic therapy.

Results: After accounting for confounders, antibiotic use significantly increased the odds of hyperbilirubinaemia and duration of subsequent phototherapy. It was also associated with a significant delay in the times to commence enteral feeds, reach full enteral feeds and prolonged SCN admission length. Prolonged antibiotic therapy duration (≥ 5 days) also increased the odds of hyperbilirubinaemia, times to commence enteral feeds, reach full enteral feeds and admission length. The type of antibiotic therapy increased the odds of feeding intolerance, phototherapy duration, times to commence enteral feeds, reach full enteral feeds and admission length.

Conclusions: Antibiotic therapy in preterm infants with early-onset sepsis negatively impacts enteral feeding and neonatal hyperbilirubinaemia. Judicious use of neonatal antibiotic therapy should be considered to avoid these important complications in preterm infants.

Does a hypoglycaemic episode for small for gestational age infants further disadvantage their neonatal outcomes?

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Women's and Children's

Background: Small for gestational age (SGA) babies, whose birthweight is below the tenth percentile, have a high risk of poor perinatal outcomes. Hypoglycaemia is commonly experienced by SGA babies and is associated with long term neurodevelopmental complications.

Method: A retrospective cohort study was conducted including SGA babies admitted to the neonatal unit at Northern Health from January 2015 to December 2019. The primary outcome measures were length of admission in the neonatal unit and interventions required for feeding.

Results: 285 SGA babies were admitted to the neonatal unit. 106 (37.2%) babies had a hypoglycaemic episode within 24 hours of birth. SGA babies were more likely to develop hypoglycaemia if they were born to mothers with hypertensive disease (p<0.05) or with an abnormal body mass index (p<0.05). Overall, SGA babies with hypoglycaemia were at greater risk of feeding intolerance (p<0.05) and required interventions for feeding more frequently (p<0.01). When considering only moderate to late preterm SGA babies, 86.1% of those with hypoglycaemia were admitted to the neonatal unit for seven days or more, compared with 64.1% of those without hypoglycaemia (p=0.02). 16.7% of hypoglycaemic preterm SGA babies were able to feed exclusively orally compared to 42.3% of normoglycaemic babies (p=0.01).

Conclusions: SGA babies who were born to mothers with hypertensive disease or an abnormal body mass index had a higher risk of developing neonatal hypoglycaemia. Hypoglycaemia in moderate to late preterm SGA infants was associated with a longer admission in the neonatal unit and an increased requirement for feeding interventions.

Obesity, Pregnancy and Lifestyle Clinic: Evaluations and Outcomes

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Women's and Children's

Background: Increasing numbers of women are entering pregnancy with an elevated body mass index (BMI). Maternal obesity is associated with a number of adverse outcomes for both mother and child, however attention to diet and lifestyle during the antenatal period has been shown to reduce the rate of many of these complications. The Obesity, Pregnancy and Lifestyle (OPAL) Clinic was started at the Northern Hospital in July 2018 to provides specialised antenatal care to women with a BMI ≥ 40 kg/m^2.

Method: We performed a retrospective cohort study of women with a BMI ≥ 40kg/m^2 delivering a singleton pregnancy at the Northern Hospital, Victoria, between January 2019 and April 2020, comparing obstetric and neonatal outcomes of women who attended the OPAL clinic (n=60) to those who received standard antenatal care (n=121). Statistical analysis performed using $\chi 2$, Fisher's Exact Test, Student's T-test and Mann-Whitney (rank sum) test with a significance level of 0.05.

Results: Compared to women in standard antenatal care, OPAL women are more likely to be to be primiparous (OR 2.65 (1.33-5.28), p=0.00) and less likely to be born outside of Australia/New Zealand (OR 0.47 (0.22-1.03), p=0.06). Women in the OPAL clinic attended a significantly higher number of antenatal appointments (9 vs 8, p=0.02), and had a lower median gestational age of delivery (38.3 vs 38.5, p=0.02).

Conclusions: The OPAL clinic is currently attracting a specific subset of obese pregnant women. These results suggest that the OPAL clinic has achieved increased engagement in antenatal care.

Dose-delivery time interval of morphine in labour and its impact on adverse neonatal outcomes

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Women's and Children's

Background: To find the effect that time between dosage of morphine and delivery of the baby has on the incidence of need for neonatal resuscitation, Apgar scores, feeding behaviour and requirement for admission to special care nursery.

Method: Retrospective analysis of 659 births at the Northern Hospital featuring use of morphine in labour. Time between morphine dose and delivery of baby was recorded for each birth, known as the dose-delivery interval (DDI). Four equally distributed categories were created based on quartiles of DDI. Various neonatal outcomes were compared between the groups, including need for resuscitation, type of resuscitation used, 1-minute and 5-minute Apgar scores and need for admission to special care nursery. Univariate and multivariate analysis were performed using IBM *SPSS* version 26.

Results: Dose-delivery category 2 (155-314 minutes) was found to have significantly higher odds of requiring neonatal resuscitation (OR 2.08; 95% CI 1.20-3.59 *P*= 0.009), in addition to specific forms of resuscitation such as tactile stimulation (OR 2.05; 95% CI 1.20-3.51 *P*= 0.009), continuous positive airway pressure (OR 2.51; 95% CI 1.20-5.25 *P*= 0.015) and intermittent positive pressure ventilation (OR 6.67; 95% CI 2.53-17.62 *P* < 0.001) compared to the longest dose-delivery category (>526.5 minutes).

Conclusions: A dose-delivery interval between 155 and 314 minutes may lead to a higher incidence of requirement for resuscitation at birth, in addition to specific types of resuscitation including tactile stimulation, continuous positive airway pressure and intermittent positive pressure ventilation.

The effect of anti-thrombotic therapy on cell-free DNA release from first- and third-trimester placental explants

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Women's and Children's

Background: Heparins, like enoxaparin, are commonly used during pregnancy and have been shown clinically to increase failure rates of non-invasive prenatal testing (NIPT), a testing method that analyses cell-free fetal DNA (cffDNA) present in maternal blood. This study aimed to test enoxaparin and other anti-thrombotics on placental tissue *in vitro* to determine their effects on cffDNA release.

Method: First- and third-trimester placental explants from women undergoing terminations of pregnancy and caesarean sections were treated with varying concentrations of enoxaparin, aspirin, clopidogrel, prasugrel and ticagrelor. cffDNA release into the media was quantified and relative differences between treated and control samples, and differences between first- and third- trimester samples with the same treatment, were assessed using the Student's T-test.

Results: Enoxaparin increased cffDNA release by placental explants, rather than the expected decrease. This was more pronounced in the first trimester, when NIPT is usually performed. 40% and 55% increases were seen for third-trimester explants treated with 2.0 IU/mL and 4.0 IU/mL enoxaparin respectively (p<0.01) and

a 181% increase was seen for first-trimester explants treated with 4.0 IU/mL enoxaparin ($p<0.01$).

Conclusions: The hypothesised decrease in cffDNA by enoxaparin was contradicted by our results, suggesting NIPT failure due to heparin use may be mediated by a mechanism other than increased cytotrophoblast survival. Further work is underway with RNA analysis and histochemical staining to confirm whether the observed effect is mediated through apoptosis or a different mechanism.

Recruitment of obstetric patients for biosample donation. Is our biobank representative?

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Women's and Children's

Background: The Northern Centre for Health Education & Research (NCHER) Reproductive Health Biobank is a growing initiative in obstetric basic science research at Northern Health. This study audited the strategy employed by our research team to recruit pregnant women undergoing elective caesarean birth for the donation of research biosamples. To maintain useful and diverse biobank, it is important that the patients recruited are representative of the total obstetric population.

Method: The Chi-squared test for categorical data was used to compare patient characteristics and recruitment rates, with a significance level of $p<0.05$. Research participant demographics were compared with those of the total obstetric and the singleton elective caesarean populations at the Northern Hospital.

Results: Face-to-face recruitment was significantly more successful than the pre-admission phone call approach. Of the 47 patients contacted for consent by phone, only 51% consented to participate, compared to 80% of people approached face-to-face ($p<0.01$). The population who donated tissue samples represented the total elective caesarean population well but differed more from the total obstetric population. There was a significantly lower proportion of non-English speakers amongst recruited patients ($p<0.01$) but significantly higher rates of gestational diabetes mellitus ($p<0.01$).

Conclusions: The audit confirmed that we have largely been successful in recruiting a sufficiently diverse cohort of patients for research and justifies the continued use of face-to-face recruitment over contacting by phone. It revealed the disadvantages of focused recruiting of elective caesarean patients and the need to pro-actively recruit those of non-English speaking backgrounds.

Postnatal breastfeeding telephone support significantly improves rates of breastfeeding

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Women's and Children's

Background: Breastfeeding has multiple benefits both to mother and infant. However, there are many factors which lead to breastfeeding cessation well before the World Health Organization minimum recommended six months duration of exclusive breast feeding. Aim: To evaluate if a lactation consultant led telephone based support program achieves improved exclusive breastfeeding (ExBF) rates at one, three and six month postpartum.

Method: In a single centre, randomised controlled trial, mothers with uncomplicated pregnancies of more than 36 weeks gestation, were randomised to a Control Group (CG) receiving standard postnatal support and an Intervention Group (IG) receiving standard postnatal care plus weekly lactation consultant telephone contact for first month postpartum, then follow-up support at three and six months.

Results: A total of 765 mothers were enrolled in the study. While breastfeeding rates understandably decreased during the study, the ExBF rates for the IG were significantly enhanced compared to CG at one, three and six months respectively (73% vs 55% $p<0.0001$, 57% vs 49% $p<0.05$, 52% vs 36% $p<0.0001$). Rates of any breastfeeding compared to artificial formula (AF) were higher in the IG compared to the CG respectively (88% vs 83% $p=0.05$, 88% vs 70% $p<0.0001$, 63% vs 56% $p<0.05$). As a consequence, AF use was consistently lower in the IG compared to the CG at one, three and six months.

Conclusions: A lactation consultant led telephone program to provide early and regular support for new mothers not only significantly improves exclusive breastfeeding rates but promotes breastfeeding in general.

Congenital Cytomegalovirus: are we choosing wisely?

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Women's and Children's

Background: Cytomegalovirus (CMV) is the leading infectious cause of hearing loss, cognitive deficit and vision impairment in the developed world. The absence of clinical guidelines for screening worldwide means detection is highly dependent on clinical suspicion.

Method: This is a single-centre retrospective chart review of neonates who were admitted into the Northern Hospital Special Care Nursery and had urine CMV polymerase chain reaction (PCR) testing. Electronic hospital-based medical records were used to collect data on birth characteristics, maternal serology, liver function tests, neuroimaging, newborn hearing screen and confirmed diagnosis of sensorineural hearing loss and/or developmental delay in positive cases.

Results: Over 5 years, 154 neonates met inclusion criteria with 1 positive case of cCMV (congenital CMV) infection detected. 0.0057% (5.62 per 100 000 live births) is the calculated birth prevalence at the Northern

Hospital. 151/154 (98%) of urine CMV PCR samples were collected ≤ 21 days old. 74 mothers (47.1%) had antenatal CMV serology. Approximately 25% of infants had liver function tests and/or neuroimaging conducted. 3 (1.9%) of infants failed their newborn hearing screen. Indications for cCMV testing include symmetrical intrauterine growth restriction (IUGR), asymmetrical IUGR and microcephaly (62.3%, 15.8%, 5.7%).

Conclusions: The cCMV infection birth prevalence at our institution is similar to the reported Australian rate, however, this is still significantly lower than the worldwide birth prevalence. Development of standardised guidelines for cCMV testing would ensure better identification of cCMV infected infants.

Prevalence and management of hepatitis B infection in pregnant women at Northern Health: a clinical audit

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Women's and Children's

Background: Chronic Hepatitis B (CHB) is a chronic, incurable liver disease with mother to child transmission (MTCT) being the leading cause of acquisition. Universal screening to reduce MTCT is a core component of antenatal care. Our aim was to investigate the antenatal prevalence of CHB at Northern Health and evaluate our management against current guidelines.

Method: Retrospective audit of obstetric outcomes for all women birthing >= 20 weeks gestation from January 2016 to December 2017. All women with positive HBsAg status were included. Descriptive statistics were performed for maternal demographics and perinatal outcomes.

Results: Of the 7269 women who birthed during the two-year study period, 7215 (99.3%) had their HBsAg status recorded. 49 (0.7%) were CHB-affected women. This prevalence is significantly lower than the 1.4% observed in 2006-11 (P < 0.001).The majority of women with CHB (86%) were born overseas. For eight women, antenatal screening provided the first diagnosis of their CHB status. Half of the women with known CHB had no regular liver surveillance prior to pregnancy. Viral load was measured in 43 (90%) women, of whom 7 (15%) met criteria for antiviral therapy during pregnancy. Six of these women were treated with tenofovir. All babies born to CHB-affected mothers received the hepatitis B vaccine and all but one received IVIg at birth.

Conclusions: The prevalence of CHB in our antenatal population has halved in the past decade. Pregnancy remains an important opportunity to detect CHB and provide education and follow up to optimise long term health outcomes.

Pressure reducing characteristics of offloading devices commonly used to manage diabetes-related foot ulceration

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Other – Allied Health

Background: Pressure reduction is a key component in the management of diabetes-related foot ulceration, and variations of removable cast walkers are often used to achieve pressure reduction at ulcer sites. However, limited evidence exists measuring their offloading capacity. This study aimed to quantify pressure reduction achieved with these offloading devices from neuropathic, diabetes-related foot ulcers.

Method: A within-participant, repeated measures design was used for this study. Peak plantar pressure in kilopascals (kPa), contact area and contact time were measured in 16 subjects with plantar neuropathic foot ulceration. Three variations of a removable cast walker were measured in addition to a control condition to obtain baseline peak pressure.

Results: Statistically significant decreases in peak plantar pressure of 65.2%, 79.1% and 72.9% respectively were observed with removable cast walkers alone (*mean difference* (M^{diff}) = 252.5kPa reduction, p = <0.01), removable cast walkers with felt to foot (306.3kPa reduction, p = <0.01) and removable cast walkers with felt to insole (M^{diff} = 282.0kPa, p = <0.01). A statistically significant decrease of 39.9% was also observed when comparing removable cast walkers with felt to foot (M^{diff} = 53.8kPa, p = 0.03) to removable cast walkers alone. No significant changes in contact area was seen and contact time was consistent across testing conditions.

Conclusions: Removable cast walkers with felt adhered to foot provided significantly greater amounts of peak pressure reduction compared to control measures and removable cast walkers alone. Further studies are required to evaluate the efficacy of these devices on ulcer healing.

"It's disappointing and frustrating, because it feels like it's something that will never go away."

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Other – Allied Health

Background: Achilles tendinopathy (AT) is a common and often persistent musculoskeletal disorder affecting both athletic and non-athletic populations. Despite this relatively high incidence there is little research into the impact of tendinopathy from the patient's perspective. Qualitative research allows us to explore patient's perspectives and can provide crucial insights into the best management of this complex and persistent musculoskeletal injury.

Method: A qualitative, interpretive design was utilised. Semi-structured interviews were conducted on 15 participants (8 male and 7 female) with AT. Inclusion criteria comprised of patients with AT > 3 month duration of symptoms, pain aggravated during or after weight-bearing activities and evidence of Achilles thickening, hypoechoic regions, and /or Doppler signal on ultrasound imaging. Thematic analysis was performed and reported in accordance with the consolidated criteria for qualitative research (COREQ) checklist.

Results: Four main themes were identified: 1) beliefs about causes of AT 2) the biopsychosocial impact of AT 3) frustration with the management process 4) future prognosis of AT

Conclusions: This study offers a unique insight into the profound impact and consequences of AT in a mixed sample of both athletic and non-athletic individuals. The findings of this study have important clinical implications. Specifically, it highlights the need for clinicians to recognise and adopt treatment approaches that embrace biopsychosocial model of care.

Malnutrition Prevalence at Northern Health 2020

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Other – Allied Health

Background: Malnutrition is estimated to affect up to 40% of acute inpatients in Australian hospitals. This study aimed to describe malnutrition prevalence in acute admissions at Northern Health (NH) over a three month period.

Method: Auditors collected data across acute inpatient beds at Northern Hospital Epping (NHE) and Broadmeadows Hospital (BH) continually over a three month period (March – June 2020). The auditors screened medical files and where indicated, completed the Malnutrition Screening Tool (MST) and Subjective Global Assessment (SGA) to diagnose malnutrition and its severity. Data was analysed descriptively.

Results: Of the 1489 NH patients included in the study 14% (n=202) were malnourished (mean age 69 years [range 20-100 years], 54% male 46% female). Proportion of malnutrition differed across the two NH sites with BH having a higher rate of 31% compared to NHE rate of 13%. Across all inpatient wards, Unit Three at BH had the highest rate of malnutrition at 50%. Rates in the surgical and medical service streams at NHE differed only slightly being 14% and 12% respectively.

Conclusions: Malnutrition prevalence in acute admissions at NH (14%) is lower than the national estimated prevalence (40%); however this study was undertaken during the coronavirus COVID-19 pandemic in which there were changes and closures to multiple services across NH. The data from this study can provide comparison for future malnutrition prevalence studies and inform the development and evaluation of malnutrition prevention and management strategies at NH.

Using propensity score matching to retrospectively evaluate the effectiveness of the Health Independence Program

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Other – Hospital Without Walls

Background: The Health Independence Program (HIP) supports the transition of patients from hospital to home, receiving care which prevents future deterioration, with the aim of reducing the need for hospital admissions or presentations with patients accessing HIP services directly. This study evaluates the effectiveness of the HIP in reducing patient's inpatient admissions and ED presentations.

Method: The retrospective cohort evaluation included patients admitted to HIP in 2017-18. For those patients with at least one admission to Northern Health, a set of matched control patients were identified who had not been enrolled in HIP using propensity score matching. Data back to 2010-11 was accessed to provide an indication of prior hospitalisations and comorbidity burden to improve the accuracy of the propensity score matching. Statistical analysis compared healthcare utilisation over a 12-month period following the patient's admission to the HIP.

Results: A total of 8987 patients were referred to at least one HIP service, with a total of 15,905 referrals. The propensity score matching process identified valid controls for comparison with the HIP patient cases to an acceptable level of accuracy. Admissions for HIP cases were fewer by over 50% for the majority of HIP subgroups, particularly when considering patients recruited to only one HIP service. Post-acute care and Specialist Wound HIP subgroup displayed smaller or no benefits of the program.

Conclusions: This study found significant reductions in hospital utilisation for patients enrolled in a HIP. Future work could investigate the cost benefits of these programs in assisting patients.

Paid employment for medical students in hospitals. Does it work?

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Other – Medical Education

Background: Historically, medical students have sought paid employment in hospitals to finance their medical education and gain additional exposure to the healthcare system. Little is known about what students can learn in this setting. This project aimed to investigate the experiences of medical students who undertake paid employment within the hospital and to explore hospital staff perspectives on the feasibility and acceptability of medical students undertaking paid hospital employment.

Method: Semi-structured interviews were undertaken with medical students (n=15) from the University of Melbourne and senior hospital staff (n=10) from a large teaching hospital in Melbourne. The audio recordings were transcribed and analysed using a combination of content and thematic analysis.

Results: Students reported largely positive experiences of working in a hospital. Benefits to their learning included increased familiarity of the hospital system and opportunistic learning experiences. Staff reported minimal knowledge of medical students working in the hospital; however, they acknowledged potential benefits arising from the employment of medical students who they see as knowledgeable and competent, with a unique skillset. These include increased efficiencies in hospital workflow by filling workforce gaps and freeing up experienced staff. Barriers to employing medical students in the hospital included a rigid university schedule and budgetary constraints.

Conclusions: Students and staff agree that the employment of medical students in hospitals is largely positive and provides bidirectional benefits to both the hospital and the student.

Pharmacist Led Discharge Summary Audit

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Other – Pharmacy

Background: Poor medication management after discharge from hospital increases the risk of unplanned hospital readmissions by 28% within 30 days of discharge. At the point of discharge one in five changes made to a patients medicine regimen during hospital admission are not explained in the discharge summary and three in five hospital discharge summaries contain at least one medicine error.

Method: Retrospective audit of discharge summaries of patients discharged from Northern Hospital Epping over a two week period. Documented discharge medicines in the 'Medications (medications stopped, started or modified)' section of the discharge summary was compared to the discharge prescription checked by a pharmacist and discrepancies documented in the audit tool.

Results: 262 discharge summaries were examined. 67% (n=176) of discharge summaries had incomplete documentation of the patient's discharge medicines. Of documented medicines 65% were inaccurate compared to checked discharge prescription by the pharmacist. Omission of a medicine (n=113) and incorrect dose or frequency (n=87) were the most common errors identified.

Conclusions: A large proportion of discharge summaries contained incomplete documentation of patient's discharge medicines. Accurate documentation of patient's medicine regimen on discharge is vital to ensure appropriate medication management in the primary healthcare setting, reducing the risk of polypharmacy and avoidable readmission to hospital. Pharmacist documentation of discharge medicine regimen on the discharge prescription has been shown to be more accurate than the medical prescriber's discharge summary and may potentially be an avenue to explore in the future at Northern Health.

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