Objective: To test whether patients exposed to a resident physician changeover early in admission would have a longer length of stay, and whether that association would be reduced with the separation of resident and attending physician changeover days.

Methods: We conducted a multi-center study of patients admitted to the general internal medicine at four hospitals at the University of Toronto from 2010 to 2019. The changeover day was the same day (first Monday of month) for both resident and attending physicians until June 30, 2013, but were separated by one or more days after July 1, 2013. The primary outcome was length of hospital stay, 7-day transfer to a critical care unit, 7-day in-hospital death, and rate of discharge per 100 patients were secondary outcomes.

Results: We identified 95,282 patients of whom 22,773 (24%) were exposed to resident changeover and 72,509 (76%) were not exposed to resident changeover. Baseline characteristics were similar for both groups. Resident changeover day was associated with a 5% increase in length of hospital stay compared to control days (95% confidence interval 2% to 8%, p < 0.001) Separation of changeover days did not significantly modify the association (pre-separation was 5%, 95% confidence interval 2% to 8%, post-separation was 2%, 95% confidence interval 0% to 4%, p interaction = 0.10). Exposure to resident changeover day was not associated with an increased risk of in-hospital death (95% confidence interval −26% to 6%) or increased risk of transfer to a critical care setting (95% confidence interval −12% to 19%) but was associated with an 8% lower rate of discharge (95% confidence interval 0% to 14%, p = 0.047).

Conclusion: Our results show an association between exposure to resident physician changeover and increased length of hospital stay, and reduced rate of discharge. We found that separating changeover days for resident and attending physicians did not significantly reduce these associations.
DIMERS IN INPATIENTS – CLOSER TO A NICKEL OR A QUARTER IN VALUE?

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Objective: To explore the negative predictive value of a D-dimer laboratory test, using different diagnostic thresholds, and its cost-effectiveness in the inpatient population for the diagnosis of pulmonary embolism (PE).

Methods: We performed a retrospective cohort study of all inpatients that had a D-dimer measured within 72 hours of a Computed Tomography Pulmonary Angiography (CTPA) for suspected PE at a 637-bed tertiary care center in Montreal, Canada between January 1st, 2012 and Dec 31st, 2019. Patient demographics, comorbidities and presenting symptoms were collected. D-dimer value was assessed based on three cut-off thresholds: 500 ug/L, 1000 ug/L, and the age-adjusted threshold (age (years) x 10 ug/L for patients ≥ 50 years of age). Using laboratory cost information, we explored the cost-effectiveness of a D-dimer-based approach amongst inpatients.

Results: A total of 247 inpatients underwent a CTPA within 72 hours of a D-dimer assay during the study period. The median age was 70 years old (IQR = 51–81.7) and 68% of inpatients were female. A total of 34 (14%) CTPAs were positive for PE. A D-dimer value less than 500 ug/L was seen in 10 (4%) inpatients, yielding a negative predictive value of 100%. D-dimer less than 1000 ug/L occurred in 45 (18%) inpatients and 20 (8%) had a negative age-adjusted value, yielding negative predictive values of 96% and 100% respectively. The total laboratory cost of all D-dimers in this cohort was $1,551; as compared to approximately $6,250 for the 10 CTPA avoided in the most conservative threshold.

Conclusion: The high negative predictive value of D-dimers across three validated diagnostic thresholds for the exclusion of PE suggests that D-dimer testing may have a role in the inpatient setting to improve diagnostic utilization of CTPA and improve cost-effectiveness. Our findings lay the groundwork for future prospective studies evaluating their use in inpatients for the work-up of PE.

GENDERED SOCIAL DETERMINANTS OF HEALTH AND RISK OF MAJOR ADVERSE OUTCOMES IN ATRIAL FIBRILLATION: AN ANALYSIS FROM THE ESC-EHRA EURObservational RESEARCH PROGRAMME IN ATRIAL FIBRILLATION GENERAL LONG-TERM REGISTRY

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Introduction: Atrial fibrillation (AF) is associated with a high risk of adverse outcomes. Social determinants of health (SDOH) are gendered (unevenly distributed between females and males) and associated with outcomes in cardiovascular diseases. Little is known about their impact in AF. We evaluated the association between gendered SDOH and adverse outcomes in AF patients.

Methods: Data came from the ESC-EHRA EORP-AF General Long-Term Registry, a European AF prospective registry. Gendered SDOH included: education, living alone vs not, smoking, alcohol use, gender inequality index (GII), physical activity, a visual analogue scale (VAS) of overall perceived health and value health state (VHS), an overall quality of life score from the EQ-5D-5L questionnaire. Study outcome was a composite of major adverse cardiovascular events and all-cause death. SDOH main effect was tested in multivariate logistic regressions and for a sex/GII interaction.

Results: We studied 11,096 patients (mean (SD) age 69.2 (11.4) years; 40.7% females, median [IQR] CHA2DS2-VASc score 3 [2–4]). Most participants had secondary education, did not live alone, did not smoke or use alcohol, were physically inactive, had moderate quality of life, and lived in countries with gender equity. In multivariate analyses adjusted for age, sex, hypertension, diabetes mellitus, a history of thromboembolic events including stroke and transient ischemic attack, previous myocardial infarction, peripheral vascular disease, alcohol use and smoking, social determinants of health were associated with the outcome.
Higher education (OR:0.80;95%CI:0.66–0.97), not living alone (OR:0.82;95%CI:0.70–0.97), at least moderate weekly physical activity (OR:0.71;95%CI:0.60–0.85), VAS (OR:0.93;95%CI:0.90–0.96) and VHS (OR:0.94;95%CI:0.91–0.97) were associated with a lower risk of adverse outcomes. Conversely, higher GII (larger gender inequity) was associated with worse outcomes (OR:1.18;95%CI:1.07–1.30) for every increment of 0.1 in GII. Females were found at lower risk (OR:0.85;95%CI:0.73–0.98) but this protective effect was reversed in countries with higher GII (Interaction sex and GII (OR:1.14;95%CI:1.00–1.30), p-interaction = 0.049).

Conclusions: Gendered SDOH are associated with adverse outcomes in AF. Notably, gender inequity confers poorer outcomes in females with AF.

VIRTUAL CARE IN AMBULATORY CLINICS DURING THE COVID-19 PANDEMIC: PATIENT/FAMILY AND HEALTHCARE PROVIDER PERSPECTIVES AND EXPERIENCES

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Objective: With the expansion of virtual care during COVID-19, a cross-sectional study was designed to explore the experiences of adult patients and their families (PFs), as well as healthcare providers (HCPs), with their ambulatory virtual care appointments.

Methods: A randomly selected 10-15% of PFs and 200 HCPs in seven adult clinics were invited to complete a telephone or online survey, respectively. Quantitative and qualitative questions for both surveys included virtual care appointment setups as compared with in-person visits, associated benefits, impacts of virtual care, preferences for future appointments, and improvement suggestions. Data was then descriptively analyzed.

Results: Of 347 PFs who completed the telephone survey, 72% rated their overall experience with virtual clinic appointment setup as ‘excellent’ (i.e. 8, 9, or 10 out of 10) versus 39% of 81 HCPs. About half of HCPs felt that all necessary information for clinical decision-making was captured during video (41%) and telephone (51%) appointments. They also felt that video (41%) or telephone appointments (22%) negatively affected patient care when compared to in-person appointments, with concerns including lack of physical exams, difficulty navigating the technology for older patients, and patients not taking virtual appointments seriously. In comparison, 87% of PFs rated their overall virtual appointment experiences as ‘excellent’, with 77% feeling confident that these were as good as in-person appointments. Advantages of virtual appointments noted by both parties included convenience, reduced costs, and decreased risk of COVID-19 exposure. Forty percent and 56% of HCPs having video and telephone appointments, respectively, preferred to continue with these corresponding appointments. Comparatively, 52% of PFs preferred to continue with virtual appointments, while 44% desired in-person appointments.

Conclusion: PFs and HCPs would like to see virtual care become a regular option for healthcare delivery beyond the pandemic. Such implementation will require expansion of health system supports and technologies and guidelines for virtual care practices. This study provides a cross-sectional snapshot of key aspects of virtual care experiences of both PFs and HCPs within the same ambulatory clinics during the first year of COVID-19. Additional cross-sectional repeat studies and others correlating virtual care experiences with outcome measures are needed.

A TELEMEDICINE BUNDLE TO SUPPORT EARLY DISCHARGE OF HYPOXIC COVID-19 PATIENTS WITH SUPPLEMENTAL OXYGEN FROM AN ACUTE CARE SETTING AS A SAFE AND ACCEPTABLE MODEL FOR PRESERVING HOSPITAL CAPACITY

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Objective: To assess the safety and user acceptability of the London Urgent COVID-19 Care Clinic (LUC3), a
MINISTRY OF HEALTH AND LONG-TERM CARE DO NOT RESUSCITATE CONFIRMATION FORM: COMPLETION RATES WHEN THE PATIENT DOES NOT WISH TO BE RESUSCITATED

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**Background:** Goals of care (GOC) planning occurs when healthcare providers (HCPs) explore patients' health preferences. Code status discussions are often integral to these conversations. Options include “full code” (cardiopulmonary resuscitation [CPR] and intubation) or “do not resuscitate (DNR)” (allowing natural death to occur). Studies highlight significant gaps in documentation of discussions around end-of-life care. In 2008, a new DNR Standard was introduced, allowing first responders to refrain from performing CPR if a patient had registered a Do Not Resuscitate Confirmation Form (DNR-CF). Although GOC conversations occur routinely during hospital admissions, few physicians complete DNR-CFs to provide guidance to first responders should a person arrest in the community.

**Objective:** We aimed to identify the awareness of, rates of, and perceived barriers to completing DNR-CFs.

**Methods:** We retrospectively reviewed baseline characteristics of all COVID-19-positive adult patients discharged from London Health Sciences Centre on supplemental oxygen (up to 4L/min) or room air, for follow-up with LUC3 between 01/01/2021–28/02/2022. Safety was assessed by all-cause 30-day readmission rates (RR) and mortality within 30 days of discharge. User acceptability was measured by a patient survey.

**Results:** A total of 371 COVID-19-positive patients were followed by LUC3. Median age was 62[46–71] years, 57% were male, and 207 (56%) required supplemental oxygen (median 2[2–3] litres). There were no significant differences in comorbidities between patients discharged on oxygen versus room air, although patients sent home on oxygen were older (50.7% < 65yrs vs. 62.2% who were < 65yrs; p = 0.028), more likely to have received steroids (99.0% vs. 70.7%; p < 0.001) and Remdesivir (26.6% vs. 11.6%; p < 0.001) as an inpatient, and had a longer inpatient length of stay (median 7[4–11] vs. 5[2–8.75] days; p < 0.001). There were no significant differences in all-cause 30-day RR (7.7% on home oxygen vs. 15.2% on room air; p = 0.062), including readmissions with COVID-19 pneumonia or respiratory distress (5.3% vs. 7.3%; p = 0.517), or mortality (1.4% vs. 3.7%; p = 0.359). No patients died in the community setting. Both groups reported LUC3 follow-up reduced anxiety (88% vs. 78%; p = 0.314), reported the quality of telemedicine follow-up to be equivalent to in-person care (92% vs. 81%; p = 0.134), and expressed overall satisfaction (98% vs. 97%; p = 0.408).

**Conclusion:** Patients with COVID-19 infection can be safely discharged with supplemental oxygen, when supported by close telemedicine monitoring optimizing efficient use of limited inpatient resources. This model is both highly acceptable to patients and safe.
ADVANCED IMAGING USE AND DELAYS AMONG INPATIENTS WITH PSYCHIATRIC COMORBIDITY

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Objective: To determine whether presence of a psychiatric comorbidity impacts use of inpatient imaging tests and subsequent wait times.

Methods: This was a retrospective cohort study of all patients admitted to General Internal Medicine (GIM) at five academic hospitals (2010-2019). Primary outcome was time to test, as calculated from the time of ordering to the time of test completion, for CT, MRI, ultrasound, or peripherally-inserted central catheter [PICC] insertion. Multilevel mixed effects models to identify predictors of time to test, and marginal effects were used to calculate differences in absolute units (hours). The secondary outcome was the rate of each type of included test per day hospitalised. Subgroup analyses were performed according to type of psychiatric comorbidity: psychotic, mood and anxiety, or substance use disorder.

Results: There were 196,819 admissions to GIM in the study period, and 77,562 admissions in which at least one advanced imaging test was performed after admission. After adjusting for all other variables, presence of any psychiatric comorbidity was associated with increased time to test for MRI (adjusted difference 5.3 hours, 95% CI 3.9-6.8), PICC (adjusted difference 3.7 hours, 95% CI 1.6-5.8), and ultrasound (adjusted difference 3.0 hours, 95% CI 2.3-3.8), but not for CT. Presence of a psychotic illness specifically was associated with increased time to test for all test types, an effect most pronounced for PICC (adjusted difference 9.1 hours, 95% CI 2.5-15.7). Although the mean number of tests performed during admission was greater for patients with psychiatric comorbidity than for those without (0.81 versus 0.70, standardized mean difference 0.07), presence of any psychiatric comorbidity was associated with lower rate of ordering for all test types (adjusted difference -17.2 tests per 100 days hospitalized, IQR -18.0 to -16.3).

Conclusion: There was a lower rate of ordering of advanced imaging among patients with psychiatric comorbidity, and once ordered, wait times were longer for MRI, ultrasound, and PICC. Further exploration, such as quantifying rates of cancelled tests and qualitative studies evaluating hospital, provider, and patient barriers to timely advanced imaging will be helpful in elucidating causes for these disparities.

IDENTIFYING LEARNING NEEDS IN MEDICAL ASSISTANCE IN DYING: FROM THE PERSPECTIVE OF INTERNAL MEDICINE RESIDENTS

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To determine the learning needs in MAiD for Internal Medicine (IM) residents.

Residents were recruited at an academic half day and completed three patient cases created to test situational judgement and knowledge in MAiD. Cases were discussed and recorded in a group setting guided by a MAiD expert. Data was analyzed manually to identify themes and key quotes of learners’ perspectives on MAiD. An inductive thematic analysis approach was used to describe IM residents’ reactions and approach to MAiD.

Twenty-eight residents participated (44% response rate). Three high level categories were identified that outlined the approach residents had to a MAiD request: Action, MAiD Decision, and Reaction. Residents were comfortable in managing acute and chronic medical problems near end of life and created an environment for shared decision-making. When approaching a specific MAiD Decision, they lacked knowledge in basic MAiD eligibility criteria and understanding of their role in the referral process. IM residents...
assumed their role was to assess patient eligibility for MAiD. The final decision to refer to the MAiD team was driven by the residents’ level of comfort in making this decision. In the reaction category, residents assumed the responsibility to optimize patient medical conditions and suffering first before they felt comfortable involving palliative care or referring to the MAiD team. This stemmed from the residents’ struggles with the concept of “do no harm” and difficulty balancing medical care and comfort care.

IM residents require content-based teaching on MAiD, specifically around eligibility criteria, policies, and information needed to make a referral. There is also a need for an approach to end of life care discussions, specifically focusing on dealing with uncertainty and personal reactions. This will not only improve patient care for those who request MAiD, but will also improve the wellbeing of residents, potentially reducing risk of burnout as they progress in their careers.
Quality Improvement Abstracts

STANDARDIZED DIRECT ORAL ANTICOAGULANTS PRESCRIPTION FOR THE TREATMENT OF VENOUS THROMBOEMBOLISM IN THE EMERGENCY DEPARTMENT: A QUALITY IMPROVEMENT INITIATIVE

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Background: Direct oral anticoagulants (DOAC) are considered the mainstay of therapy for the treatment of acute venous thromboembolism (VTE). Previous studies and a local audit have shown significant rates of inappropriate DOAC prescriptions in this and other populations. Standardized prescriptions have shown to decrease the incidence of prescription errors in different contexts.

Aim: To mitigate DOAC prescribing errors by evaluating the use of a standardized prescription among patients with acute VTE being discharged from the Emergency Department (ED) at a tertiary care academic healthcare centre.

Improvement / Innovation: We created a standardized, pre-printed prescription for DOAC, including the loading and maintenance doses and frequency, duration of therapy, and the appropriate drug coverage code.

Measures: The primary outcome measure was the appropriateness of prescriptions, defined using the Medication Appropriateness Index (MAI) with categories: A for appropriate, B for inappropriate with limited clinical significance, and C for inappropriate. The absolute risk reduction (ARR) of inappropriate prescriptions during the pre-intervention period (December 27, 2019, to June 27, 2020) compared with the post-intervention period (June 28, 2020, to December 27, 2021).

Project Impact: We hypothesized that a standardized DOAC prescription for the treatment of acute VTE would result in significantly less inappropriate DOAC prescriptions during the post-intervention period.

Results and Lessons Learned: A total of 161 prescriptions for Rivaroxaban, Edoxaban or Apixaban were written for adult patients with acute VTE being discharged from the ED during the study period (37 pre-intervention and 124 post-intervention). Among the inappropriate prescriptions, 19.7% were categorized as MAI B in post-intervention group vs 24.3% in pre-intervention group (ARR 4.7%) and 0.8% were categorized as C in post-intervention group vs 16.2% in the pre-intervention group (ARR 15.4%). The rate of appropriate prescriptions (MAI A) increased by 20.1% during the post-intervention prior relative to the pre-intervention period. While a decrease in prescribing errors is expected as clinicians become more familiar with this class of drugs, a standardized prescription likely enhances this effect and offers a promising avenue to improve patient safety outcomes.

VIRTUAL INTERNAL MEDICINE SPECIALIST ASSESSMENT PROGRAM reduces emergency department transfers from long-term care

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Background: Long-term care residents are among the highest users of emergency departments (EDs), however, 33% of transfers to the ED from long-term care are unnecessary or due to preventable causes.

Aim: The Virtual Internal Medicine Specialist Program aims to improve ED crowding by reducing the number of unnecessary transfers to the ED from a long-term care home over two years.

Improvement: On June 11, 2020, a long-term care home began using Maple, a virtual care platform which allowed residents to speak with specialist physicians through video and receive diagnoses and treatment plans remotely.

Measures: Data on the number of ED transfers were collected from January 2019 to October 2021 at a long-term care home. We evaluated the Virtual Specialist Program using a pre and post study design by comparing the number
of transfers to ED, and the proportion of these transfers resulting in hospital admission before and after program implementation. To understand the experiences of program end-users, we conducted unstructured phone interviews with employees at the home. Our outcome measure was the number of transfers to ED from the home. Our process measure was the virtual care platform for early Internal Medicine specialist assessment. Our balancing measure included the interviews with key stakeholders at the home.

**Project Impact:** The Virtual Internal Medicine Specialist Program will improve ED crowding by reducing the number of unnecessary transfers to the ED from the long-term care home by 10% over two years.

**Results and Lessons Learned:** The Virtual Specialist Program reduced monthly transfers to the ED from the long-term care home by 13%. The monthly proportion of transfers that resulted in hospital admission increased by 26% after program implementation, indicating that the program allowed for a higher proportion of ED transfers that were necessary. Early access to Internal Medicine specialist care via virtual platforms has important implications for improving ED workflow and significantly reducing healthcare costs. Future work will further explore the impact of using virtual platforms to reduce unnecessary ED transfers from long-term care.

**DETERMINING PREDICTIVE FACTORS FOR DELAYED EMERGENCY DEPARTMENT (ED) CONSULT TO DECISION TO ADMIT FOR GENERAL INTERNAL MEDICINE (GIM)**

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**Background:** Overcrowding in the emergency department (ED) is a common issue that negatively impacts patients, hospitals, and health organizations worldwide. One contributor to suboptimal ED patient flow could be admission decision delays. At large academic hospital in Western Canada, the GIM service receives a high volume (459/month) of consult requests for admission of medically complex patients. Improved understanding of patient, provider, and system factors contributing to delays in admitting ED patients to this GIM service was required.

A retrospective chart audit of GIM-admitted patient charts between January-December 31, 2021 was completed. A logistic regression was performed to identify predictive factors for delayed (defined as a decision to admit of > 4 hours) ED-consultation and to identify improvement interventions. A total of 5516 GIM ED-consultations were requested in 12-months, 4173 were admitted. Of those admitted, 42.7% were delayed. Predictive factors (p-value <0.05) found were age over 65-years; primary diagnoses of addiction & mental health; delirium, frailty, and malignancy; a LACE Readmission Score ≥ 74; CTAS score of 1; and time of consult request between 0400-0759 and 2000-2359 were independently associated with delayed admission decision time. Two interventions were identified, adjustment of GIM-physician and resident ED work-shift schedule and development of ED clinical flow pathways.

**Aim:** Within 6-months, reduce the percentage of delayed GIM ED-consult to admission decision time from 42.7% to 25%.

**Measures:** To determine intervention effect, the following will be measured: (1) proportion of ED-consult requests for admission that are fulfilled within 4-hours; (2) an audit of cases with delayed admission decisions to determine adherence to the ED-flow-pathways; (3) proportion of patients with a cancelled GIM-admission order; whose care is transferred to another service; or who are discharged within 12-hours of admission; and (4) physician satisfaction with the adjusted shift schedule.

**Project Impact:** Understanding the factors associated with delayed admission decision time identified interventions that may improve ED flow, allowing ED physicians to care for other unadmitted patients. Adherence to ED-flow-pathways would reduce the need for GIM-physicians to become involved in some patient cases prematurely or unnecessarily, allowing for more efficient use of GIM-physician clinical time.