13.43, SF-12 Mental Composite Summary (MCS)-49.35 ± 7.90. We found that patients who were actively working had better HRQOL as compared to patients who were retired which was statistically significant ($p < 0.05$). Among the medical characteristics, patients of older age, longer time on dialysis, diabetics, with cardiovascular comorbidities, with history of non-compliance to hemodialysis and with increased annual hospitalization rate had worse HRQOL which was statistically significant ($p<0.05$). We also found that patients who had higher phosphate levels and lower albumin levels, had lower HRQOL which was statistically significant ($p<0.05$). We found that the participants who have higher scores in KDQOL-36 have a lower chance (0.96) of death which was statistically significant ($p<0.05$). A similar study was done in our same hospital 10 years back in 2012, where we had assessed the quality of life in patients undergoing hemodialysis. We found that in comparison with the scores 10 years back, there was significant statistical difference in the mental component summary ($p<0.001$). This probably reflects the improvement in the health care delivery systems, socioeconomic environment and support system.

**Conclusions:** The present study gives an insight into the socioeconomic and medical factors associated with the quality of life in ESRD patients on hemodialysis, from Bengaluru, South India. Our study underscores the need to assess the patient's quality of life during regular intervals in the hemodialysis unit and the need to plan individualized interventions according to individual patient requirement, which in turn increases the patient's satisfaction, and will improve dialysis compliance. We found that a patient's HRQOL can predict the risk of death, thus, early intervention can improve short and long term outcomes as well.

No conflict of interest

## WCN23-0976

### RATES OF OUTCOMES OF CARDIAC SURGERY AMONG DIALYSIS & TRANSPLANT PATIENTS 2010-2019: AN AUSTRALIAN REGISTRY LINKAGE STUDY

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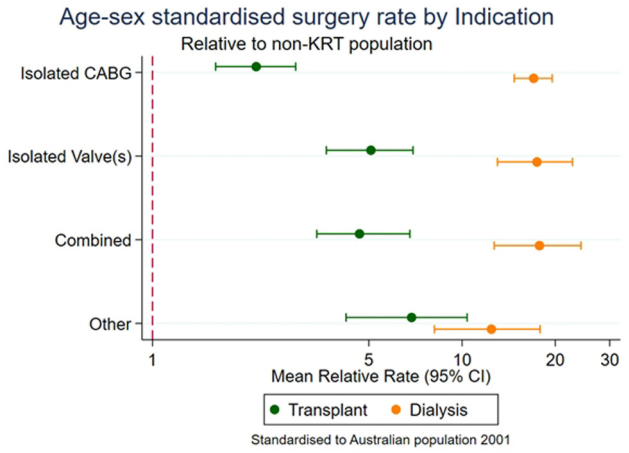
**Introduction:** Kidney failure is associated with increased rates of various types of heart disease, including coronary artery disease and valvular pathology. Using data linkage we examined the rates, type and outcomes of cardiac surgery between 2 national Registries in Australia.

**Methods:** Data from the Australia and New Zealand Dialysis and Transplant Registry were linked with the Australia and New Zealand Society for Cardiothoracic Surgery Database using probabilistic linkage. Rates of different types of cardiac surgery were calculated for those greater than 18 years of age receiving various types of Kidney Replacement Therapy (KRT - dialysis, people with a functioning kidney transplant), and the non-KRT group. Although data was available from both Registries from 2001, the analyses were restricted to the period 2010-2019 as this was the period of national coverage by the Cardiothoracic database.

**Results:** In total 1588 people underwent surgery who were receiving KRT at the time of surgery (1282 people receiving dialysis and 306 with a functioning kidney transplant). There were 114855 people in the non-KRT group. The mean [95%CI] age at surgery was younger for both the dialysis (62.1 [61.5-62.7] years) and transplant (61.6 [60.4-62.8] years) groups than non-KRT group (65.8 [65.7-65.9] years ), with a higher prevalence of diabetes (61% in dialysis group, 45% in transplant group) than the non-KRT group (29%).

The age- and sex-standardised relative rates for surgery were higher for dialysis patients (relative rate (RR) 16.4 [95% CI 14.5-18.3]) than transplant patients (RR 3.9 [3.2-4.7]), with increased rates seen across all surgery types (isolated CABG, isolated valve procedure, combined procedure) – see Figure. This excess rate did not change over time.




Early outcomes were poorer among KRT patients with higher in-hospital mortality (7.5% among dialysis group, 6.9% transplant group vs 2.2% non-KRT group) and lower proportion discharged home (61% in dialysis group, 70% in transplant group vs 76% in non-KRT group). Age- and sex adjusted relative risk of in-hospital mortality was 3.85 [3.1-4.8] for the dialysis group and 3.82 [2.44-5.98] for the transplant group.

**Conclusions:** Rates of both coronary artery bypass graft surgery and cardiac valve surgery were considerably higher among the dialysis and to a lesser extent the transplant groups than non-KRT group. Outcomes were poorer with a similar increase in early (in-hospital) mortality among both dialysis and transplant groups. There are likely to be a number of contributing factors to this excess disease burden. Given the increased demand for surgery, a focus on improving outcomes is warranted.

No conflict of interest

## WCN23-0997

### MACHINE LEARNING MODELS USING BIOMARKERS TO PREDICT MORTALITY IN HEMODIALYSIS

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**Introduction:** Data from the 2020 Brazilian Dialysis Census indicate that 144,779 people were in chronic dialysis in the country, 92.6% of which in hemodialysis, and 81.6% paid by the Brazilian Public Health System. In 2014, a Clinical Guideline for the care of patients with Chronic Kidney Disease (CDK) in the Unified Health System (SUS) was published. The document established the rules for regulation, authorization, registry and payment of the care of CKD patients in Brazil. For dialysis, a list of periodic obligatory laboratory tests was demanded for all patients. This study evaluates the performance of these biomarkers to predict outcomes, such as mortality, using Machine Learning (ML). The aim was to develop models for death prediction using hemodialysis patients' biomarkers.

**Methods:** A retrospective cohort study from 2012 to 2016 with patients over 18 years old in hemodialysis in 23 Dialysis centers in three Brazilian geographical regions: Northeast, Southeast, and Midwest. The data were collected from a standard electronic medical record- European Clinical Dialysis Database. Ethical approval was obtained from the university's Ethics Committees.

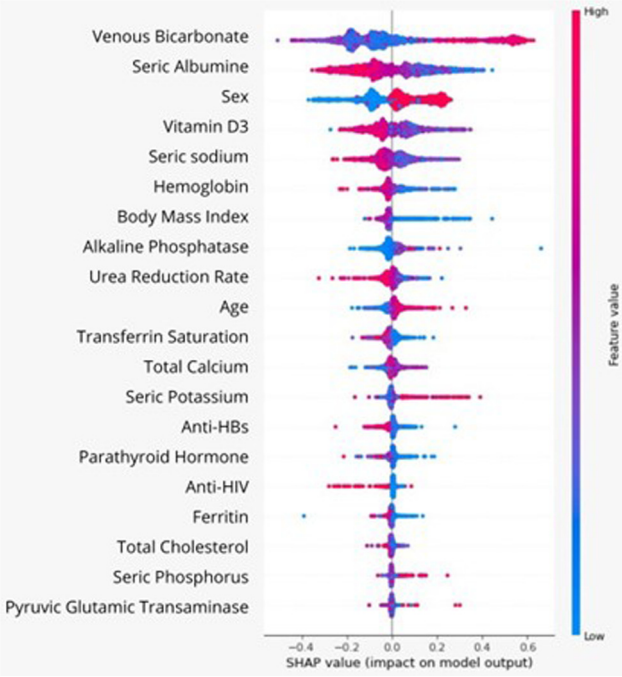
1) Pre-processing data: the primary outcome was death. A sample pairing of 1:1 to the outcome of interest with 2 groups: a reference group with 917 deaths and a control group with 917 randomly selected with no deaths. Variables (n=23): 18 mandatory biomarkers (Hemoglobin, calcium, phosphorus, urea reduction rate, potassium, anti-HBc IgM, sodium, total serum protein, albumin, ferritin, alkaline phosphatase, transferrin saturation, parathyroid hormone, D3 vitamin, anti-HBs, total cholesterol, anti-HIV, 1 non-mandatory biomarker (venous

bicarbonate) and 4 patient profile variables (sex, age, body mass index and Charlson comorbidity index).

2) Modeling and experimenting – Several ML models were tested, including Decision Tree, Random Forest, and XGBoost. Model development and analysis employed Python (3.7.13), using SKLearn, TensorFlow, Keras, and SHapley Additive exPlanations (SHAP).

3) Interpretation and analysis – The impact of each variable was evaluated using the SHAP method. The models' performance was demonstrated by the following metrics: accuracy, precision, sensitivity, and F1-score.

**Results:**




| Metrics (%) | Decision Tree | Random Forest | XGBoost |
|---|---|---|---|
| Accuracy | 76.29 | 81.42 | 83.65 |
| Precision | 76.77 | 86.55 | 87.57 |
| Sensitivity (Recall) | 78.76 | 76.68 | 80.31 |
| F1-Score | 77.75 | 81.32 | 83.78 |

Data from 1834 patients were analyzed. The biomarkers tended to normality. The models' performance metrics are presented in Table 1. The best model was XGBoost. The SHAP method allows us to evaluate the variables' influence on the results of the death prediction model (Figure 1). On XGBoost, venous bicarbonate was the attribute with the highest impact in the model, with a positive direct association with mortality. Bicarbonate was followed by albumin, male gender, D3 Vitamin, sodium, hemoglobin, body mass index, alkaline phosphatase, and urea reduction rate.

**Conclusions:** It is possible to predict dialysis patient mortality by analyzing the Brazilian obligatory routine biomarkers using Machine Learning. The aim was to develop models for death prediction using hemodialysis patients' biomarkers. The predictive model with the best performance was XGBoost.

Conflict of interest Potential conflict of interest: Fresenius Medical Care

## WCN23-1027

### DISTRIBUTION, PREPAREDNESS AND MANAGEMENT OF UKRAINIAN ADULT REFUGEES ON DIALYSIS— AN INTERNATIONAL SURVEY BY THE RENAL DISASTER RELIEF TASK FORCE OF THE EUROPEAN RENAL ASSOCIATION

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**Introduction:** During armed conflicts dialysis patients may experience limitations or interruptions of therapy leading to severe life-threatening complications due to medical and logistical challenges. Before the Russian-Ukrainian war, there were approximately 10,000 adults requiring dialysis in Ukraine. Some patients decided to flee their place of residence and look for opportunities to continue dialysis in another location in Ukraine or abroad. To better understand the needs of conflict-affected kidney failure patients and to provide data which could support equitable and evidence-based prioritization of resources, the Renal Disaster Relief Task Force of the European Renal Association conducted a survey on distribution, preparedness and management of adults requiring dialysis displaced due to the war in Ukraine.

**Methods:** Cross-sectional online survey was conducted to assess the status of dialysis patients who were displaced across European countries since the beginning of the conflict in February 2022. The survey was sent to all national nephrology societies across Europe with a request to disseminate it to all dialysis centers in their countries. Data were collected between May and August 2022. Fresenius Medical Care (FMC) shared a limited set of aggregated data without direct center participation.

**Results:** We received data on 602 patients (290 collected through the survey and 312 from FMC), who were dialyzed in 24 countries. Most patients were dialyzed in Poland (45.0%), followed by Slovakia (18.1%), Czech Republic (7.8%), Romania (6.3%), Germany (4.7%) and Hungary (3.5%). Most patients were originally dialyzed in Kyiv (north-central), Kharkiv (northeast), Odesa (southwest) and Zaporizhzhia (southeast). Before reaching the current reporting center, 34.6% of patients were treated in at least one other center since leaving their regular unit. Mean age was 48.1±13.4 years, 43.5% were females. Before patients left Ukraine, 95.7% had been on hemodialysis (HD), 2.5% on continuous ambulatory peritoneal dialysis (PD) and 1.8% on automated PD. HD session frequency was reduced under war conditions in 23.5% of patients. Eighty-eight percent of HD patients had a patent arteriovenous fistula, 7.3% were HBs antigen positive, 16.1% had anti-HCV antibodies, 0.6% anti-HIV antibodies and 27.3% anti-HBc antibodies. In terms of patient preparedness for displacement, 63.9% carried medical records with them, 63.3% had a list of medications, 60.4% had medications themselves and 44.0% had a dialysis prescription. Overall, 26.1% of patients were admitted to the dialysis unit in the possession of all these factors while 16.1% presented with none. After leaving Ukraine, 33.9% of patients were hospitalized. Of the 88.5% of patients tested in the reporting center for COVID-19 1.9% was positive. Communication and language problems were reported by 43.8% of responding physicians.

**Conclusions:** Up to the end of August 2022, less than 10% of Ukrainian dialysis patients decided to flee their country since the start of the Russian-Ukrainian conflict and the majority of them chose as their place for dialysis a country neighboring Ukraine. Preparedness for displacement varied and was incomplete in most patients. Results from our survey may inform evidence-based policies and interventions to prepare for and respond to special needs of vulnerable kidney failure populations during armed conflicts and other emergencies.

No conflict of interest