# Evaluation of multiple risk factors for prediction of one-year survival in hemodialysis patient 65+

## Polish Society of Nephrology

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**Polish Society Of Nephrology– NATIONAL PROJECT**

**ERA-EDTA and National Societies for Nephrology and Dialysis**

**October 10-11, 2015, Innsbruck (Austria)**

# Introduction

- In hemodialysis (HD) patients many risk factors for death are often considered **separately**.
- In the era of a **growing geriatric population** many socio-economic factors (nursing home care, independent functioning) influence **patient survival**.
- Malnutrition, protein-energy wasting and **sarcopenia** often precede complications and functional disability.
- Among available scales for functional state evaluation the **Barthel Index** is widely used in Poland to measure disability levels.
- Albumin, phosphorus and lipids are among routinely assessed biochemical parameters indirectly expressing dialysis adequacy and death risk.

- Recently published results from the DOOPStudy (Kanda et al.) indicate that the **simultaneous evaluation of multiple risk factors** can more accurately assess patients' prognosis and identify patients at an increased risk of death than single factors. [PLoS ONE 10(6): e0128652. doi:10.1371/journal.pone.0128652]

# Introduction

**Evaluation of multiple risk factors** can more accurately assess patients' prognosis and identify patients at an increased risk of death than single factors



Survival Index
(multiple risk factors)
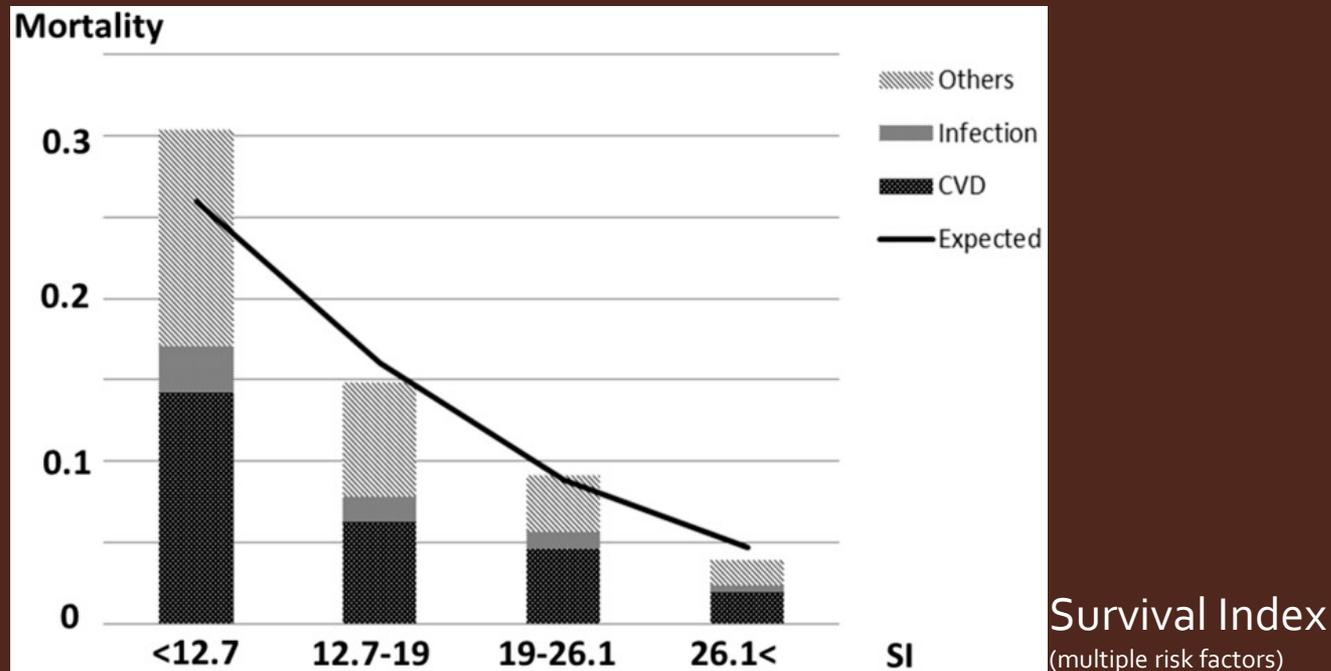
Observed vs predicted incidence of death within one year among SI quartiles. The bar graphs show the observed incidence of all-cause deaths (CVD-caused, infection-caused, and other-caused death). The line graph shows the incidence of deaths predicted using SI. The observed incidences are in good agreement with the predicted incidence. Abbreviations: SI, Survival index; CVD, cardiovascular disease-caused death; infection, infection-caused death.

# Introduction – sarcopenia increases risk of mortality and hospitalization

- The body mass index (BMI), commonly used for defining obese patients, does not give sufficient indication on the body composition and distribution of fat mass. In the elderly population, relative excess in fat mass associated with a decrease in lean mass is frequently observed. In such situations of sarcopenic obesity, the relative weight stability can be misleading.

- Sarcopenia increases progressively along with loss of renal function in CKD patients and is high in dialysis population. It has been documented that prevalence of frailty in hemodialysis adult patients is around 42 % (35 % in young and 50 % in elderly), having a 2.60-fold higher risk of mortality and 1.43-fold higher number of hospitalization, independent of age, comorbidity, and disability.

- The diagnosis of sarcopenia is based on muscle mass assessment by body imaging techniques, bioimpedance analysis, and muscle strength evaluated with a handheld dynamometer

# Introduction

## the Barthel Index in assessing the activities of daily living of older people

| Activity | Score |
|---|---|
| **FEEDING**<br>0 = unable<br>5 = needs help cutting, spreading butter, etc., or requires modified diet<br>10 = independent | _____ |
| **BATHING**<br>0 = dependent<br>5 = independent (or in shower) | _____ |
| **GROOMING**<br>0 = needs to help with personal care<br>5 = independent face/hair/teeth/shaving (implements provided) | _____ |
| **DRESSING**<br>0 = dependent<br>5 = needs help but can do about half unaided<br>10 = independent (including buttons, zips, laces, etc.) | _____ |
| **BOWELS**<br>0 = incontinent (or needs to be given enemas)<br>5 = occasional accident<br>10 = continent | _____ |
| **BLADDER**<br>0 = incontinent, or catheterized and unable to manage alone<br>5 = occasional accident<br>10 = continent | _____ |
| **TOILET USE**<br>0 = dependent<br>5 = needs some help, but can do something alone<br>10 = independent (on and off, dressing, wiping) | _____ |
| **TRANSFERS (BED TO CHAIR AND BACK)**<br>0 = unable, no sitting balance<br>5 = major help (one or two people, physical), can sit<br>10 = minor help (verbal or physical)<br>15 = independent | _____ |
| **MOBILITY (ON LEVEL SURFACES)**<br>0 = immobile or < 50 yards<br>5 = wheelchair independent, including corners, > 50 yards<br>10 = walks with help of one person (verbal or physical) > 50 yards<br>15 = independent (but may use any aid; for example, stick) > 50 yards | _____ |
| **STAIRS**<br>0 = unable<br>5 = needs help (verbal, physical, carrying aid)<br>10 = independent | _____ |
| | **TOTAL (0–100):** _____ |

Collin C, Wade DT, Davies S, Horne V. "The Barthel ADL Index: a reliability study." *Int Disability Study.* 1988;10:61-63.

# Aim of the study

to evaluate the maintenance concerning HD patients' risk of death within one year from multiple risk factors using a novel indices

Based on available data on site (dialysis centre) two types of indices will be analysed:

> age+ Barthel score + albumin level + body mass index + vascular access + total cholesterol + phosphorus levels + cardiovascular diseases

> age+ Barthel score + albumin level + **BCMI (body cell mass index)** + vascular access + total cholesterol + phosphorus levels + cardiovascular diseases

# Evaluation of multiple risk factors for prediction of one-year survival in hemodialysis patient 65+

- **Design:**

Multicentre, prospective (12 months follow-up) nationwide study on hemodialysis dependent patients aged 65 years or more.

- **Patients & methods:**
- The first step of the survey entails gaining participants for a nationwide study; the information forms will be sent to all dialysis centres in Poland. The materials will explain the purpose and the importance of the study. After collecting responses from dialysis centres, the study page (WWW) will be launched and the enrolment will be opened.
- Study inclusion criteria:
1. Patients starting dialysis within the last 180 days.
2. Patients aged 65 years or more not scheduled for living related transplantation.

- The number of patient participated in the study: 1500

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- **<u>Measures</u>:** The database will collect only data routinely collected: age, gender, dialysis vintage, HD time /week, kt/V, HGB level, Barthel score, Charlson index (if available), albumin level, pre-dialysis serum sodium level, pre-dialysis serum potassium level, pre-dialysis serum bicarbonate level, body mass index, vascular access (AVF use), total cholesterol, phosphorus levels, PTH, cardiovascular diseases, interdialytic weight gain, BCMI (ECM/BCM), LTI, FTI – if available.

- **<u>Data analysis and statistics:</u>**

- **Patients who will survive >90 days will be separately analysed due to additional factors competing in the first 90 days usually worsening prognosis.**

- **An analysis in two different patient groups will be performed to develop and validate indices, respectively. To predict death within one year, models will be developed using logistic regression models.**

# Project implemantation - centers

**Wojciech Załuska (Principal Investigator), Mariusz Kusztal (co-Principal Investigator)**

**Collaborators: :**

**Marian Klinger, Magdalena Durlik, Kazimierz Ciechanowski, Alicja Dębska-Slizień, Tomasz Stompor, Beata Naumnik, Michał Nowicki, Andrzej Oko, Jolanta Malyszko, Joanna Matuszkiewicz-Rowińska, Andrzej Więcek, Władysław Sułowicz, Ryszard Gellert.**

List of the centres/institutions involved :

- Department of Nephrology, Medical University of Lublin,
- Department of Nephrology and Transplantation Medicine, Wroclaw Medical University, Wroclaw,
- Department of Nephrology and Transplantation Medicine, Warsaw Medical University,
- Department of Nephrology, Transplantology and Internal Medicine, Medical University of Gdańsk,
- Department of Nephrology, Hypertension and Internal Diseases, University of Warmia and Mazury, Olsztyn,
- Clinical Department of Nephrology, Transplantology & Internal Medicine, Pomeranian Medical University, Szczecin,
- 1st Department of Nephrology and Transplantation with Dialysis Centre, Medical University, Bialystok,
- Department of Nephrology, Transplantology and Internal Medicine, Poznan University of Medical Sciences,
- 2nd Department of Nephrology, Medical University, Bialystok,
- Department of Nephrology, Department of Nephrology, Dialysis and Internal Medicine, Medical University of Warsaw,
- Transplantation and Internal Medicine, Medical University of Silesia, Katowice,
- Department of Nephrology, Jagiellonian University, Medical College, Cracow,
- Department of Nephrology, Medical Centre for Postgraduate Education, Bielański Hospital, Warsaw

Polish Club of Young Nephrologist / branch of Young Nephrologists' Platform will be involved !
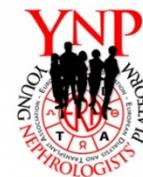
# Poland 2014 –demographic data

## Population  -  38,5 mln

### Patients  on haemodialysis -   19372
### Patients on HD >65 years -  50%
### Dialysis centers- 280

# Advantages of the study

- **Multifactory prediction model with verification**
- **Taking into account  the Barthel Index, which is widely used in Poland to measure disability levels (practical!)**
- **Collection of clinically and laboratory relevent data including dialysis adequacy**
- **Focus of nutrition and sarcopenia (BIA measures)**
- **Separate analysis for patients survived ≤90 and >90 days to regard factors competing in the first 90 days**
  **/worsening prognosis/**

- **Involvement Young Nephrologists**

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