Conceptualisation and validation of a paradigm based on uraemic toxins for management of chronic kidney disease in paediatric patients

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Background

Children with **chronic kidney disease** have **significant co-morbidities** resulting in

- ✓ a **lifelong** need for health care
- ✓ 3 times **decreased life expectancy**
- ✓ **poor quality of life** and integration in society

Good **tools to evaluate severity** and **monitor adequacy of treatment** of children with CKD are lacking resulting in **suboptimal management**.

Retention of uraemic toxins is accepted to play a major role in the pathogenesis of the comorbid conditions, but studies in children are lacking.

Objective

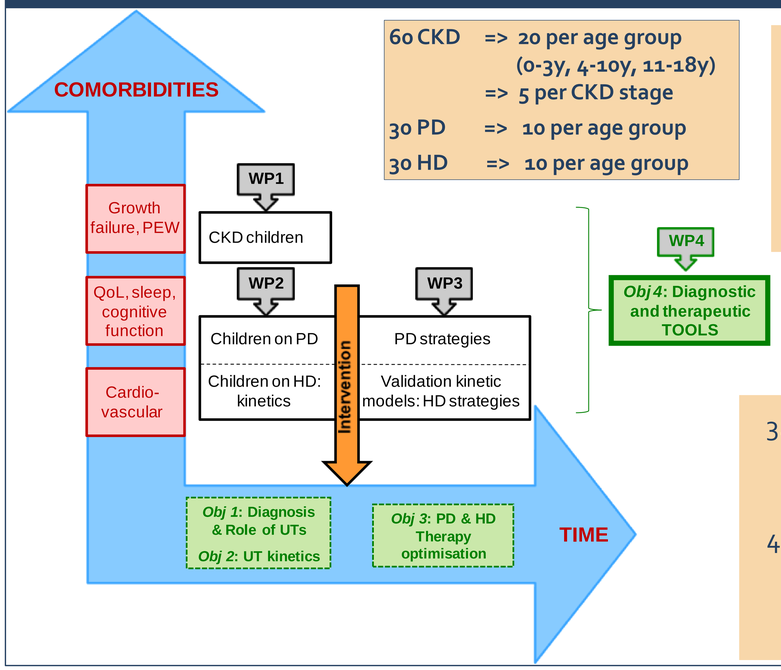
The **scientific objective** of this **four years project** is to:

provide the clinician
with new diagnostic and therapeutic tools
for the management of children with chronic kidney disease

based on the improved understanding of
URAEMIC TOXICITY

Project funded by IWT and starting on the 1st of October 2015

Methods



60 CKD => 20 per age group (0-3y, 4-10y, 11-18y)
=> 5 per CKD stage

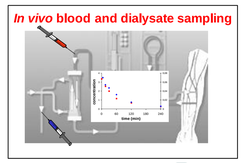
30 PD => 10 per age group

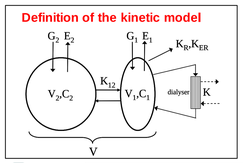
30 HD => 10 per age group

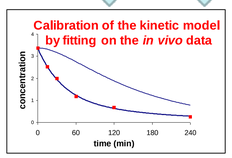
1. Identify **associations between concentrations of a broad array of uraemic toxins and different co-morbidities**: i.e growth, protein-energy wasting, cardiovascular risk factors, quality of life, circadian rhythm, psycho-social functioning (cross-sectional & longitudinal)
2. Evaluate k**inetic modelling of uraemic toxin distribution** and transport in haemodialysis (HD) patients

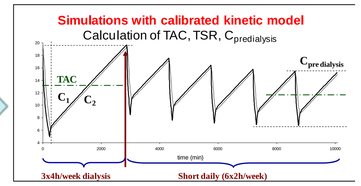
IDENTIFICATION OF THE MOST
REPRESENTATIVE URAEMIC TOXIN MARKER(S)

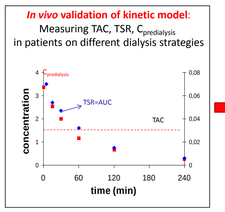
3. Validation of the **kinetic models** by evaluating uraemic toxin concentrations and co-morbidity variations **after interventions** (e.g. optimal dialysis strategy as determined by the modelling) in PD and HD patients.
4. Development of **prediction simulator** to determine the most optimal dialysis strategy in the individual patient, including the organisation of the **'CKD academy'** for nephrologists and laboratory staff with workshops about the simulator and the related laboratory techniques.

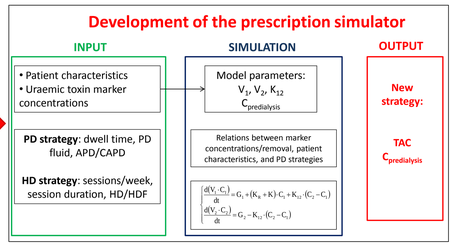












Conclusions

By providing clinicians, dealing with children with CKD, with **more advanced and appropriate** tools to improve management of all children with CKD, i.e. better assessment of the degree of renal dysfunction, better determination of the ideal time to start renal replacement therapy, and more accurate monitoring of the quality of that renal replacement therapy, **we aim to improve neurocognitive and psychosocial functioning**, **growth, maturation into puberty**, and **social integration** and **survival**.

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