SHORT TERM SCIENTIFIC MISSION (STSM) – SCIENTIFIC REPORT

The STSM applicant submits this report for approval to the STSM coordinator

Action number: CA15210 (European Network for Collaboration on Kidney Exchange Programmes)
STSM title: Hungarian-Portuguese collaboration on optimisation and practice of KEPs
STSM start and end date: 27/01/2018 to 03/02/2018
Grantee name: Réka Kis-Benedek

PURPOSE OF THE STSM/

Three of us from Budapest (Péter Biró, Márton Gyetvai and Réka Kis-Benedek) visited Ana Viana and her research group in Porto. I am a Bsc student in mathematical economics and right now I am writing my thesis on kidney exchange programmes, under the supervision of Péter Biró. The main goal of the visit for us was to get to know an actual working exchange programme, since Hungary is on its way to start a KEP itself, and for me I can use these experiences in writing my thesis.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

We had very fruitful discussions on optimisation in kidney exchange problems, and implementation of kidney exchange programmes. During our stay we talked through the following topics.

Portuguese KEP: Ana and his group explained us the details of their national programme and also showed us some current study of their own in the topic.

International exchanges: The hosts also explained us, how they plan to implement an international collaboration with Spain and Italy. This topic turned out to be the most interesting one to me. Based on one of our hosts earlier paper (Carvalho, M., Lodi, A., Pedroso, J. P., and Viana, A. (2017). Nash equilibria in the two-player kidney exchange game. Mathematical Programming, 161(1-2), 389-417.) I intend to search in this game theoretical aspect of kidney exchange programmes in my bachelor thesis. The hosts also presented a new study for the most general model by Viana et al. with simulations.

Reoptimisation: The last question we discussed was how can we re-optimise a matching after lab test. Since virtual crossmatch tests often proved to be wrong, several cycles can fail. Some countries use some kind of re-optimisation if an exchange fails, but it is uneasy and costly to do. Ana Viana and her colleagues have several recent publications on closely related

questions: maximising the expected number of transplants and robust models for kidney exchange.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

The detailed knowledge of the Portuguese KEP and its planned collaboration with Spain and Italy will be useful in the establishment of the Hungarian programme, since the size of the two countries is similar, and Hungary may also have a joint programme with Austria and the Czech Republic in the future.

In the game theoretical aspect there has occurred some possible relaxations of the model that may can be computed, and other methods for the proves in the previously mentioned paper. The hosts presented their latest results in the topic, and they also showed us some simulation results of their own.