

## 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: STSM reference number: 42364 visit to the Hungarian Academy of Sciences, Institute of Economics, Budapest, HU**

**STSM start and end date: 21/01/2019 to 25/01/2019**

**Grantee name: Antonio Nicolò**

### PURPOSE OF THE STSM/

As described in the research plan, I visited my colleague Peter Biro and his team at the Hungarian Academy of Sciences for a week. The two main goals of the visit are knowledge exchange and the initiation of joint researches.

### 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. We describe the main topics for discussions below.

**Practical application:** I present to my Hungarian colleagues the new DEC-K program (DEC-K: DECeased-Kidney paired exchange) that is going to be implemented in Italy. This program exploits deceased donor kidneys to initiate chains of living donor kidney paired donations, combining deceased and living donor allocation mechanisms. I first present a simulation study using retrospective data on the pool of donor/recipient incompatible and desensitized pairs at the Padova University Hospital, the largest centre for living donor kidney transplants in Italy. Then, I discuss the national protocol that has been written to merge this new program with the other two living donor programs already existing in Italy, the cross over program and the Samaritan program.

#### References

1. Deceased-donor-initiated chains: first report of a successful deliberate case and its ethical implications” ((with L. Furian, C. Cornelio C. Silvestre, F. Rossi, P. Rigotti, E. Cozzi, and F. Neri), forthcoming *Transplantation*
2. “Using deceased-donor kidneys to initiate chains of living donor kidney paired donations: algorithm and experimentation”, (with C. Cornelio, L. Furian, and F. Rossi), Proceedings

of the AAAI/ACM Conference on Artificial Intelligence, Ethics and Society (AIES), 2019.

**Incorporating quality in kidney exchanges:** We extendedly discussed a new project that aims to incorporate quality consideration in KPE programs.

#### References

1. “Age-Based Preferences in Paired Kidney Exchange” (with. C. Rodriguez-Alvarez), Games and Economic Behavior, 102, 508–524, 2017.
  2. “Incentive Compatibility and Feasibility Constraints in Housing Markets” (with C. Rodríguez Álvarez ), Social Choice and Welfare, 41, 625-35, 2013.
- “Transplant Quality and Patients’ Preferences in Paired Kidney Exchange” (with C. Rodríguez Álvarez ), Games and Economic Behavior, 72, 299-310, 2012

#### DESCRIPTION OF THE MAIN RESULTS OBTAINED

**Practical application:** Peter Biro gave to me very useful suggestions on how to ameliorate the algorithm that we are currently designing jointly with Italian National Transplant Centre (CNT) to implement the three living donor programs above mentioned.

**Incorporating quality in kidney exchange** We analyzed different quality indexes that were recently proposed by the medical literature, the LDKP index proposed by Messie et al (2017) and the Estimated Kidney Graft Survival Calculator proposed by Bray 2017 et al (2017) ,and we discussed how to design a new algorithm that could incorporate such information in its optimization procedure.

#### FUTURE COLLABORATIONS (if applicable)

**Practical application:** I will consult the Hungarian colleagues about the implementation of the Italian living-donor programs, especially about the software and the optimisations technique.

**Incorporate quality in kidney exchange** We are planning to conduct simulations to test the effect of incorporating quality in KPE programs. In particular we are interested in designing allocation procedure that could provide incentives to compatible pairs to participate to these programs and to estimate how their increased participation of compatible pairs could be beneficial to increase both the number and the average quality of the transplants.