FARMAPRICE: DEVELOPMENT OF A PHARMACOGENETIC CLINICAL DECISION SUPPORT SYSTEM AND PRELIMINARY EVALUATION OF ITS FEASIBILITY AND USABILITY IN THE CLINICAL PRACTICE

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Introduction: FARMAPRICE prototype was conceived as the first Italian endeavor of a Pharmacogenetic (PGx) clinical decision support system (CDSS) development to aid healthcare professionals in managing PGx information in the clinical context in the Italian Centro di Riferimento Oncologico (CRO)-Aviano Hospital. It was developed through a coordinated partnership between two e-Health companies (Roncato et al., Genes, 2019). The primary aim of the presented project was to develop FARMAPRICE functional prototype as an active PGx CDSS integrated with PGx guidelines and patient genetic data. As a follow up activity of the project an interview was set up to evaluate the FARMAPRICE CDSS feasibility and usability for PGx drug therapy among healthcare providers (i.e. oncologists, anesthetists or pharmacists) in everyday clinical practice.

Methods: Publicly available guidelines were reviewed and compared to reach a consensus in terms of gene-drug pairs considered, their different level and classification of evidence rated of pre-emptive PGx test basing on a scoring system and the therapeutic strategy recommended. Information on the strength of the recommendation were considered necessary to be integrated in the prescribing system along with the therapeutic recommendation. The IT tools for collecting medical-molecular data were configured together with corresponding protocols for the acquisition and integration of molecular data in a standardized form. To guarantee the longest lifetime of the applications and a high level of interoperability, open source solutions were implemented. Recently a review protocol has been started and healthcare professional received a training on and access to the FARMAPRICE CDSS. FARMAPRICE potential users have been interviewed following a semi-structured guide including a hypothetical patient scenario that had to be solved by using FARMAPRICE. Follow-up questions were asked to be answered on the perceived feasibility and usability. Healthcare professionals' attitudes to the clinical uptake of PGx before and after participating in this implementation project was also surveyed.

Results: FARMAPRICE has been designed as a web-service platform, implemented by using open-source components and technologies. It is designed to be a module: It defines and enforce logical boundaries, it is pluggable with another module that expects its interface, and it is a single unit to be easily deployed, overcoming fragmentation issues. FARMAPRICE includes gene-drug pairs related to 46drugs. Prescribing physicians can interrogate the FARMAPRICE platform to get a PGx-based dosing recommendation integrated with its level of evidence and clinical impact in presence of a potentially clinically actionable genotype. A PGx-based recommendation is first delivered at the time of drug prescription as a "first level message" briefly describing the involved risk (inefficacy or toxicity) and an on-demand "second level message" detailing the recommended changes in terms of PGx-based drug dosing and selection. Between 2018and 2019, 23healthcare professionals (n=15oncologists, 5anesthetists and 3pharmacists) participated in the evaluation of FARMAPRICE PGx CDSS. The results of FARMAPRICE evaluation are in progress.

Discussion and conclusions: FARMAPRICE was designed to aid clinicians in prescribing the most efficacious and cost-effective pharmacological therapy available by providing support for prescribing drugs within available PGx guidelines. A CDSS prototype has been created and has just been presented to clinicians for use in the clinical setting. In the next few years, pre-treatment patient genotyping will likely become a more common clinical practice, and FARMAPRICE could represent a user-friendly, stand-alone system that can be integrated into every clinical context to manage genetic data and optimize patient treatments.