# NON-INVASIVE RADIO-FREQUENCY FOR EARLY DIAGNOSIS OF PROSTATE CANCER

Bellorofonte Carlo (a), Spagnolini Umberto (b), Giudici Andrea (c), Badalucco Pietro (d), Cesana Claudio (e), Canonico Michelangelo (f)
*(a) Columbus Clinic of Milan, Urology Center*
*(b) Polytechnic of Milan, Electonics, Information and Bioengineering Department*
*(c) Medielma Srl, Research and Development*
*(d) Medielma Srl, Research and Development*
*(e) Columbus Clinic of Milan, Urology Center*
*(f) Medielma Srl, Research and Development*
*Presenting author: Bellorofonte Carlo bellorof@gmail.com*

Since the early diagnosis has the potential to reduce mortality, it is important to involve new diagnostic tools for cancer investigation to prevent the unnecessary use of current diagnostic methods that are expensive, time-consuming, invasive, and uncomfortable. Early diagnosis for massive screening needs a medical device that is non-invasive (vs. DRE, colonscopy, mammography, prostate biopsy, rectal ultrasound, etc.), and with a higher negative predictive value (NPV) than traditional diagnostic tests. Objective of this study was to evaluate the feasibility of prostate cancer detection using the ESO-MED 8G and to evaluate its diagnostic accuracy. ESO-MED 8G is an electromagnetic medical device that performs non-invasive diagnosis for the exclusion of neoplastic diseases. It is based on a transmitting probe that emits a low-power radiofrequency, a receiver equipment and a diagnostic software to evaluate the diagnostic parameters and to provide a clinician friendly graphical representation. 602 men (64 ± 13 years) were evaluated with the ESO-MED 8G between November 2012 and September 2013 in a prostate unit. The patient normally dressed is placed standing in front of the receiver equipment while the probe is approached and moved over the anatomical area of interest. The presence of biochemical alterations in tissues changes the level of coupling between the transmitting probe and contact tissues returning a diagnostic indicator to discriminate tumor tissues. ESO-MED 8G sensitivity for the diagnosis of prostate cancer was 94.9%; specificity, positive and negative predictive values were 97.9, 88.1 and 99.1%; accuracy was 97.5%. Comparing the ESO-MED 8G with others diagnostic tests currently involved for prostate cancer investigation, the NPV (99.1%) is higher than PSA, DRE and rectal ultrasound, 72, 74 and 78% respectively.

The results of this study confirm the possibility of electromagnetic exclusion of cancer. When the device response is negative it means that further invasive investigations are not necessary (NPV > 99%). On the contrary when the response is positive it means that prostate biopsy or further investigations is recommended. Strengths of ESO-MED 8G are non- invasive and fast examination, use of non-ionizing radiation with very low intensity, and high-sensitivity (detection of tumor below 5 mm in size with high accuracy). In conclusion ESO-MED 8G represents the first-screening method that can be adopted to prevent unnecessary use of other uncomfortable diagnostic methods (e.g., DRE, rectal ultrasound for prostate).