

## 1. PUBLISHABLE SUMMARY

### **Summary of the context and overall objectives of the project (For the final period, include the conclusions of the action)**

Armenia has a very high incidence and mortality of cancers, as well as a very high prevalence (according to incidence) among rare malignant diseases, while it underperforms in cancer research when compared to the EU average. ARICE aims to increase the cancer research infrastructure capacities in Armenia, through integrating a robust pathology and genomic background with state-of-the-art biobanking to a research-ready data structure at YSMU. This will be achieved by establishing close cooperation between researchers from multiple specialties hosted by YSMU with the leading expert-institutions in the field as well as by facilitating spread of the competences at institutional, national and regional levels. New scientific developments in the field of cancer prevention, particularly in biomarker research and large population-based investigations will facilitate success in cancer research. Eventually, acquired competences will be easily transferable to other fields of research related to medicine, biology, medical ethics, health-economics and biostatistics in Armenia and in the wider Caucasus region.

### **Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far (For the final period please include an overview of the results and their exploitation and dissemination)**

After systematic and detailed analysis, YSMU has developed an initial Roadmap which primarily concerns with institutional level for cancer research and requiring infrastructure which will also serve at national and society levels to have a strategic impact on cancer research in Armenia. The roadmap which addresses the ethical, legal and organizational issues is dedicated for from the investigator to the society levels. Currently, there are no legal regulations or laws in Armenia regulating the protection of human subjects, including human specimens, residual diagnostic specimens or medical information. ARICE addressed the application of regulatory standards to the research use of biological specimens and associated data, including of genomic data which is not regulated or could be complicated by a variety of organizational issues. Eventually, YSMU provided the strategic steps and recommendations which the coordinator should meet for the creation of the biobank and development for cancer research infrastructure.

Within the scope of the ARICE project (Twinning for the Armenian Research Infrastructure on Cancer Research), the European partners provided YSMU with 71 SOPs (Standard Operating Procedures). They contain specified information and instructions concerning cancer research and biobanking and represent a major progress in establishing state-of-the-art research workflows at YSMU. All SOPs were reviewed by the YSMU experts and were adapted for the local use in the YSMU as well as in the Armenian scientific community.

The first research results were published in the "Human Genome Variation" international peer-reviewed journal authored by the YSMU scientists. The article is dedicated to the study of hereditary breast and ovarian cancer in Armenian patients with main conclusion of need of complete analysis of cancer-associated genes. The second publication of ARICE researchers from MedUniGraz, IARC and YSMU was the book entitled "Biobanks in low- and middle-income countries: relevance, setup and management" which introduces the fundamentals of biobanking and guides through the practical planning.

Trainings. Because of the COVID pandemic situation, the training courses initially planned to organize at partner institutions in Europe, were organized online 2 training courses in the form of daily training sessions. The online sessions allowed participation of wider audience (researchers, teachers, and students) who were able to further delineate issues of state-of-the-art cancer research.

Project consortium has followed the Communication and Dissemination plan to mobilize multiple stakeholder support and ensure the widest distribution of project achievements. Following to the development of project website (<http://www.arice.am>), it became accessible through the link also from the web-sites of the coordinator and partner country universities. An online opening conference of ARICE was officially held on February 12, 2021 gathering participants of the project consortium.

The YSMU presented its first scientific results to whole oncological society of Armenia during the first Armenian Oncological Congress during 6-7 February, 2021.

To strengthen the role of medical genetics education and new master and clinical residency programs in partner universities, TV and youtube broadcasting programs were prepared and realized.

### **Progress beyond the state of the art, expected results until the end of the project and potential impacts (including the socio-economic impact and the wider societal implications of the project so far)**

The ARICE project will contribute to:

- 1) Increasing research excellence of YSMU in the particular field of research” in 3 main ways: increasing the number and quality of researchers working on cancer, building the multidisciplinary capacity needed for research and policy, and increasing the use of existing research infrastructure,
- 2) enhancing the reputation, attractiveness and networking channels of YSMU into cancer through the unique, multidisciplinary approach combining large-scale study design, biobanking, and cost-effectiveness modelling for genetics-based research on cancer.
- 3) Improving capability to compete successfully for national, EU and international competitive research funding by ARICE specific training in writing grant applications.
- 4) Illustrating the expected potential impact of the project at national and international levels: increase of peer-reviewed publications, increase of successful international grant applications in relevant areas, new national research and innovation projects with participation of scientists involved in ARICE, contracts with international partners for use of YSMU’s biobanking resources, new and innovative products/services implemented in the field, researchers, PhD, post-doctoral students and residents having received training within ARICE.

ARICE will generate 7 main exploitable results during and beyond the project funding period with wider socioeconomic impact and implementation in health care:

- 1) New data processing methodologies for biobanks in cancer research: The implementation of the biobanking methods will already considerably improve the quality of data gathered by YSMU researchers. This will make the biobank data more attractive and useful to other researchers in the cancer research field. Furthermore, the material acquired by the biobank will be available for further project realization on the EU and international platform, therefore providing availability for new projects.
- 2) Development of protocols for cancer research that will improve decision making in public health infrastructure for interventions. This provides a basis for consultancy services to national public health authorities.
- 3) Training programmes carried out in the scope of ARICE will be used to develop training for other research institutions.
- 4) The project consortium will identify additional platforms for sharing biobank data outside Europe.

- 5) The cancer research protocols developed in the project can be expanded to other geographical regions.
- 6) ARICE SWOT and Risk analyses to develop project's exploitable results into commercial products, including ethical and legal risks.

**Address (URL) of the project's public website**

<https://www.arice.am>

