

# Personalised Medicine Gaps and Needs analysis in African regions

## North Africa/ Egypt

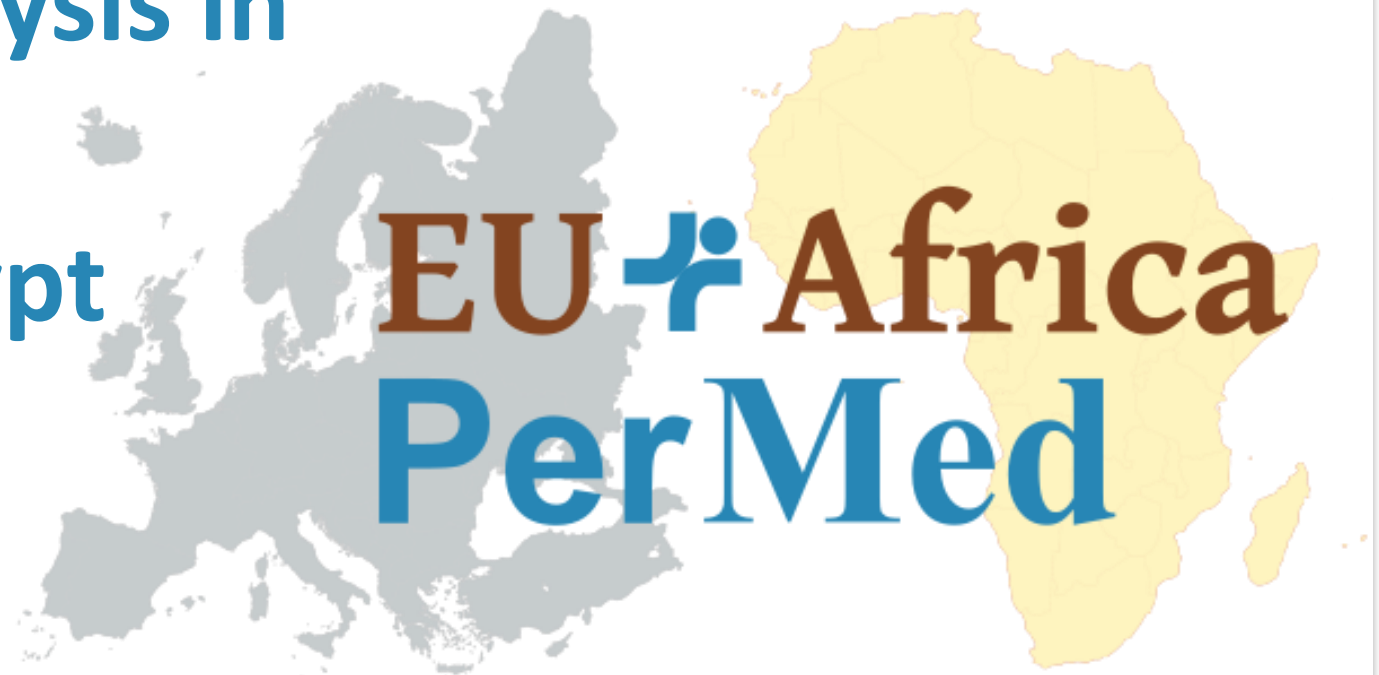
### 2<sup>nd</sup> Stakeholder Workshop

Day 1

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Egypt, ECITD

Cape Town South Africa- 21 February 2023



**BUILDING LINKS BETWEEN  
EUROPE AND AFRICA IN  
PERSONALISED MEDICINE**



EU-Africa PerMed has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 964333

# SWOB summary

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"><li>- Increased research funding, legal infrastructure, EDA and RDIC</li><li>- The Reference Genome Project. Relatively large pharma industry</li><li>- Building large data and research infrastructure: 100 Million Healthy Lives [HCV, NCD, women health], Biobanks, data centers</li><li>- Availability of national data on congenital and genetic disorders</li><li>- Development of 11 genetic counselling clinics in different Egyptian governorates, counselling services &amp; national newborn screening programs</li><li>• Recognition of medical genetics as a medical speciality</li><li>• Establishment of professional bodies and scientific societies</li><li>• Availability of training courses for healthcare practitioners -EKB</li><li>• Genetic services started to be integrated into the primary, tertiary community &amp; included in the MoH&amp;Ps five-year plans</li></ul>	<ul style="list-style-type: none"><li>- Equitable access to services, medical insurance &amp; Increase the coverage of genetic tests funded from the public sector</li><li>- Awareness and knowledge of genomic applications still needs improvement.</li><li>- Insufficient pharmacogenomics practices and test unavailability due to limited funding.</li><li>- Measuring the impact of congenital and genetic disorders on health services</li><li>- Establishing comprehensive population based congenital disorder surveillance systems</li><li>- Documenting the prevalence of hereditary "late-onset disorders"</li><li>- Increase the coverage of newborn screening (urban vs.rural areas)</li><li>- Establishment of postgrad degree for the genetic lab specialists</li></ul>
OPPORTUNITIES	BARRIERS
<ul style="list-style-type: none"><li>• Specialized degrees Msc/PhDs of medical genetics e.g SCU</li><li>• National and International collaborative projects and scientific events i.e hackathons, supportive ecosystem</li><li>• Increase the funding e.g Egyptian Human Genome Project</li><li>• Advanced pharmacogenomics practices &amp; genetics services e.g 57357 &amp; NRC specialized unit</li><li>• <i>Efforts in</i> successful genomic medicine integration in healthcare system in Egypt</li></ul>	<ul style="list-style-type: none"><li>• Underreporting birth prevalence of disorders</li><li>• The multiplicity of actors and initiatives leads to the fragmentation of efforts and to limited synergies</li><li>• Inequitable genetic services due to limited geographical accessibility, out-of-pocket payments</li><li>• Skill gaps in the recognition of congenital and genetic disorders result in delayed referral</li><li>• Cultural beliefs • Care Disparities and underrepresentation</li></ul>



	Pilot egyptian human genome project (EgyptRef)	The national reference genome project for egyptians and ancient egyptians	H3Africa international Genome project
Duration	2018 and ongoing	2021–2025 (first phase)	2010 and ongoing
Aims and scope	To establish a reference genome for Egyptian and North African populations to complement the Genome Reference Consortium human genome (GRCh)	To establish a benchmark genome center for creating the map of the Egyptian human genome to discover and accurately determine the genetic characteristics of various diseases aiming to help Egypt in entering the era of precision medicine. The project's scope is classified into three categories: A- The population genome B- The Genome of the ancient Egyptians, and C- Diseased genome.	H3Africa empowers African researchers to be competitive in genomic sciences, establishes and nurtures effective collaborations among African researchers on the African continent, and generates unique data that could be used to improve both African and global health.
Website	<a href="https://www.egyptian-genome.org">https://www.egyptian-genome.org</a>	Under Construction	<a href="https://h3africa.org">https://h3africa.org</a>
Coordinator	The genetics and systems biology divisions of LIED, Lübeck University, Germany	Medical Research and Regenerative Medicine Center at the Ministry of Defense, Egypt	The African Society of Human Genetics
Partners	The Center for Experimental Medical Research (MERC), Mansoura University, Egypt	Thirteen Temtamy and Hussien, (2017) Egyptian universities and research centers from the Ministries of Defense, Higher Education, Scientific Research, Health and Communications, and a number of civil society institutions.	The National Institutes of Health (NIH) The Wellcome Trust (WT) The African Academy of Sciences (The AAS)
Funding	The German Science Foundation, excellence program (EXC 306) and the DAAD	Egyptian governmental funding a total of 62,500,000 dollars for first phase over 5 years	NIH Director's Common Fund. Till now, H3Africa activities has been supported with 176 million dollars investment by NIH/WT
Data sharing	Public access	No data Yet	Public access

100,000 samples representing the Egyptian people will be studied, which will provide the necessary information to identify the most important genetic diseases as well as the most common and widespread diseases among Egyptians to be studied in a more accurate and specialized manner.

It also aims to study the genomes of the ancient Egyptians, which would provide genetic information dating back thousands of years, which in turn would serve human genetics in the region.

## STRENGTH

- Success of several international cooperation activities at the Euro-Mediterranean levels between (health) centres of excellence, with a wide type of activities (RIA, CA, Capacity building etc.)
- Strong enthusiasm and willingness of several research actors and stakeholders (researchers, CSO activists, decision makers) from both shores of Mediterranean to collaborate and conduct common R&I activities for the benefit of Euro-Med populations.
- Mobility programs for Euro-Mediterranean Researchers in particular young researchers (Erasmus plus, MSCA) allowed to develop highly skilled human resources able to tackle regional specific health challenges, build long lasting relationships between the scientific community in the region.
- Improvement of health indicators and achievements in the health sector in the region: better health infrastructure, trained health professionals, decrease or eradication of some infectious diseases, better health outcomes for NCDs. Part of this improvement have been possible thanks to know-how and technology transfer facilitated by Euro-Mediterranean R&I collaboration.
- The Euro-Mediterranean populations have particular genetic structure with a variety of admixed as well as isolated populations. This provides a valuable opportunity for epidemiological observational studies as important tools for longer-term impacts on public health.
- The Euro-Mediterranean populations share common rich cultural heritage in particular nutritional habits (Mediterranean diet) that has a great potential for health benefit. This offers opportunities for exchange of knowledge and development of products and services to improve health of Mediterranean populations.

## OPPORTUNITIES

- The current health crisis (counter intuitively) and coronavirus SARS COV2 pandemics provides a great opportunity to improve and to make enormous strides towards more collaborative R&I in the region that would lead to better health of populations
- Digitalization (and various ICT tools, including social media) and open science provide access to a wealth of data and helps to overcome several barriers between the various actors and stakeholders in the (health) research community (geographic, cultural, etc.) enabling more training, vocational and lifelong learning of the health professionals also through digital tools. E-twinning provides several opportunities to train young researchers, to share experiences in a cost effective and efficient way and to transform the acquired knowledge into innovative services and products.
- Availability of tools/platforms for Responsible R&I narrow the gap between the various stakeholders and provide the path to find affordable solutions to social needs.
- Development of new technologies, in particular genomics, nanotechnology, IT etc. This helps to improve our understanding of disease aetiologies, provide new diagnosis tools that help early detection of diseases and consequently better health outcomes for Euro-Mediterranean populations.
- There are still several unexploited niches for health R&I in particular in the investigation of rare genetic diseases as models for common chronic diseases, combination of new technologies (digitalization of clinical trials, use of generic drugs, genomics etc.)
- Interplay between the three majors thematic (health, renewable energies and climate change) allows trans-disciplinary, transborder collaborative initiatives thus maximizing the impact beyond that of each individual initiative.

## WEAKNESS

- Economic growth has been to some extent at the expense of health.
- Despite scientific evidence, the impact of climate change on health has been insufficiently considered as a priority.
- Low involvement of the communities and Civil Society Organizations (CSO) in (health) research, leading to poor uptake of research results and inefficient health interventions.
- Poor quality of scientific mediation/communication to reach out the various communities, including researchers from other disciplines, limits policy uptake and translation of research results into effective interventions and loses the chance to enhance scientific, environmental and sustainability literacy of the citizens.
- Low capacity of the region to attract, retain and invest in the highly skilled and educated young researchers compared to other parts of the world.
- Disparities between Euro-Mediterranean countries in (health) research capacities, governance, technology transfer and innovation management policies and regulatory aspects (e.g., ethics, data sharing and protection etc.). Health inequities persist in the region (various causes of vulnerability: gender, age, socio-economic, health conditions, displacement).
- Health inequities are increasing dramatically with the current pandemic. Countries of both shores of Mediterranean are unable to produce locally essential products to face the pandemic.
- (Consequently) Euro-Mediterranean Health Innovation policies need to be revised in collaboration with health industries among other stakeholders.
- The multiplicity of actors and initiatives in the region leads to the fragmentation of efforts and to limited synergies between them with a risk of redundancy or unbalanced allocation of resources. The meta-governance of the overall R&I programmes and initiatives is almost inexistant.

## THREATS

- Considering economic and technical growth as the major drivers of (market oriented) R&I programs at the expense of other factors (in particular social factors).
- Limited preparedness of the health systems (including research actors) to face health crisis or other challenges (e.g., natural or other types of disasters).
- Persistence of the health crisis in particular the coronavirus SARS COV2 pandemic threatens the resilience of the health system even for the most developed ones.
- The waste production and management that was already threatening the environment and health of Euro-Mediterranean populations is worsened by the current pandemic with the related biological risks.
- Impact of climate change is increasing the burden of Infectious and non-infectious chronic diseases and is creating new vulnerability groups (migrants, people with heavy disabilities due to comorbidity).
- Inequities, if not considered and adequately addressed, are going to expend at a level that amplifies crisis and be itself a “natural” disaster leading to displacement of populations and intensifies migration.
- The absence of an adequate policy and regulatory framework in particular in the South-East Mediterranean Region will lead to poor management of the current and to come health crises. This urges new strategies and policies related to technology transfer and innovation management adapted to persisting crisis situation.
- Lack of trust of the communities towards research and health research professionals will lead to no compliance with preventive measures, and in some cases an increase in unethical behaviour.
- Brain drain and impoverishment of the HR capital in the region.
- The absence of a clearly stated inclusion of health research from the regional priorities and from the existing water-energy-food nexus leaves the regional agenda unfinished with unanticipated undesirable consequences

# Summarize the Areas of Interest & Models of Collaboration



RESEARCH INSTRUMENTS	RESEARCH AVENUE	RESEARCH OPTIONS	RESEARCH QUESTIONS
<b>DESCRIPTION</b> Epidemiological research	Measuring the burden	Level of research projects	Level of research papers
	Understanding risk factors		
	Measuring prevalence of exposure to risk factors		
	Evaluating the existing interventions		
	Measuring prevalence of coverage of interventions in place		
<b>DELIVERY</b> Health policy & System research to improve performance of capacity to reduce burden	Studying capacity to reduce exposure to proven health risks	Level of research projects	Level of research papers
	Studying capacity to deliver efficacious interventions		
	Policy analysis, cost analysis,HR, operations		
<b>DEVELOPMENT</b> Improving existing interventions	Research to improve deliverability	Level of research projects	Level of research papers
	Research to improve affordability		
	Research to improve sustainability		
<b>DISCOVERY</b> Introducing new interventions	Basic, clinical, and public health research to advance on existing knowledge to develop new capacities	Level of research projects	Level of research papers
	Basic, clinical, and public health research to explore entirely novel ideas to develop new capacities		

- Feasibility
- Impact
- Disease Burden
- Translational
- Novelty
- Patentability
- Effectiveness
- Deliverability
- Affordability

Context of prioritization

Motivation

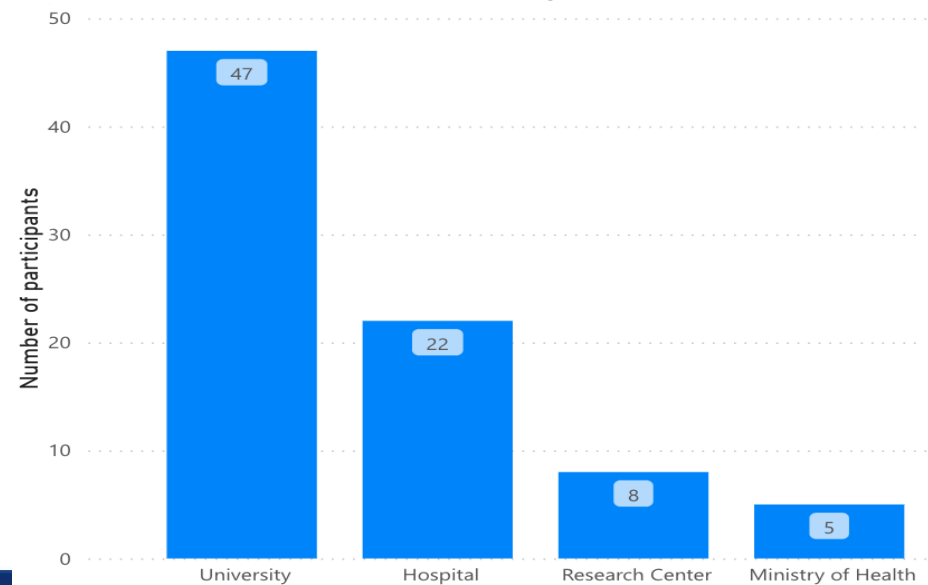
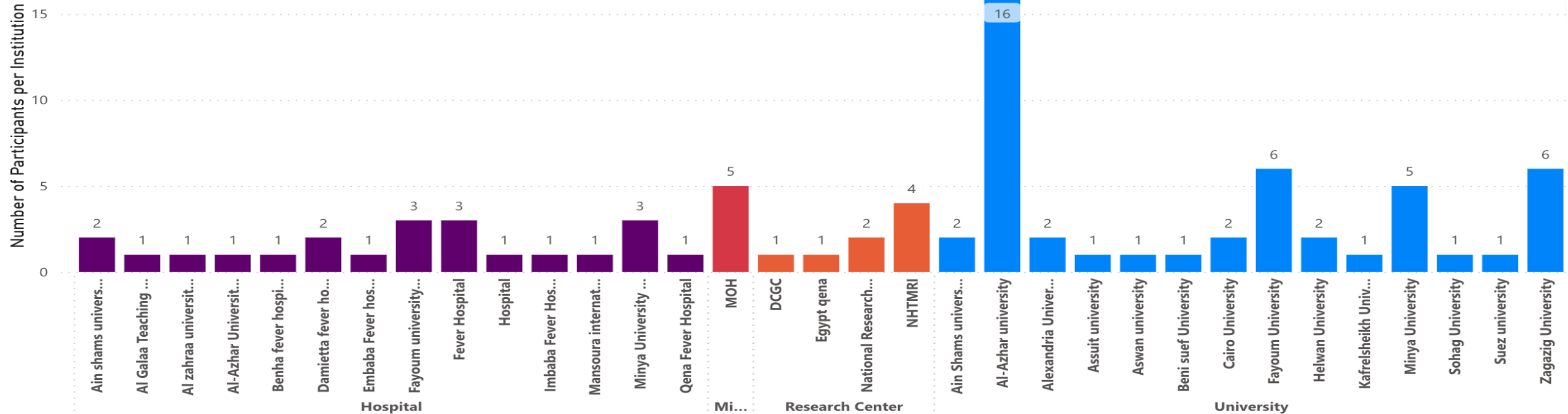
Investment style

Population

Target (focus)

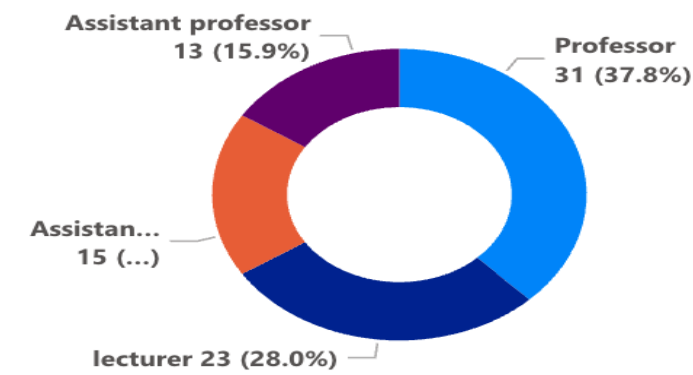
Timeframe

# Infectious Diseases



82  
Participants

33  
Institutions



# Oncology

Priority area	AEA	Feasibility	Population Size	Disease Burden	Translational	Impact	Novelty	Patentability
Bioinformatic approach for early discovery and treatment of cancer.	0.90	21.30	19.70	20.70	20.80	21.20	17.90	17.20
Application of artificial intelligence, neural networks or different computational techniques that can be applied for diagnosis and treatment of cancer.	0.88	19.10	18.80	18.70	19.70	19.60	19.50	17.60
Identification of germ line and acquired mutations associated with cancer (different types) in Egyptian patients using bioinformatics	0.85	20.40	17.10	18.60	19.60	20.60	18.20	16.90
Bioinformatic, genetic map and molecular mechanisms of cancer development among young patients.	0.74	19.70	17.50	17.00	19.20	18.60	16.60	17.00
What are the population based incidence rates of different types of cancer that affect Egyptian population?	0.71	20.70	15.80	17.90	18.30	19.90	15.00	14.10
Recent epidemiological data for different types of cancer distributed in different geographical regions, taking in consideration the following topics: - Recognition of the registry as an official activity.- Establishing of registry administrative structure- Badger and financial support- Plan of action and methodology in view of the expanding cancer tertiary care facilities and university hospitals- Structure of peripheral registry, staffing; permanent and not seconded- Necessary software- Training	0.69	18.40	16.20	16.40	18.80	19.20	14.90	14.60
Searching for more sensitive, specific and non-invasive tools.	0.68	19.20	16.80	16.90	19.20	19.00	17.50	16.70
What are the types of cancer that can be prevented?	0.67	17.30	17.30	17.30	17.30	17.30	17.30	17.30
The role of nutrition, environmental pollution and occupational factors in cancer	0.65	18.30	16.10	17.30	17.70	17.90	15.20	13.90
Economize the tools for cancer diagnosis.	0.65	18.10	16.80	17.00	17.60	18.50	16.20	16.10
How to promote cancer awareness and health literacy among Egyptian population?	0.64	18.30	16.20	16.70	17.00	17.40	14.60	14.10
Reducing time of diagnosis.	0.63	18.10	17.00	16.60	18.30	18.30	16.10	16.90
What is the incidence and frequency of pediatric cancer?	0.63	15.90	15.00	16.80	16.90	18.50	15.20	15.60
Immune system: Vaccination against cancer, is it effective or not? What are the types of cancer that have viral etiology and can be prevented by vaccination?	0.61	16.80	15.60	15.80	16.40	16.80	15.30	15.70
Targeted therapy from different aspects: laboratory experiments, tissue culture, in vivo studies using experimental animals and clinical trials	0.58	16.70	14.80	16.20	16.00	15.50	14.90	15.80
The incidence of HCC after curing Egyptians from HCV? This topic requires multidisciplinary collaboration; epidemiology, hepatology, statistics and model building.	0.56	17.70	14.90	15.10	15.50	16.10	14.00	14.70
Searching for genetic and biochemical changes linked to each type of tumor. Could these changes be used as markers for the transformation of a normal cell into a malignant one? Tumor suppressor genes, Oncogenes, Mismatch repair genes, Epigenetic changes, miRNA profile, Expressed proteins.Can they be used as markers for early diagnosis, prognosis, developing targeted therapy or follow-up of the disease?	0.56	17.00	13.80	14.20	16.70	16.20	15.00	14.60
What is the feedback of awareness campaigns against different types of cancer?	0.55	15.50	16.10	15.30	14.20			
What are the etiological and risk factors of pediatric cancer?	0.54	15.90	15.40	16.10	15.70			






# Infectious Diseases

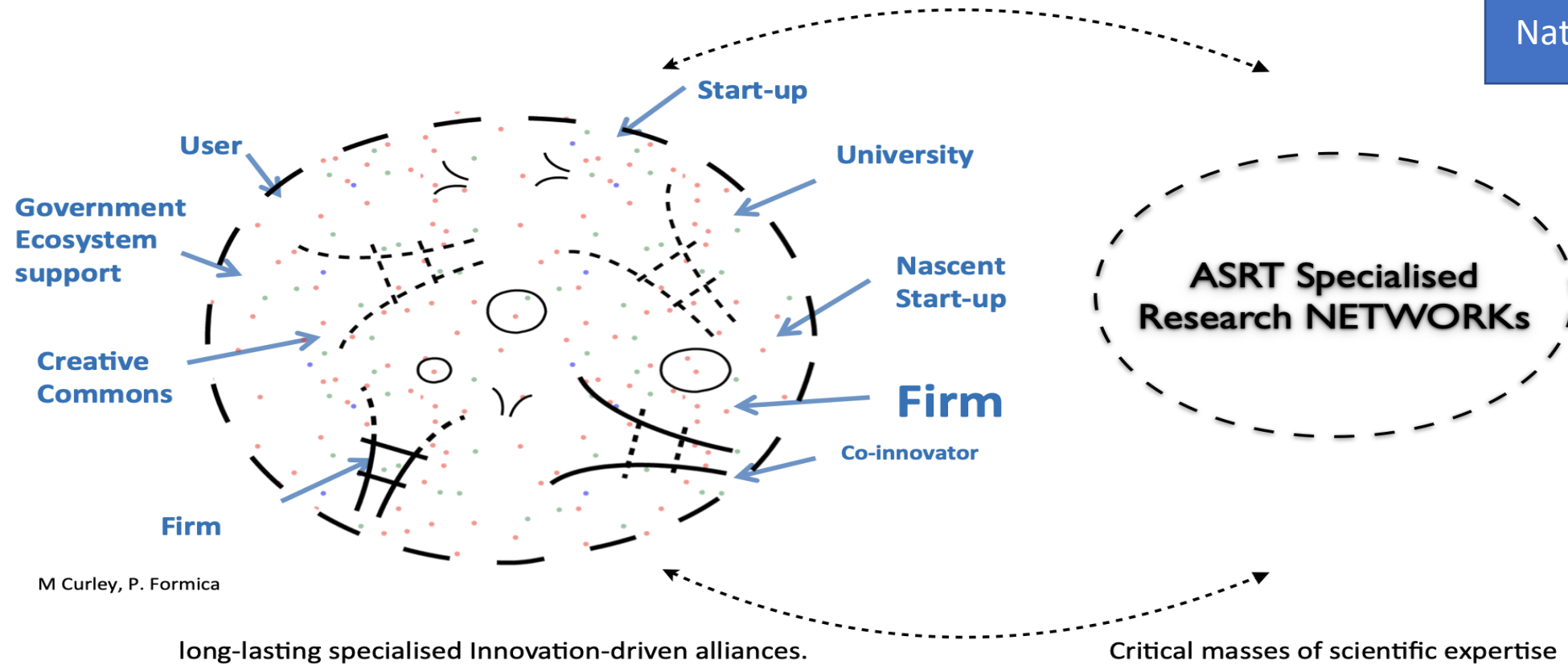
Priority area	AEA	Feasibility	Population Size	Disease Burden	Patentability	Impact	Translational	Novelty
Antimicrobial multidrug resistance COVID-19 era	0.92	38.10	32.70	36.30	31.30	38.30	35.90	33.10
How to maximize high-quality, evidence-based care during pandemics, a condition in which information is changing rapidly?	0.91	34.00	33.20	35.60	31.50	35.40	35.50	31.90
Factors make humans increasingly vulnerable to pandemics (including Covid 19, Hepatitis B, Ebola and Fungal and opportunistic infection)	0.86	34.60	35.30	32.20	26.80	34.70	34.80	27.40
Antibiotic/antiviral resistance Research: T.B, Influenza, Meningitis, Pneumococcal Pneumonia, Hepatitis B, HIV/AIDS, Fungal and opportunistic infections	0.81	32.70	32.80	32.50	31.10	34.40	33.30	30.20
The prevalent organism and what the antibiotic sensitivity for different hospital acquired infection and prevalence of multidrug resistance.	0.77	33.60	30.90	33.30	32.80	32.70	33.30	32.10
Antibiotic resistance / sensitivity in H pylori	0.74	30.60	31.30	28.80	29.50	31.20	30.90	27.00
Prevalence of hospital acquired infection in different localities in Egypt and what are risk factors associated with the hospital acquired infection	0.67	31.00	28.80	31.30	30.20	31.50	32.20	28.30
Mental health effects during pandemics	0.63	26.70	25.80	28.20	25.60	30.70	28.20	25.40
Develop platform(s) to maximize commonality of data collection across trials, and collaborations between trials	0.62	29.10	27.10	28.00	27.30	29.10	28.40	28.50
Identify COVID-19 resilient populations and better understand the protective determinants	0.55	27.20	24.90	25.70	24.60	26.60	25.20	26.50
Prevalence of HIV in different Egyptian population, the rate of accessibility to care among HIV patients and the level of awareness of health care workers about HIV	0.53	25.70	22.00	27.50	22.70	26.70	28.20	23.30
Utility of gene expert in improving diagnosis	0.53	26.50	25.60	25.40	25.10	27.50	27.20	24.80
Oncogenesis Research: H pylori Hepatitis B Hepatitis C AIDS Fungal and opportunistic infections	0.51	25.20	24.50	24.90	23.10	25.40	25.70	24.90
Hepatitis B virus targeted therapy, that can rely on drug repurposing strategy. Computational drug screening for targeting the HBV proteome prevalent in Egypt	0.48	23.50	22.00	24.20	23.20	23.00	25.30	25.30
The efficacy of available medication against HIV and failure rate, rate of mutation development among treated HIV patient	0.48	25.50	23.40	23.90	22.30	24.00	25.50	22.60
Vaccine development Research: Covid 19 Pneumococcal Pneumonia HIV/ AIDS	0.46	24.00	23.20	24.30	23.60	23.80	25.30	23.10
Antibiotic sensitivity of salmonella in Egypt.	0.44	22.40	20.50	22.40	21.70	21.10	22.20	19.60
New/improved interventions of fungal and opportunistic infections in Egypt	0.43	24.10	21.40	21.40	22.60	24.70	22.40	22.90
Blood-filtering systems in critically ill patients with septic shock	0.43	24.10	21.50	21.30	22.50	23.40	22.70	21.60
Geographic Information System, health mapping, now-and forecasting Research: Covid 19 T.B Meningitis HIV/AIDS Dengue Malaria Fungal and opportunistic infections	0.42	22.10	21.70	22.60	21.80	24.20	23.20	22.80
Antibiotic sensitivity of brucella in Egypt	0.41	21.90	17.70	22.20	21.40	21.10	22.20	19.60
Prevalence of H pylori among general population in Egypt	0.41	22.60	21.80	20.30	21.10	21.10	22.20	19.60
Prevalence of T.B in Egypt	0.40	21.30	19.60	22.00	20.50	21.10	22.20	19.60



Obesity									
Priority area	AEA	Feasibility	Population size	Patentability		Disease Burden	Novelty	Impact	Translational
Risk factors and morbidities associated with overweight and obesity among Egyptian adolescents and launching for lifestyle education program	0.90	34.60	33.30		17.20	33.80	31.80	36.40	33.20
Consequences, underlying causes, management of childhood obesity	0.88	35.20	31.60		21.40	35.20	30.50	36.50	36.20
Childhood obesity in Egypt: A national study on obesity in Pre-University Students to Assess: Prevalence, Risk Factors, and Best Preventive and Therapeutic Approaches.	0.87	36.80	31.20		20.50	35.30	29.20	35.80	35.60
Facing the Obesity Epidemic in Egypt: A Comparative Study between Urban and Rural Communities with Focus on Risk Factors Management.	0.86	35.20	34.10		22.60	34.40	26.40	35.80	35.50
Population-based studies to fill the knowledge gaps regarding the actual precise prevalence and risk factors of obesity in Egypt. This would provide a good database for hypotheses generation.	0.81	35.20	31.90		21.10	33.00	27.20	34.80	32.40
Preschool and school nutrition education for prevention of obesity. An evaluation of nutrition education and development of nutrition lessons and activities in primary schools	0.73	32.10	29.70			31.10	30.30	32.00	31.60
Assessment of relationship between cardiometabolic disease and obesity in younger generation	0.67	31.00	28.70		27.30	31.60	28.00	31.60	31.10
Analysis of obesogenic environment. And Evaluation of already present official strategies for obesity management	0.66	28.50	29.10		18.50	29.40	22.80	31.50	30.10
Population based surveys to reach better definitions for obesity in the Egyptian context, Survey Stratification of obesity prevalence in different age groups in both sex, Epidemiological data about the prevalence of obesity in rural versus urban areas, Time spent on activities per day	0.66	29.30	28.80		18.50	28.70	24.30	29.80	29.20
Effectiveness of interventions on obesity (surgical, medical, etc.) as assessed by long term overall mortality (and not by weight reduction, which can be grossly misleading	0.63	29.50	27.10		21.70	28.50	21.80	30.30	29.70
Molecular Bio marker red flags of obesity in Egyptian children	0.61	28.70	25.80		31.50	26.60	26.80	28.10	28.20
Obesity and the gut microbiome in Egypt	0.61	28.50	24.10		26.80	28.10	25.50	29.50	26.10
Identification of the relative roles of diet, exercise and behavior modification on cardiovascular outcomes of overweight and obese patients.	0.60	28.70	26.10			27.30	26.60	27.90	28.50
Different types of food, existing nutritional regime and the influence on cancer development in Egyptian patients	0.59	28.20	25.80			28.40	26.90	27.30	26.80
Nutrition interventions to reverse epigenetic modifications of obesity	0.59	27.70	25.75		30.20	27.65	25.15	28.30	27.85
Key factors and relation between obesity and cancer	0.56	27.20	26.20			26.50	26.20	27.80	27.00
Systematic reviews and meta-analyses of various types of interventions addressing the problem of obesity.	0.55	27.30	25.90		15.80	26.20	20.90	26.80	27.70
Pathophysiology of obesity and its genetic traits	0.55	26.30	23.70		7.50	25.20	26.60	25.90	24.20
Basic research to understand the effect of environment and family feeding among Egyptian adolescents and launching for lifestyle education program behaviors on the Genetic/epigenetic etiology of obesity in Egyptian community	0.54	25.35	25.20		25.60	26.20	24.25	26.50	26.80
Effects of Obesity on COVID 19 Outcome: A- Acute effects: morbidity and mortality. B- Chronic effects: Post COVID	0.53	26.50	23.40			24.00			
Models of Collaboration	National: PRISM, Research networks, KTA European collaboration: EuroNanoMed, EraPerMED ASRT is member of GloPID R, JPI-AMR, ERA4HEALTH and PRIMA Inter-regional: North African and African collaboration [Maghreb, South Africa, Nigeria] Morocco, Egypt, Libya [strategic committee and Horizon Europe NCPs collaboration]								

# ASRT Specialised Research Networks (SRN) & Alliances (KTA)

National collaboration



M Curley, P. Formica

Unlike other similar networks and clusters, ASRT, with its councils and relevant units, contribute in coordinating each cluster to ensure the optimum synergy.

Beneficiaries: 10 partners involved include at least one participant from University, Research Institution, NGO, local authority and at least 3 participants from Industry.

**Industrial sector FOCUS:** "Pharmaceutics and vaccines", "Healthcare services and diagnostics" & "Microelectronics"

Specialised networks aims at pooling national resources and competencies together within a particular specialised topic. Universities and research institutions are the main target group. SRN can accommodate world class scientists to perform top notch research in collaboration with partner institutions

# Examples

## Integrated Pharmaceutical Alliance (IPA); towards production of technology based Egyptian Pharmaceutical products



- Cairo University
- Mansoura University
- Pharos University
- National Research Center
- German University in Cairo
- Arab Academy for S&T
- NODCAR
- Alexandria Co. for pharmaceuticals
- Memphis Co
- El-Nasr Co
- ATOS Pharma
- Health Tech (SME)
- BIG
- VACSERA
- MEK

- **PRODUCTS:**
- **Ranitidine** (Active Pharmaceutical Ingredients)
- **Diagnostic kits** a-for HBV b-Pregnancy test
- **Rice bran** tablets for Alzheimer's Disease (AD)
- **Olive leaf Ext. (OLE)** for export.
- **AND Ozolive** cream
- **Pectin** High value Pharmaceutical raw materials from food processing waste (STDF, LE 1.0 M)
- **Spirulina Nutraceuticals** (MASS PRODUCTION tablet and powder)
- **Dunaliella Nutraceutical** (tablet and powder)
- **Khellin** and **Proximadiol**
- **Halbosa** Tablets AND Exploring Genetic Susceptibility to Cardiovascular Disease in Egyptians
- **Galantamine/ Chitosan Complex Nanoparticles**

## Integrated Model for HCV treatment Alliance



- Cairo University
- Ain Shams University
- Helwan University
- National Liver Institute
- Ministry of Health, Central Directorate of Health and Development
- Egyptian Cure Bank
- Pharco Pharmaceuticals
- European Egyptian Pharmaceutical Industry
- Pharco International

- Manufacturing raw materials of novel HCV oral treatment
- Providing an innovative locally produced highly effective, safe, and affordable drug clinically tested antiviral in both adult and adolescent Egyptian HCV patients.
- Further development of Egypt pharmaceutical raw material industry
- Clinical Research studies and services

• 10 MEGP, 20 years



# National Program for Research and Innovation in Health and Biomedical sciences (PRISM)

## Health Innovation Funding Scheme (Inno-Health)

Direct activities based on R&D or exploitation of research results, knowhow and technology transfer. i.e

- A- Device based intervention including personal and point of care diagnostics
- B- Applications for better surveillance
- C- Innovative preventive service & screening
- D- Health ,Healthcare platform technologies
- E- Pharmaceutical innovative service and the rational use of drugs

## Preclinical and Translational-Research Funding Scheme (Pre-CRFS)

Addressing the translational funding gap between basic research and later stage of drug development by funding high potential preclinical drug discovery, preclinical research and proof of concept including testing of novel lead compounds in animal, screening assays, hit-to-lead development and lead optimization, in vitro and in vivo efficacy studies

## Clinical Research Funding Scheme (CRFS)

This funding scheme covers a wide spectrum of clinical research; intervention modalities and encourage collaborative research on therapeutics, diagnostics, explorational studies, or drug candidates in areas of unmet medical need, in addition health-related biomedical interventions

The following thematic areas are indicated as high priority: **Infectious diseases** and **antimicrobial resistance, cardiovascular diseases, respiratory diseases, diabetes** and **cancer**.  
P1: proteomics, imaging protocols, and wireless monitoring devices

Research institutions, SMEs, Individual Researchers and entrepreneurs

Up to 1 M EGP

research institutions and research groups (multicenter)

Up to 3 M EGP

research institutions and research groups (multicenter)\*  
Research Networks

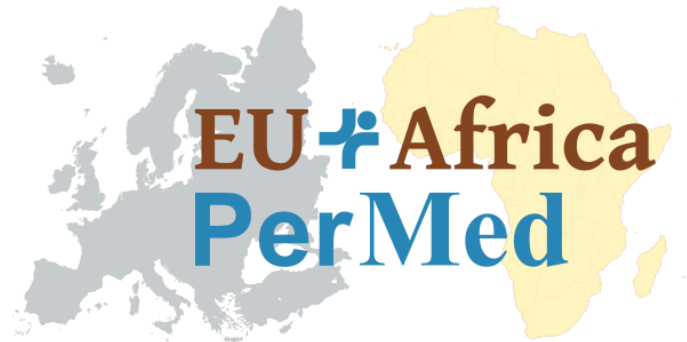
Up to 5 M EGP

\*Consortium can be led by Egyptian SMEs in particular fields which are diagnostic and monitoring products and tools, and primary care technologies. In this respect, priority is given to relatively mature technologies, concepts, processes and business models that need an additional development support to reach the final beneficiaries and the market.

- The inclusion of a private industrial sector with a clear unbiased and significant added value will be positively evaluated.
- Multinational pharmaceutical companies can participate with its own funding, when positively evaluated
- Registration is mandatory- Ministry of Health (within 30 days from the starting date; funded by ASRT)

# References and acknowledgement

- El-Attar EA, Helmy Elkaffas RM, Aglan SA, Naga IS, Nabil A and Abdallah HY (2022) Genomics in Egypt: Current Status and Future Aspects. Front. Genet. 13:797465. doi: 10.3389/fgene.2022.797465
- **Theories of Change and Impact Pathways, June 2021, Union for Mediterranean**
- **Medical Research Council, Egypt** , PSP Project



# Thank you

We are looking forward to continue our discussions on day 2!



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