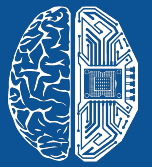
TOP LONGEVITY CLINICS IN THE UK LANDSCAPE OVERVIEW 2021

MOST ADVANCED CLINICS, TECHNOLOGIES AND METHODS

LONGEVITY.INTERNATIONAL

AGING ANALYTICS AGENCY



DEEP KNOWLEDGE GROUP

www.aginganalytics.com

Table of Contents

Considering increases in the proportion of the elderly in respect of the populations in developed countries (aka the Silver Tsunami), **the concept of Longevity Medicine, which is based on advances in modern healthcare**, as well as innovative methods and technologies, is becoming more relevant than ever. Its ultimate goal is to slow down the aging process and prolong active and healthy human life.

The main conclusion of the Top Longevity Clinics UK Overview 2021 is that **Longevity Medicine has great potential.** Powered by deep biomarkers of aging and longevity, Longevity Medicine is highly personalised and preventative in nature.

Methodologically and conceptually similar, Longevity Medicine is an integral part of Anti-Aging Medicine. **Anti-Aging Medicine is an evolving branch of medical science** which treats the underlying causes of aging and aims to alleviate age-related ailments. Its ultimate goal is to extend the human healthy lifespan.

As mentioned above, **Anti-Aging Medicine is highly personalised** and uses the most advanced medical technologies for the prevention, early detection, and treatment of age-related pathologies.

Anti-Aging Medicine holds both risks and opportunities for humans, making it necessary for them to regulate and carefully integrate it into the clinic and society.

Report Value Proposition

1. Which personalised and preventive therapies, diagnostics, prognostics, technologies and techniques can Longevity Clinics use to increase their competitive advantage?
2. What is the optimal set of Longevity health technologies and services and how can it be integrated into Longevity Clinics' existing scope of services?
3. What techniques and technologies will become market-ready in 3 to 5 years' time? Which prospective technologies should Longevity Clinics watch out for and use within the next several years?

Over the past five years, we have accumulated enough knowledge and expertise to launch our new project - Longevity Medicine Landscape Overview in the UK 2021: Most Advanced Clinics, Technologies and Methods.

This report aims to provide:

- Ranking and analysis of the leading Longevity Clinics in the UK based on the publicity available information;
- In-depth analysis of Longevity technologies and therapies available today;
- Tangible estimations of what we can expect in 3 to 5 years, and which new technologies and treatments will be market-ready by 2022-2025;
- Practical guide to putting together the best possible combination of technologies and treatments today and tomorrow.

The information contained herein can help Longevity Clinics boost their strategic, technological and scientific prospects and provide their clients with the most sophisticated and comprehensive longevity health products and services.

Approach Used

Database

Identification of Top 40 Longevity clinics in the UK. To rank clinics and select our Top 15, we have used ratings compiled by independent organisations.

Data Sources[1]

Publicly Available Sources (Websites)	Industry-Specific Databases	Media Overview (Articles, Press Releases)	Industry Reports and Reviews

Applied Research & Analytics Methods

Descriptive Analysis	Comparative Analysis	Qualitative Data Collection	Mixed Data Research	Exploratory Data Analysis	Data Filtering

Relying on various research methods and analytical techniques, the present report provides a comprehensive overview of the Top-40 Longevity Clinics in the UK. Longevity Clinics are a new type of medical institutions and play an important role in the implementation of the Longevity Medicine concept. AAA is not responsible for the quality of the secondary data presented herein, however, we do our best to eliminate said risks by using different analytic techniques and cross-checking data. Please note that we did not deliberately exclude certain companies from our analysis. Nor was any exclusion due to the data-filtering method used or difficulties encountered in the data sourcing process. In fact, the main reason for their non-inclusion was incomplete or missing information in available sources. Our research is based on publicly available data from open sources provided by the clinics themselves, from government sources and public health organisations, authoritative specialised media and other informational sources.

Notes: (1) Grouped by, but not limited to

Ranking of Top-40 Longevity Clinics in the UK

AGING ANALYTICS AGENCY

Top 15 Leading Longevity Clinics in the UK

1. Charing Cross Hospital (London)
2. St. Mary's Hospital (London)
3. Hammersmith Hospital (London)
4. London Center for Longevity Metabolic (London)
5. Kuer Clinic (London)
6. Queen Elizabeth Hospital (Birmingham)
7. Princess Grace Hospital (London)
8. Royal Brompton and Harefield NHS Foundation Trust (London)
9. The Hamlet Clinic (London)
10. The Lister Hospital (London)
11. London Bridge Clinic (London)
12. The London CyberKnife Center (London)
13. Harpal (London)
14. Medica Stem Cells (London)
15. Hormone Health (London)

Longevity Clinics Industry Analytical Framework Criteria Classification Directory

AGING ANALYTICS AGENCY

General Characteristics
HQ location
Collaboration
Countries involved
Number of clinics
Regulation level
Regulatory jurisdiction
Size of all facilities
Certification (JCI)
Stage of business's life cycle

Scientific Activity
Grants
H-index
Impact factor of publications
Number of collaborations with scientific establishments
Number of licensed patents
Number of publications
Participation in scientific conferences

Financial Position
Annual revenue
Amount of investments
Number of investors
Number of subsidiary clinics
Ratio of funding to patents filed and grants

Marketing
Customers' interest level
Events attended
Media mentions
Participation in big industry conferences
Sponsorship activities

Focus Level (Therapeutic depth factor)
Biochemistry level
Cellular
Genomic
Organs
Proteins and Cell signaling
Tissue level

Team Composition
Doctors' H-index
Doctors' qualification
Doctors:employees ratio
Number of doctors
Number of employees
Number of specialised doctors

Orientation
Personalised biomarker analysis
Personalised diagnostics
Personalised in vivo & in silico drug testing
Personalised prognostics
Personalised QALY & HALE estimation
Preventive therapies

Clinic specialisation
Longevity
Age-related diseases
Aesthetic medicine
Wellness/SPA
Restorative medicine
Regenerative medicine

Infrastructure
Pensions
Hotels
Boutiques

Personality
Medical specialty
Gerontologist
Regenerative medicine specialist
Membership in Associations
Association of gerontologists

Longevity Clinics Industry Analytical Framework Criteria Classification Directory

AGING ANALYTICS AGENCY

Services

Personalised Diagnostics

- 3D imaging
- Biomarker analysis
- Database of personal biomedical data
- Dual-energy X-ray absorptiometry scans
- Mobile Apps/AI assistants
- Multi-Omics Sequencing
- Non-invasive monitoring of biomarkers
- Qualitative functional tests
- Telemedicine
- Total-body imaging

Personalised Prognostics

- Disease outcome prognostics
- Personalised in vitro prognostics
- Screening of hereditary diseases
- Virtual Human Prognostics

Cosmetics

- Personalised stem cell creams
- Cosmetic nutraceuticals targeted at the Hallmarks of Ageing
- Cosmetic medicines and surgeries
- Rejuvenated stem cell facelifts

Preventive Treatment

- 3D bioprinting
- Gene therapies
- Genetically engineered cell therapies
- Heart Rate Variability optimisation
- Lifestyle programs
- Microbiome engineering
- Natural mimetics of validated geroprotectors
- Non-surgical heart therapy
- Small molecules & biologics
- Tissue engineering

Reactionary Treatment

- Abdominal medicine
- Ambulance
- Family medicine
- General internal medicine
- Hormone therapy
- Hospice
- Infrared therapy
- Long-term care
- Movement medicine
- Nuclear medicine
- Robotic surgery
- Surgery
- Traveller medicine
- Ultrasound therapy

Technologies

Omics

- Epigenomics
- Foodomics
- Genomics
- Glycomics
- Lipidomics
- Metabolomics
- Nutritional genomics
- Pharmacogenomics
- Pharmacomicrobiomics
- Proteomics
- Toxicogenomics
- Transcriptomics

Data Processing

- Big Data
- Bioinformatics
- Symbolic AI/Machine Learning
- Deep neural networks/ Deep learning
- Cloud computing

Targets of Treatment

- Alcohol/drug treatment
- Allergy
- Biological age measurement
- Cardiology
- Dentistry
- Dermatology
- Endocrinology
- Gastroenterology
- Immunology
- Infectious disease
- Maternal-Fetal medicine
- Neurology
- Obesity
- Oncology
- Ophthalmology
- Orthopaedics
- Otolaryngology
- Rheumatology
- Sleep disorders
- Targeted diseases
- Tracking the effect of therapies
- Urogynecology

Equipment

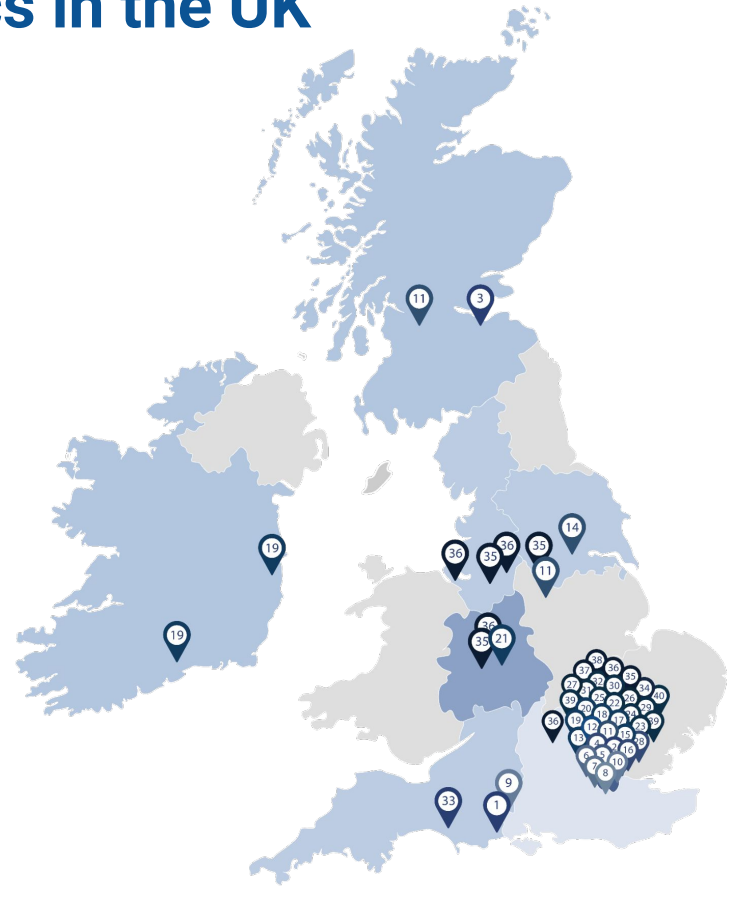
- 3D whole body photo-imaging system
- Air displacement plethysmography system
- CT/PET scanner
- CTC
- CyberKnife
- DaVinci robotic
- Doppler ultrasonography
- Dual-Energy X-ray absorptiometry (DXA)
- Fit3D
- FlexArm
- GAINSWave
- HRV optimisation device
- Isokinetic dynamometer
- Medical ventilators
- MRI machine
- MR-TRUS Fusion
- Non-Surgical heart therapy device
- SizeStream

Section 1:
Top Longevity Clinics in the UK

AGING
ANALYTICS
AGENCY

1.1 List of the Leading Longevity Clinics in the UK

1. Age Repair Aesthetic Clinic (Romsey)
2. Algocell (London)
3. Anne Rowling Regenerative Clinic (Edinburg)
4. Cadogan Clinic (London)
5. Center for Men's Health (London, Manchester)
6. Charing Cross Hospital (London)
7. Chelsea and Westminster Hospital
8. Harpal (London)
9. Health Optimising (Winchester)
10. High Life Clinic (London)
11. Hormone Health (London, Nottingham, Oxford, Glasgow)
12. Hammersmith Hospital (London)
13. Kuer Clinic (London)
14. Leger Clinic (Doncaster)
15. London Bridge Clinic (London)
16. London Center for Longevity Metabolic (London)
17. London Spine Clinic (London)
18. Marion Gluck Clinic (London)
19. Medica Stem Cells (London)
20. Princess Grace Hospital (London)
21. Queen Elizabeth Hospital (Birmingham)
22. Rejuvence (London)
23. Rolfing (London)
24. Royal Brompton and Harefield NHS Foundation (London)
25. St. Mary's Hospital (London)
26. St. Thomas Hospital (London)
27. The Anti Aging Clinic (St Albans)
28. The CyberKnife Center (London)
29. The Hamlet Clinic (London)
30. The Lister Hospital (London)
31. The London Musculoskeletal, Sports & Exercise Medicine Centre (London)
32. The London Endocrine Center (London)
33. The Men's Health Clinic (Dorset)
34. The OrthoBiologics Clinic
35. The Private Clinic (London, Manchester, Leeds, Birmingham)
36. The Regenerative Clinic (Birmingham, London, Manchester, Liverpool, Ascot)
37. The Women's Health Clinic (London)
38. Vie Aesthetics (London, Germany)
39. University College hospital
40. Wellington Hospital (London)



Notes: Based on publicly available data

1.2 Top 15 Longevity Clinics in the UK

Top 15 Longevity Clinics in the UK[1]

1. Charing Cross Hospital (London)
2. St. Mary's Hospital (London)
3. Hammersmith Hospital (London)
4. London Center for Longevity Metabolic (London)
5. Kuer Clinic (London)
6. Queen Elizabeth Hospital (Birmingham)
7. Princess Grace Hospital (London)
8. Royal Brompton and Harefield NHS Foundation Trust (London)
9. The Hamlet Clinic (London)
10. The Lister Hospital (London)
11. London Bridge Clinic (London)
12. The London CyberKnife Center (London)
13. Harpal (London)
14. Medica Stem Cells (London)
15. Hormone Health (London)

The Top 15 of Longevity Clinics in the UK has been compiled as per the ranking methodology described in Chapter 2.1. The clinics are assessed according to multiple criteria, parameters and expert assessment. The methodology used makes it possible to rank the clinics even if the information on them is incomplete or unavailable (e.g. due to the lack of generally accepted standards, absence of aging in the classification of diseases or the lack of a clear definition of Longevity Clinics).

Included in the list are precision medicine clinics that use modern technologies for diagnosis, treatment and prevention of diseases. Other selection criteria included individual variability in the genomic landscape, environment and lifestyle.

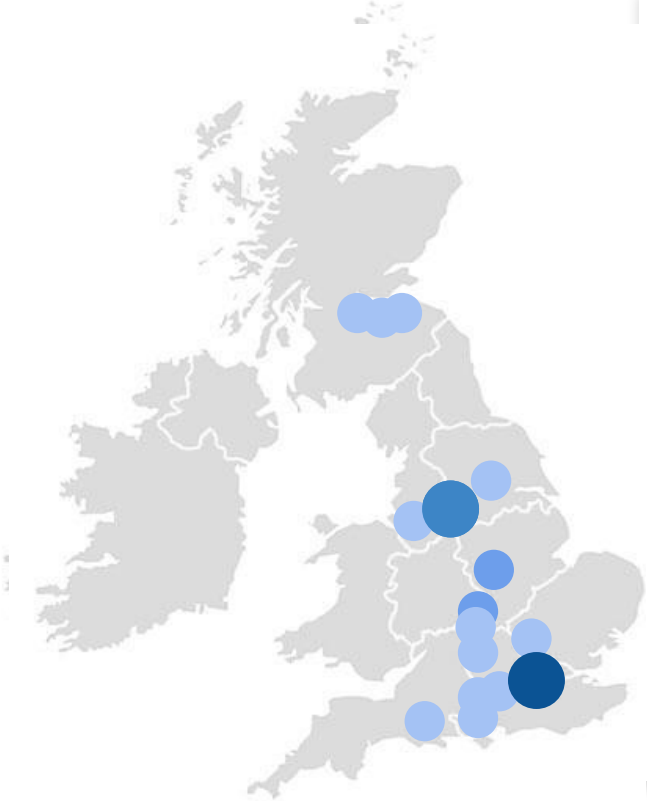
The selected clinics are assessed according to the weighted average indicators:

- Indicators are assigned weights based on the results of expert assessment to be used in the overall ranking;
- The total score for all criteria is determined for each clinic. The overall rating is calculated by taking into account the weights for each indicator.

Notes: (1) Based on publicly available data

1.3 Distribution of the Leading Longevity Clinics in the UK

28	London	3	Manchester
2	Nottingham	2	Birmingham
1	Derriford	1	Edinburgh
1	Winchester	1	St Albans
1	Romsey	1	Glasgow
1	Oxford	1	Liverpool
1	Leeds	1	Ascot
1	Dorset	1	Doncaster



The map to the left shows the distribution of Longevity Clinics across the UK[1].

Longevity Clinics are mostly found in London, a city with the highest concentration of business, industrial, and scientific organisations. Some of the most high-tech healthcare facilities are also located here. According to "Demographia. World Urban Areas 17th Annual Edition 2021" London is ranked 34th among 100 most populated megalopolises.

In terms of the number of Longevity Clinics (28), London is significantly ahead of other UK cities. **There are 3 clinics in Manchester and 2 clinics in Nottingham and Birmingham**. The rest of the cities marked on the map have 1 clinic.

Notes: (1) Based on publicly available data

Section 2: Classification & Technology Framework

AGING ANALYTICS AGENCY

2.1 Research Methodology and Criteria

Research Timeline

Preamble

This analytical study draws on regional research in the Longevity Industry and research in **Regenerative Medicine and Precision Medicine Clinics** conducted since 2013. It also contains a brief description of **our vision of the research methodology used, as well as our approach to the formation of selection criteria and a ranking system.**

One of the main achievements of the analytical study is the **refinement of the Longevity Medicine concept and creation of an objective system for evaluating Longevity Clinics** according to multiple parameters.

Longevity Medicine is a rapidly evolving branch of preventative precision medicine that focuses on promoting healthspan and lifespan, and utilising aging biomarkers commonly referred to as aging clocks.

Longevity Medicine is the next generation of Precision Medicine that evaluates patient parameters within a reference range for the ideal biological age of the patient and seeks to close the gap between current parameters and parameters of maximum physical performance for the ideal age. Deep aging clocks as quantifiable, trackable and accurate biomarkers of aging are an indispensable component of Longevity Medicine. Without the ability to measure biological age and how it changes as a result of interventions, Longevity Medicine cannot be applied.

This area of medicine will revolutionise healthcare and change the worldview of everyone — doctors, politicians and, above all, patients.

2.1 Research Methodology and Criteria

In the first stage, we sought to **analyse clinics providing Longevity-related services**, attempted to **determine parameters** affecting the assessment of these clinics and tried to **create a ranking system** for the assessment of Longevity Clinics.

We **reviewed and analysed methodology for compiling annual ratings of the best clinics** used by Newsweek & Statista, IBM Watson Health, and Overall Hospital Quality Star Ratings. Compiling such ratings required using various methods, including but not limited to, expert assessments, surveys of patients and clinic managers, and statistical methods.

We relied on **more than 140 qualitative and quantitative criteria** we derived while conducting our previous studies. Analysis of the above methodologies allowed us to significantly increase the total number of criteria and parameters and pinpoint those of them that are crucial for including hospitals into the Longevity category. The **use of mathematical models and statistical methods of data processing** under conditions of incomplete information and uncertainty allowed us to achieve more accurate results.

The Proper Longevity Clinics **criteria system relies on qualitative and quantitative indicators** using which we were able to come up with a collective image of an ideal clinic and apply it to other areas (e.g. diagnostic techniques, equipment and technology used, scientific examination, and therapeutic specialisation).

The stages of the study (i.e. annual or in-depth in one of the regions) are as follows:

- Formation and refinement of the primary set of criteria and updating assessment methodology;
- Approval of the methodology and criteria with the Customer (in the case of a custom research mandate);
- Creation of a database of clinics, including special selection criteria;
- Evaluation of clinics by using indicators characterising Longevity Clinics;
- Determination of the best clinics (in several nominations) by ranking.

2.1 Research Methodology and Criteria

The **clinics were selected from amongst medical institutions, hospitals and clinics**, information about which can be obtained from open sources, verified databases of government and public organisations, and international and country ratings of clinics [1, 2, 3, 4, 5].

This approach made it possible for us to select **the best certified clinics that meet international standards, employ highly qualified personnel, use modern technologies and research methods, utilise cutting-edge equipment and have a well-developed infrastructure**.

While assessing the clinics, the following indicators were taken into account by default: opinions of patients, doctors, researchers and hospital managers, survival rate adjusted for risk, volume and quality of care, and clinic efficiency based on patient outcomes.

It should be kept in mind that the **parameters of international ratings and Longevity criteria may differ substantially** (e.g. the number of beds in a hospital, the average length of stay of a patient in it until recovery, etc.), therefore, we **did not limit** ourselves only to **clinics that were included in international rankings according to any particular criterion.**

One of the **parameters** we used is the **presence of a clinic in international rankings**. If a clinic that qualified for the Longevity Clinics category was included in international or regional ratings of the best clinics, its chances of being positively assessed in our rating increased substantially.

While selecting and ranking clinics for data validation and verification, we also used the following generally accepted methods: **expert assessments, patient surveys, clinic survey methods and "mystery shopper"**.

2.1 Research Methodology and Criteria

At this stage, clinics that do not specialise in the prevention and treatment of aging manifestations (e.g. surgical, oncological or pediatric ones), as well as clinics practicing traditional and alternative medicine) are excluded from consideration.

The criteria used for selecting clinics can be attributed to the following main groups:

- Specialisation (target of treatment);
- Technologies and diagnostic methods (personalised diagnostics);
- Technologies and treatment methods;
- Equipment;
- Medical staff (composition);
- Each of these groups can be broken down into subgroups.

The list of Longevity Clinics selection criteria is being constantly updated. New criteria identified in open sources (e.g. publications, databases, the Internet, expert opinion, etc.) are being constantly added to it. Below are the examples of groups of criteria, each of which can be applied to Longevity Clinics:

- Age-related diseases;
- Systemic inflammation;
- Aesthetic medicine;
- Regenerative medicine;
- Cell technologies.

2.1 Research Methodology and Criteria

Currently, our basic set of verified, balanced and harmonised criteria (with an adapted SMART approach — Specific, Measurable, Achievable, Relevant, Time bound used in time management) for benchmarking and scoring clinics includes more than **140 criteria (quantitative and qualitative ones)**. This basic set of criteria has been complemented by the Longevity selection criteria proposed by experts in fields of biology of aging, anti-aging medicine and Gerontology.

Based on the results of surveying the expert community, the criteria for **the selection and comparison of clinics were supplemented with the weighting coefficients of conformity to the Longevity category**. The weighting factors characterise the contribution of each criterion to the overall assessment of the clinic.

For comparative analysis of Longevity Clinics, a multi-criteria linear model is used in which, after several iterations on additional "training samples" of Longevity Clinics, iterative refinement of the criteria weights is carried out.

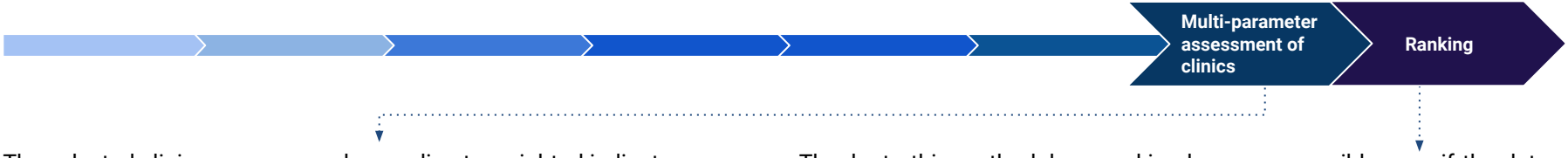
This approach will allow us to increase the number of criteria for comparative analysis and use Machine Learning and AI algorithms in the future. **Multi-criteria optimisation methods** make it possible to select the most significant criteria and reveal hidden connections and patterns.

These approaches also make it possible to reveal inaccurate information, as well as dubious, unverified and unconfirmed methods of diagnostics and therapy, which are declared as anti-aging, slowing down aging or prolonging life.

Determination of the minimum set of Longevity criteria will allow clinics to be **ranked according to various Longevity parameters in real time**.

New and additional features for multi-comparative analysis of Longevity Clinics can ensure a smooth **transition from a linear to a non-linear scoring model**.

2.1 Research Methodology and Criteria



The selected clinics are assessed according to weighted indicators:

- Indicators are assigned weights based on the results of expert assessment to be used in the overall ranking;
- The total score for all criteria is determined for each clinic. The overall rating is calculated by taking into account the weights for each indicator.

Given that we are dealing with multi-parametric analysis, the following mathematical model that allows us to carry out a comparative analysis for any set of criteria and parameters is used:

$$Z(C\left(\frac{n^k}{n^i}\right), P\left(\frac{m^l}{m^j}\right)) = F\ (G(n^k\, m^l\, n^i\, m^j) * P\left(\frac{m^l}{m^j}\right))$$

'C' stands for a certain number of analysed clinics from n = i to n = k; 'P' denotes parameters used for this analysis from m = j to m = l

'G' is a matrix that sets weights for both parameters and clinics; 'F' is a normalising function, the form of which is determined by the developed mathematical model.

Thanks to this methodology, ranking becomes possible even if the data about a certain clinic is incomplete (e.g. due to the lack of generally accepted standards, absence of aging in the classification of diseases or lack of a clear definition of Longevity Clinics).

Longevity Clinics ranking stages:

1. The clinics are ranked based on their overall scores.
2. The clinics are listed in descending order according to their score.
3. The best clinics with the highest overall score are determined.

2.2 Currently Available Longevity Medicine Treatments & Technologies

Longevity Medicine is a new direction in health care whose **goal is to increase the average life expectancy of a person** in the near term and increase the maximum life expectancy of a person in the long term.

This branch of medicine includes the following areas:

- Early diagnosis of diseases that are characterised as age-dependent;
- Prevention of early development of age-related diseases and general early aging or involution;
- Diagnosis and treatment of age-related diseases;
- Prolongation of the active phase of a person's life (for as long as their mental, physical and social activity is preserved);
- Improving the quality of life at all stages of aging of the human body;
- Treatment and care in old age (geriatric care).

The list of the currently available diagnostic and treatment procedures in Longevity Medicine is extensive.

The Most Popular and Well-known Currently Available Diagnostic & Treatment

Aging diagnostics (Biomarkers, Genetic panels)	Geroprotection	Modern nutritional strategies & functional nutrition
Microecology and microbiota	Biorhythm Correction and Sleep Optimisation	Functional correction of the hormonal axis
Peptide bioregulators	Personalised physical activity programs.	Detox
Transfusiology approaches	Personalised anti-stress management	Placental and cell therapy
Physiotherapy and rehabilitation	Age-related cosmetology	

2.2 Currently Available Longevity Medicine Treatments & Technologies

Key Results of Longevity Medicine

- Improving the quality of human life
- The maximum duration of the health age
- The maximum duration of mental and physical activity
- Mild course of age-related diseases with a minimum number of complications and a minimum percentage of unfavorable outcomes
- Achievement of the maximum possible average life expectancy of a particular individual **(from 90 to 120 years)**

Based on this and taking into account the structure and capabilities of modern healthcare, the Longevity Medicine clinic can be assumed to be structured by several levels, namely:

- Longevity Cabinet: comprising part of the Longevity healthcare structure, it can be a clinic that provides the minimum required set of medical services;
- Closed-Loop Clinic: since it is capable of providing the maximum range of medical services, its main goal will be to extend the average life expectancy of a person and go beyond it in the near future.

2.2 Currently Available Longevity Medicine Treatments & Technologies

Diagnostic & Treatment in Longevity Medicine

Gene Therapies	Cell Therapies	Tissue Engineering	Small Molecules & Biologics	Natural Mimetics of Validated Geroprotectors	Genetically Engineered Cell Therapies	3D Bioprinting	Microbiome Engineering
Gene therapy is an experimental technique that uses genes to treat or prevent disease. In the future, this technique may allow doctors to treat a disorder by inserting a gene into a patient's cells instead of using drugs or surgery.	Cell therapy is the transplantation of human cells to replace or repair damaged tissue and/or cells. With new technologies, many different types of cells may be used as part of a therapy or treatment for a variety of diseases and conditions.	Tissue engineering is the construction of bioartificial tissues in vitro as well as the in vivo alteration of cell growth and function via implantation of suitable cells isolated from donor tissue and biocompatible scaffold materials.	Small molecules are used to treat a variety of diseases and can be quite diverse in their mechanisms of action. It can be effective enzyme inhibitors and can target extracellular proteins or intracellular receptors in the cytosol, nuclei, and central nervous system.	E.g. metformin, rapamycin. Scientists find natural mimetics as anti-cancer, anti-aging drugs metformin and rapamycin. Geroprotectors of natural origin and supplements have a strong potential on the market.	T cells genetically equipped with chimeric antigen receptors (CARs) or TCRs have shown remarkable effectiveness in treating some hematological malignancies, although the efficacy of engineered T cells in treating solid tumors is far from satisfactory.	Three dimensional (3D) bioprinting is the utilisation of 3D printing – like techniques to combine cells, growth factors, and/or biomaterials to fabricate biomedical parts, often with the aim of imitating natural tissue characteristics.	Microbiome engineering holds great promise because of advances in the field of synthetic biology, which strives to create and rewire biological organisms so they perform desired tasks.

2.2 Currently Available Longevity Medicine Treatments & Technologies

Overview of the Progressive Model of P4 Medicine Platform: Ideally-Integrated Assembly of Precision Health Clinics Pipeline

AI-Driven Precision Diagnostics

- Multi-Omic Sequencing
- Continuous monitoring powered by Big Data Analytics
- Continuous monitoring of health state based on changes in biomarkers of aging

AI-Driven Advanced Prognostics

- AI-driven prognostics
- Advanced biomarker-based prognostics
- AI-driven predictive prognostics based on personalised multi-omics

Personalised Treatment Optimisation

- AI-driven in silico personalised treatment optimisation
- AI-driven personalised in vivo drug optimisation
- Treatment optimisation based on patient genetics

AI-Driven Preventative Treatment

- Maintaining state of precision health through preventive medicine
- AI-based predictions of optimal drug combination

2.2 Currently Available Longevity Medicine Treatments & Technologies

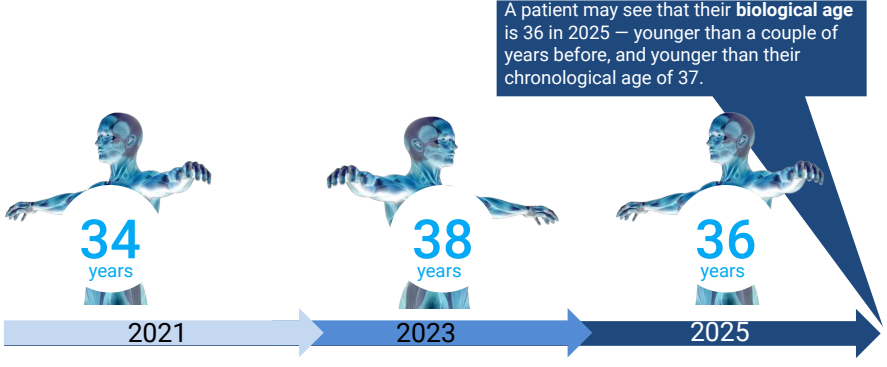
Precision Diagnostics

Multi-Omics Sequencing	**Qualitative functional tests**
Non-invasive continuous monitoring of biomarkers	**Whole-body and organ specific biological age calculation based on biomarkers**
Multi-modal total-body imaging	**3D integration of cross-sectional tissue and organ imaging**

Young.AI is a digital avatar that uses AI to assess a patient's health and age. The advantage of using a patient's information in an AI-driven environment is that it enables to obtain previously unobtainable insights and conduct a powerful analysis of the data **over time.**

3D visualisation of a patient's health enables to monitor not only its deterioration, but also improvement over a specific period of time. An interpretation can be made based on a patient's personal circumstances. A patient may, therefore, be able to see how their body has changed in terms of health, function, and biological age over a period of 5 years.

Biological Age



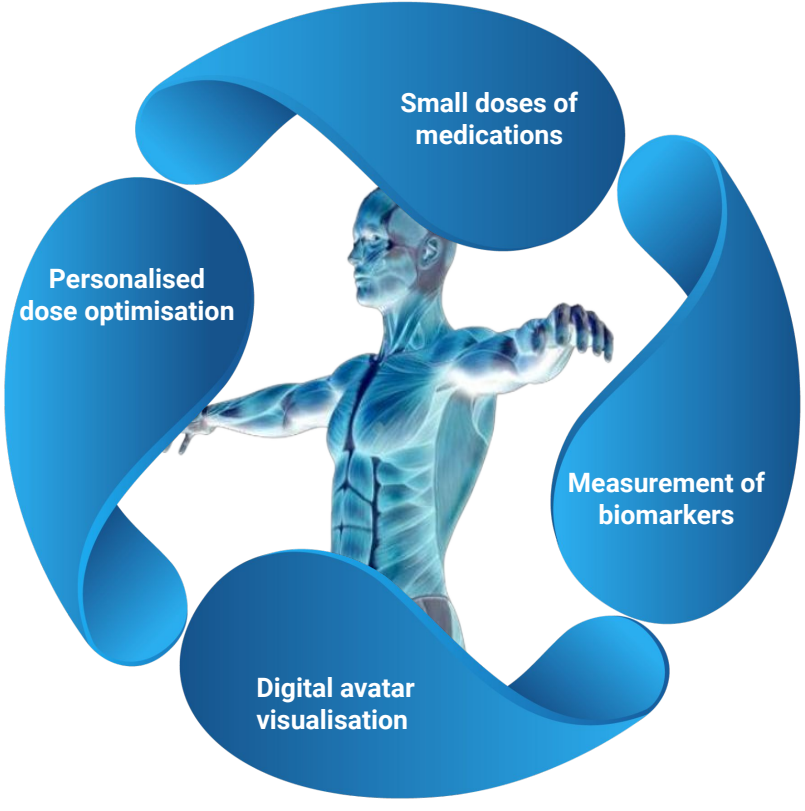
2.2 Currently Available Longevity Medicine Treatments & Technologies

Biomarkers and Data Science in the Core of P4 Medicine

Not only do new methods of standard industry benchmarking and forecasting need to be developed to combat the issues of overcomplexity and multidimensionality in the Longevity Industry, but new methods of testing the basic safety and efficacy of Longevity and Precision Health prevention, diagnostics, prognostics and therapeutics need to be adapted as well, moving away from the use of model organisms, towards a more human-centric approach.

Digital biomarkers satisfy all these new industry requirements: they can be continuously tested on all users, notifying adverse micro-effects and ultra-stratifying patients.

A large part of health information is digitised, which allows us to compile enormous amount of data, access global servers, and compare patient information, sort of a dynamic repository of information that is constantly being updated. The massive advance as far as these databases facilitates doctors in their diagnostic process, their ability to measure, analyse, compare patients, and produce medical reports that are more accurate and personalised, that will, in turn, lead to the best available therapy or treatment of the time.



2.3 Emerging Longevity Treatments & Technologies

Top-20 Cutting-Edge Biotechnologies in Development

1. **CRISPR-Cas systems:** revolutionary for gene editing, gene therapy, fundamental biology, diagnostics, and more.
2. **Gene therapy:** enables cures for genetic diseases and powerful treatments for many cancers, may eventually treat polygenic disorders, ameliorate aging, and even enhance human biology (e.g., provide radiation resistance to astronauts). Synergy with CRISPR-Cas technologies will greatly aid gene therapy.
3. **DNA origami:** paves the way for new nanomedicines, biocatalysts, biosensors, imaging probes, diagnostics, data storage methods, biocomputing, and more.
4. **Computational protein engineering:** paves the way for new nanomedicines, biocatalysts, biosensors, diagnostics, biomaterials, imaging probes, and more.
5. **Immunotherapy:** enables cures for many cancers, treatments for autoimmune diseases, and more.
6. **Computational protein structure prediction:** revolutionises drug discovery and basic biology, synergises with computational protein engineering.
7. **Spatial transcriptomics:** method for interrogation of cell and tissue biology in a holistic and multidimensional fashion to deeply understand health and disease, may lead to dramatic insights on aging, cognition, and pathology.
8. **Optogenetics:** powerful tool for understanding cellular physiology and neural circuits, may greatly enhance brain-machine interfacing (with the help of gene therapy).
9. **Expansion microscopy:** physically enlarges biological samples to multiply resolution. Making major strides in connectomics, vastly enhancing study of spatial organisation of cells and tissues in general, synergising with spatial transcriptomics.
10. **Longevity medicines:** pharmacological, gene therapy, and other methods of treating aging may extend human lifespan and dramatically reduce the prevalence of most aging-related diseases.

2.3 Emerging Longevity Treatments & Technologies

Top-20 Cutting-Edge Biotechnologies in Development

11 **Bioprinting:** produces replacement tissue; potentially makes it possible to manufacture replacement organs; greatly aids in the study of tissue biology by providing a platform for drug testing.

12 **Organ-on-a-chip systems:** may greatly reduce the need for animal models in research; helps understand organ microenvironments and organ physiology in general; serves as a platform for drug testing and discovery.

13 **Organoids:** may greatly reduce the need for animal models in research; helps understand organ physiology (especially in context to 3D structure and function); serves as a platform for drug testing and discovery; contributes to the understanding of cognition; aids in the understanding of developmental biology.

14 **Cryo-EM and cryo-ET:** rivaling x-ray crystallography for solving high-resolution protein structures, it is much easier than x-ray crystallography (especially for certain problematic samples); it can provide 3D images of cellular environments at sufficient resolution to see some macromolecular structural details and preserve sample integrity better than other methods.

15 **Phage therapy:** enables versatile and potent treatment of bacterial infections; may save the world from antibiotic resistance.

16 **Synchrotron x-ray nanotomography:** rapid 3D imaging in one or two colors; may help map out the brain structure much more rapidly than other methods; can lead to the emergence of brain-inspired AI and robotics, treatment of brain diseases, and whole-brain simulations.

17 **Tissue clearing with light-sheet microscopy:** facilitates 3D imaging of tissues and even whole organs, leading to a much better understanding of biological function; aids in connectomics.

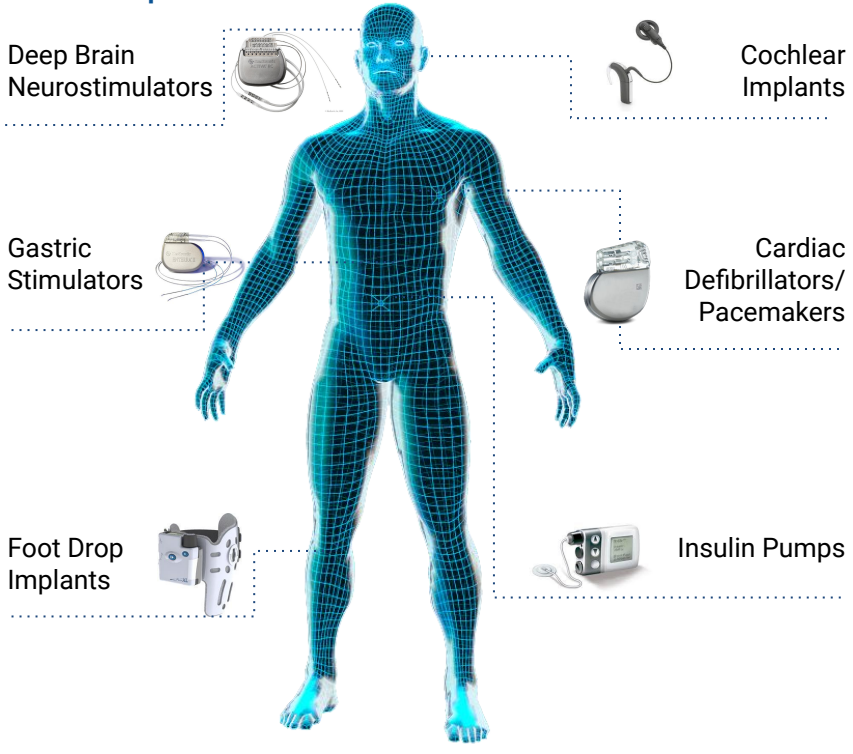
18 **Predictive systems biology models:** transforms vast biological datasets into parameters for large-scale simulations and ensures valuable insights; examples include kinetic signaling network simulations, molecular dynamics simulations, and biophysical neuronal network simulations.

19 **Predictive systems biology models:** transforms vast biological datasets into parameters for large-scale simulations and ensures valuable insights; examples include kinetic signaling network simulations, molecular dynamics simulations, and biophysical neuronal network simulations.

20 **Minimal cells:** may transform understanding of cellular physiology; may act as a superior biomanufacturing platform, may act as a superior platform for cell therapy, and more.

2.3 Emerging Longevity Treatments & Technologies

Wireless Implantable Medical Devices



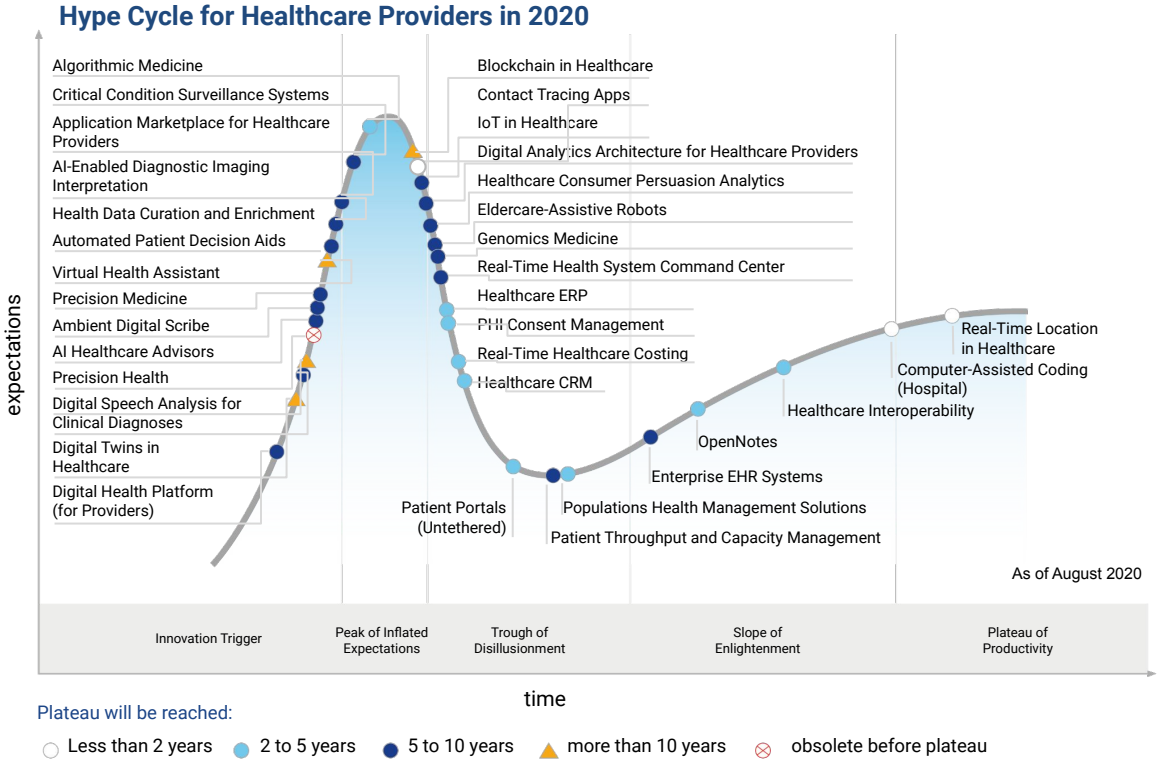
Personalised Experimentation

Intelligent in silico experimentation	Real-time tracking of changes in health and aging biomarkers in response to ongoing treatments
Personalised in vivo experimentation on human cells	Personalised ex vivo experimentation on 3D bioprinted tissues and organs with the help of patient-specific cells
Organ-on-a-chip systems	AI-based personalised biomarker development and drug response profiling via Deep Learning and Generative Adversarial Networks

2.4 False, Overhyped, Non-Validated, and Non-Recommended Technologies & Treatments

The lack of an international and regional framework, both legal and regulatory, may lead to the misinterpretation of Longevity and Anti-Aging. They are not to be confused with the mechanical and purely cosmetic elimination of external signs of aging - something that plastic surgery and cosmetology concern themselves with.

The True Longevity Medicine is the solution of the internal problems of the human body and normalisation and restoration of its organs and systems. Thanks to that, two key results are achieved: 1) life expectancy increases (due to the neutralisation of a whole set of "harmful" factors, including but not limited to, genetic predisposition to certain diseases, lifestyle defects, hormonal imbalance, lack of vitamins and trace elements) 2) quality of life improves (physically, psychologically, sexually and in many other respects).



Source: Gartner

Section 3:
Longevity Medicine Guide

AGING
ANALYTICS
AGENCY

3.1 Recommended Compact Longevity Diagnostic Complex: Longevity Cabinet

Service Portfolio

- **Diagnostics of age-related pathologies** - a standard medical consultation which involves lab analysis of the samples of the patient's biomaterial. Its purpose is to run biochemical tests, conduct genetic research, determine biomarkers of aging, and identify the patient's predisposition to age-related pathologies. It can also be done by any independent laboratories chosen by the patient.
- **A series of diagnostic procedures**, such as ECG, dynamometry, BMI assessment, fundus examination, measurement of blood pressure, etc.
- **Extended examination:** an ultrasound scan of the neck vessels (to determine the thickness of the intima media) and vessels of the lower extremities, echography of the heart, radiography of the respiratory organs, an ultrasound scan of the abdominal organs (if it is necessary to clarify the diagnoses, the patient may seek consultations of relevant medical experts).
- **A series of geriatric tests** to determine the deterioration of cognitive and physical abilities.
- **Evaluation of biological age** (based on the survey and analysis of biomarkers of aging).
- **Prognosis of the occurrence of diseases** and **life expectancy**.
- **Treatment of age-related pathology with the supervision of the patient** (periodic examinations, prescription and adjustment of therapy, and lifestyle).
- **Carrying out simple manipulations**: injections, drip transfusion of solutions.
- **Correction of age-related metabolic and hormonal disorders** (hormone therapy).
- **Recommendations regarding lifestyle** (nutrition, sleep, physical activity, and nutritional supplements).
- **The use of innovative and promising methods**: stem cells, gene therapy, etc.

3.1 Recommended Compact Longevity Diagnostic Complex: Longevity Cabinet

A Longevity Cabinet can exist as an **independent medical structure**. As a rule, it is created by one or more specialists that are well known to the interested audience, have the appropriate medical qualifications (especially in geriatrics or other similar specialties), enjoy a good reputation, and have a scientific and professional interest in the area. Oftentimes, having an interest in this area of science and medicine plays a far greater role than specialisation in geriatrics. This is because geriatrics has a slightly different purpose and is one of the directions in Longevity medicine.

In addition, such a Cabinet **can be integrated into the structures of larger private or public medical institutions**.

Personnel qualifications (General practitioner or specialisation):

- Neurology;
- Cardiology;
- Therapy;
- Endocrinology;
- Geriatrics, etc.

Structure of the Longevity Cabinet

1-2 Qualified Doctors, 1-2 Nurses (Optional)	2-3 Rooms for Examination and Manipulation

Equipment Used in the Longevity Cabinet

Medical Furniture and Equipment	Office Equipment
Means for Manipulations and Consumables	A Compact Set of Medical Equipment for Diagnostics and Treatment

3.2 Recommended Optimal Longevity Preventive Treatment

Let's consider **the configuration of a typical Medium-sized Longevity Clinic**. It can exist as an independent structure or be part of a larger medical center providing a wide range of medical services.

As it has already mentioned in **the classification of Longevity Clinics**, some of them specialise in the assessment and correction of the biological age with the help of regenerative and restorative medicine. They also concern themselves with the prevention and treatment of age-related diseases. Others combine aesthetic medicine, cosmetology, SPA and wellness directions, which are given less attention in this report.

All these clinics are biased toward either of these two directions. Some of them **place an emphasis on the therapeutic approach**, while others **pay more attention to the aesthetic component of medical care**.

Tentatively, we can **divide** such a clinic into **two independent departments**:

Longevity-Therapeutic, Geriatric

Structure:

- 1-2 qualified doctors specialising in various fields, nurses (at least 2-3 procedural nurses), 2 laboratory technicians, 4 nurses, 4 administrators, a director, an accountant, a lawyer responsible for AHP;
- 2 rooms for examination and manipulation for each specialist, a resident's office, a nursing office, a director's office, an ancillary services office, a hall, corridors, and rooms for storing inventory, consumables and medical waste (it all depends on the number of specialists and estimated throughput).

Aesthetic Medicine and Cosmetology

Structure:

- 1-2 qualified doctors specialising in various areas of cosmetology and plastic surgery, nurses (at least 2-3 procedural nurses), 4 nurses, administrative staff (see above);
- Surgical department (1-2 operating rooms with auxiliary rooms), 1-2 rooms for examination and manipulation for each specialist, massage rooms, a physiotherapy room, a gym, a SPA area, corridors, rooms for storing equipment, supplies and medical waste (it all depends on the number of specialists and estimated throughput).

3.2 Recommended Optimal Longevity Preventive Treatment Complex

Longevity Treatment Department

Personnel Qualifications:

- General practitioners, doctors of the following specialisations: neurology, cardiology, therapy, endocrinology, geriatrics, orthopedics, gynecology, urology-andrology, oncology, allergology-immunology, gastroenterologist-nutritionist, biochemist, radiation diagnostician. All specialists have a narrow specialisation and a field of medical interests in the field of longevity medicine, treatment of age-related diseases and anti-ageing.

Services:

- Initial consultation for patients in the clinic;
- Diagnostics of age-related pathologies (biochemical tests and genetic tests to determine biomarkers of aging and predisposition to age-related pathologies);
- Diagnostic procedures (ECG, dynamometry, BMI assessment, fundus examination, blood pressure measurement, etc.);
- Conducting a series of geriatric tests to determine the deterioration of cognitive and physical abilities.

Equipment:

- Medical furniture and equipment, office equipment, means for manipulations and consumables, X-ray equipment (ideally CT, MRI);
- Stethoscopes, tonometers, dynamometer, neurological hammer, scales, tape measures, height meters, ophthalmoscopes, etc.
- Apparatus for cytoplasmapheresis;
- ECG cardiograph, 1-2 ultrasound devices of an expert class for all types of examination, Densitometer, Complex "uro-gynecological office";
- Biochemical analyser, hematology analyser, urine analyser, auxiliary laboratory equipment: centrifuges, etc.

Important! All diagnostic and treatment procedures are carried out on the basis of a precise and personalised approach (ideally, the clinic should meet the 4P and Precision Medicine criteria)

3.2 Recommended Optimal Longevity Preventive Treatment Complex

Aesthetic Medicine and Cosmetology Department

Personnel qualifications:

- Plastic surgeons and anesthesiologists, resuscitators, cosmetologists, dermatologist-trichologist, nutritionist, physiotherapist, sports medicine doctor, endocrinologist, psychologist, massage therapists;
- All specialists specialise in anti-age cosmetology and focus on solving aesthetic problems associated with age.

Equipment:

- Medical furniture and equipment, office equipment;
- Means, tools for manipulation and consumables;
- Equipment for operating rooms (operating table, lighting, equipment for anesthesia and condition monitoring, operating equipment, various types of suction, means and equipment for urgent resuscitation, including a defibrillator);
- All kinds of hardware cosmetology equipment (ultrasonic, laser mechano-wave, radio frequency, ultrasonic, combined, etc.);
- Massage tables;
- Physiotherapy equipment (based on various physical principles);
- Gym equipment;
- Equipment for the SPA department (hydromassage baths, cryosauna, dry and wet saunas, vertical and horizontal solariums).

Important! Medical and diagnostic procedures are carried out on the basis of a precise and personalised approach.

3.2 Recommended Optimal Longevity Preventive Treatment Complex

Aesthetic Medicine and Cosmetology Department

Services:

- Consultation of a cosmetologist-dermatologist and physiotherapist;
- Provision of aesthetic cosmetology services (e.g. moisturising, care, peeling, etc. based on nutri-cosmeceutical preparations and products, face massage and face lifting);
- Provision of anti-aging cosmetology services (e.g. thread lifting, injections of botulinum toxin, hyaluronic acid, biorevellant drugs, drugs stimulating production of collagen and elastin and their substitutes, mesotherapy, contour plastics, using skin fibroblasts and other drugs based on stem cells);
- Apparatus cosmetology and physiotherapy, for muscle stimulation, facelift, elimination of puffiness, lymphatic drainage, fat burning, etc;
- Plastic surgery (various types of face and body plastics);
- Elimination of skin defects (acne, wrinkles, cellulite, etc.).
- Services of an anesthesiologist-resuscitator;
- Nutritionist services (selection of a diet, recommendations on the use of nutraceuticals and food supplements);
- Dermatologist-trichologist;
- Endocrinologist (consultation, diagnosis of problems, and selection of hormone replacement therapy);
- Sports medicine doctor (developing individual programs for body correction, muscle strengthening, combating sarcopenia, and physical training);
- Medical and corrective massage;
- Physiotherapy procedures;
- SPA procedures;
- Psychological counseling.

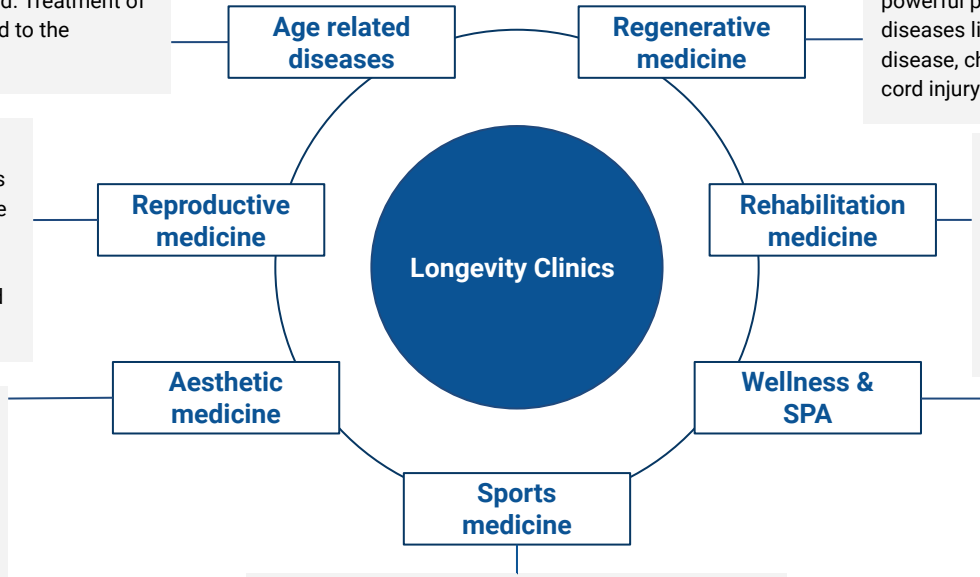
3.3 The Role of Aging Biomarkers in Longevity Research

Age-related diseases are illnesses that occur as people get older. Age-related pathologies are the most common diseases of modern mankind. Treatment of age-related diseases is directly related to the prolongation of human life.

Regenerative medicine offers treatments for aging at tissue and cellular level. Regenerative medicine has a powerful potential to treat previously incurable diseases like diabetes mellitus, cardiovascular disease, chronic renal failure, osteoporosis, spinal cord injury.

Biology views the aging of the human body as a kind of disease. Its cause is the loss of our body's ability to restore damaged tissues and organs. Regenerative medicine offers treatments for aging at the tissue and the cellular level.

Rehabilitation is the restoration of health, functional state and working capacity, impaired, diseases, injuries or physical, chemical factors. Medical rehabilitation is a complex of treatment procedures aimed at restoring the patient's physical and psychological health.



Anti-aging medicine is one of the branches of medicine, the purpose of which is to prevent age-related changes and prolong life. It is based on the principles of evidence-based medicine, and it itself identifies individual age-related changes and helps a person to effectively cope with them.

Wellness implies the complex use of methods of healing, consisting of dietology, rehabilitation programs, psychological recovery, functional training, spa treatments, etc. This combination of moderate physical activity, relaxing procedures and the healthy eating has a truly healing effect.

Sports medicine is a practical branch of medicine that studies the health, physical development and functionality of the body.

Section 4:
Appendix (Profiles of Clinics)

AGING
ANALYTICS
AGENCY

London Bridge Hospital

London Bridge Hospital
part of HCAHealthcare UK

One of the largest private hospitals in the UK, London Bridge Hospital provides the highest standard of clinical expertise and nursing care. London Bridge Hospital is committed to excellence and quality and has an established international reputation for offering the very best in private healthcare.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	1986
Specification	It has an Urgent Care unit and specialises in private GP, second opinion, age-related diseases, surgery, men's & women's health, tests & scans

Services and Treatments

Oncology: Precision Oncology, Proton Therapy, Organ Specific Cancer Care, Radiation Oncology

Surgery: Surgery for Parkinson's Disease, Minimally Invasive Cardiac Surgery, Oral & Maxillofacial Surgery, Micro Neuro Surgery

Clinical Trials: Chemotherapy, Stem Cell Transplantations, Cardiovascular, Anti-Cancer Drugs

Cardiac Services: Complex Revascularisation, TAVI, PEARS Procedure, The Cardiac Genetics Clinic

The Lister Hospital

THE LISTER HOSPITAL
chelsea
part of HCAHealthcare UK

Located in n Chelsea, the **Lister Hospital** is a private hospital owned by the Hospital Corporation of America, the largest private operator of health care facilities in the world. Hence, it is not part of the National Health Service (NHS). Its net annual revenue is estimated at £1M.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	1985
Specification	It has Critical Care Unit and specialises in orthopaedics, gynaecology, dermatology, gastroenterology, ophthalmology and plastic surgery, and also runs a fertility clinic.

Services and Treatments

Proton Cancer Centre: Cancer Screening, All Phase Clinical Trials, Proton Therapy, Tumour Boards

Robotic Surgery: Percutaneous Mitral Valve Repair with Mitraclip,, Da Vinci® Robotic Surgical System, Cyberknife®

Clinical Trials: Chemotherapy, Stem Cell Transplantations, Cardiovascular, Anti-Cancer Drugs

Advanced Screening: 320 Slice Advanced Technology, Optical Coherence Tomography, Gallium 68 (g68), mri g scan

The London CyberKnife Center

Part of the internationally renowned Harley Street Clinic, the London CyberKnife Centre was the first medical facility in the UK to offer CyberKnife® treatment. This revolutionary, non-invasive procedure delivers highly focused radiation precisely to where it's needed, treating previously inoperable tumours and protecting healthy tissue.

Headquarters	London, UK
Number of Employees	20-50
Foundation Year	2017
Specification	It specialises in CyberKnife®, a non-invasive laser treatment alternative to surgery for patients including complex brain tumours, prostate cancer, spinal lesions, and liver tumours.

Services and Treatments

Personalised care: A team of multidisciplinary consultants chooses the right treatment for your health condition

Clinical Oncology: Two state-of-the-art linear accelerators allow image guided radiotherapy

Interventional radiology: Chemoembolisation or TACE, Chemosaturation, Radio Frequency Ablation

Neurology: Paediatric neurology, Neurology aftercare and rehabilitation, advanced MRI, CT, and EEG scans

Charing Cross Hospital

NHS Imperial College Healthcare NHS Trust

Located in London, **Charing Cross Hospital** provides a wide range of medical services. It has a 24/7 accident and emergency department, as well as a hyper-acute stroke unit. In partnership with local GPs and community providers, it serves as a hub for integrated care provision. Charing Cross is one of the most important neuroscience centres. It was the first to use CT scanning; it also uses advanced oncology and chemotherapy techniques.

Headquarters	London, UK
Number of Employees	1,000+
Foundation Year	1973
Specification	It specialises in endocrinology, blood tests, age-related diseases, sexual health, and geriatric medicine

Services and Treatments

Advanced Cancer Centre: Cancer Screening, All Phase Clinical Trials, Proton Therapy, Tumour Boards

Endocrinology: Endocrine cancer genetics/MEN, robotic thyroid and parathyroid surgery, dynamic endocrine tests and hormone measurements

Genomic Medicine: Adult neurogenetics, lipid genetics, genetic ophthalmology

Geriatric care: Orthopaedic liaison service, older person's rapid access clinic (OPRAC), GI cancer surgical liaison service

St. Mary's Hospital

NHS Imperial College Healthcare NHS Trust

St Mary's Hospital is the major acute hospital for North West London, as well as a maternity centre with consultant and midwife-led services. The hospital provides care across a wide range of specialties and runs one of four major trauma centres in London in addition to its 24/7 A&E department.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	1885
Specification	It specialises in personalised regenerative cell therapies, preventive health checks, endocrinology, blood tests, age-related diseases,, and geriatric medicine.

Services and Treatments

Age-related diseases: Cancer Screening, Pancreas Transplantation, Nutritional Management, Qutenza Therapy

Major Trauma Center: One of Only Four Such Centers in London, Treating Injuries Sustained as a Result of an Accident, Sport or Violence

Compex Treatments: Chemotherapy, Stem Cell Transplantations, Cardiovascular, Anti-Cancer Drugs

Geriatric care: Orthopaedic liaison service, older person's rapid access clinic (OPRAC), GI cancer surgical liaison service

Hammersmith Hospital

Hammersmith Hospital is internationally renowned for clinical research. It earned a reputation for the treatment of various medical conditions, and more specifically, those of the heart and kidney. It is also famous for its specialisation in Endocrine surgery. The Medical Research Council (MRC) has a major presence at Hammersmith Hospital through the London Institute of Medical Sciences, ensuring a strong foundation for clinical and scientific research.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	1902
Specification	It specialises in personalised regenerative cell therapies, preventive health checks, endocrinology, blood tests, age-related diseases, sexual health, geriatric medicine.

Services and Treatments

Age-related diseases: Cancer Screening, Neuro-oncology, Cardiovascular Disease Prevention

Major Trauma Center: One of Only Four Such Centers in London, Treating Injuries Sustained as a Result of an Accident, Sport or Violence

Clinical Trials: Fertility, Anti-Cancer Drugs, Chemotherapy, Cardiovascular,

Elderly Medicine: Orthopaedic liaison service, older person's rapid access clinic (OPRAC), GI cancer surgical liaison service

London Center for Longevity Metabolic

LCLMH is the UK's number one centre for optimisation of metabolic and physical health, as well as prevention and reversal of chronic diseases. It uses the latest evidence-based techniques to provide the highest quality of care, including at the cellular and metabolic levels.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	2018
Specification	It specialises in clinical and research imaging, inflammation, metabolic health, preventive medicine, longevity, and nutritional physiology.

Services and Treatments

Brain Health: Alzheimer's Disease, Cognitive Decline, Stroke, Mental Health

Metabolic Health: Diabetes, Obesity, Metabolic Syndrome, PCOS

Heart Health: Heart Attack, High Cholesterol, Angina, High Blood Pressure

Longevity: nutrition consultations, personalised exercise recommendations, and sleep optimisation

Kuer Clinic

Located in London's Harley Street Medical district, KUER Clinic is a world class medical facility that provides premium services to local and international patients. It relies on the latest medical technology and recent advances in integrative medicine. KUER places a strong emphasis on anti-aging and longevity. By exercising a proactive approach to diagnostics and pharmaceutical prescriptions, it aims to solve complex health problems, normalize hormonal balance and boost immunity.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	2001
Specification	It specialises in personalised regenerative medicine, preventive health checks, testing, treatments, physio, and aesthetic.

Services and Treatments

Integrative Medicine: Pre-Diabetes, Newly diagnosed Alzheimer's, Dementia and Multiple Sclerosis, Chronic Fatigue

Longevity Treatments: Human Growth Hormone (HGH), Testosterone Therapy Genetic Nanomedicine, Cryotherapy

Clinical Trials: Chemotherapy, Stem Cell Transplantations, Cardiovascular, Anti-Cancer Drugs

Testing and Screening: Genetic Age Testing, Thyroid, Adrenal & Cortisol Testing, Liver and Kidney Function Testing

Queen Elizabeth Hospital

NHS
University Hospitals Birmingham
NHS Foundation Trust

Queen Elizabeth Hospital is a regional centre for cancer, trauma, renal dialysis, burns and plastics, HIV and AIDS, as well as respiratory conditions like cystic fibrosis. It provides expertise in premature baby care, bone marrow transplants and thoracic surgery and has the largest solid organ transplantation programme in Europe.

Headquarters	Birmingham, UK
Number of Employees	1,000+
Foundation Year	Old 1817, New 2010
Specification	Specialises in personalized regenerative cell therapies for aesthetics, preventive health checks.

Services and Treatments

NeuroEndocrine Tumour Centre: Lutetium Radionuclide Therapy, Radiofrequency Ablation, Trans-arterial Embolisation

Robotic Surgery: Percutaneous Mitral Valve Repair with Mitraclip,, Da Vinci® Robotic Surgical System, Cyberknife®

Genomic Medicine: Advanced Diagnosis Techniques, On-cite Clinical Trials, Combining Genomic Sequence Data with Medical Records

Advanced Screening: 320 Slice Advanced Technology, Optical Coherence Tomography, Gallium 68 (g68), mri g scan

Princess Grace Hospital

THE PRINCESS GRACE HOSPITAL
part of HCA Healthcare UK

Located in London, the Princess Grace Hospital is an international division of the HCA (Hospital Corporation of America), the world's largest private healthcare company.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	1983
Specification	It specialises in spinal surgery, breast care, gastroenterology, hepatobiliary and hepatology surgery, sports and exercise medicine, urgent care, urology, and robotic surgery

Services and Treatments

Cancer Treatment: CAR T-cell Therapy Treatment, Visualase™ Neurosurgical Laser Ablation, CyberKnife®

Robotic Surgery: da Vinci® Surgical System, Mako® Robot, ExcelsiusGPS®, Lokomat

Clinical Trials: Chemotherapy, Stem Cell Transplantations, Cardiovascular, Anti-Cancer Drugs

Diagnostic imaging: Endoscopy Centre, 3T MRI, DEXA Scanner, Advanced CT and Tomosynthesis

Royal Brompton and Harefield NHS Foundation Trust

Royal Brompton and Harefield hospitals

Royal Brompton and Harefield hospitals make up the largest specialist heart and lung centre in the UK and among the largest in Europe.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	Old 1841, new 1998
Specification	It specialises in personalized cardiology and respiratory diseases

Services and Treatments

Heart Treatments: Anticoagulant clinics, Aortic programme, Cardio-oncology, Complex coronary disease

Lung Treatments: Cancer services, Chronic obstructive pulmonary disease, Cystic fibrosis (adults), General respiratory medicine

Clinical Support: Critical care and anaesthesia, Advanced Imaging, Laboratories, Non-clinical teams

Paediatrics: Cardiac morphology, Children's cardiac care, Children's long-term ventilation service

The Hamlet Clinic

THE HAMLET CLINIC

The Hamlet Clinic is a private clinic specialising in body sculpting procedures. It also conducts anti-aging procedures and personalised hormonal replacement treatment.

Headquarters	London, UK
Number of Employees	20-50
Foundation Year	2015
Specification	It specialises in aesthetic procedures and anti-aging hormonal treatment.

Services and Treatments

Anti-aging: Hormone Replacement Therapy, Bioidentical Hormones for Women, Human Growth and Testosterone Hormones

Facial aesthetics: Botox, Dermal Fillers, Facial Surgery Interventions, Ultherapy

Surgical procedures: Arm and body lift, Vaser hi-def liposuction, Post-bariatric body contouring, rhinoplasty, Blepharoplasty, Facelift surgery

Harpal Clinic

Located in London, **Harpal Labs** is a wellbeing clinic that provides advanced health optimisation therapies, ranging from cryotherapy and IV vitamins to infrared sauna therapy.

Headquarters	London, UK
Number of Employees	100+
Foundation Year	2014
Specification	It specialises in Testosterone Therapy, Chronic Illness, Biohacking, Health Optimisation, Lab Testing, Nutrient Therapy, Gut Health, and Functional Medicine

Services and Treatments

Hormone Therapy: Bioidentical HRT, Testosterone Replacement Therapy, Melatonin and DHEA Therapy

IV Vitamin Therapy: Myers Cocktail IV Drip Amino Acid IV Infusions, Glutathione IV Drip, Magnesium Infusion, Vitamin B12 Shot

Aesthetic: Chemical Peels, Skin Rejuvenation, Microneedling, Spider Vein Removal, Platelet Rich Plasma and Mesotherapy

Functional Medicine: Autoimmune Diseases, Weight Loss,, Chronic and Adrenal Fatigue, Low Dose Naltrexone

Medica Stem Cells

Medica Stem Cells Clinic is a clinic that specialises in comprehensive Regenerative Medicine treatments, including a PRP therapy for joint and sports injuries, as well as a therapy for arthritis, osteoarthritis or any other degenerative condition of joints that cause discomfort.

Headquarters	London, Dublin, Manchester
Number of Employees	100+
Foundation Year	2018
Specification	It specialises in personalised regenerative cell therapies for joint injuries, and preventive health checks.

Services and Treatments

Regenerative treatment: Prolotherapy, Platelet-rich plasma therapy, stromal vascular fraction therapy, mesenchymal cell therapy

Joint rejuvenation: Cartilage wear bone treatment, Elbow arthritis and osteoporosis intervention, Shoulder pain treatment

Aesthetics: Hair loss treatment, Facial rejuvenation, Wrinkle treatment

Additional procedures: Nutritional advice, Physiotherapy, Goldic Therapy, IV Cell therapy

Hormone Health

Founded in 2015, **Hormone Health** is a private women's health clinic located in London's Harley Street. In September 2019, it opened a second clinic in Nottingham. Hormone Health brings together like-minded specialists committed to providing their patients with medical services of the highest quality.

Headquarters	London, Nottingham, Glasgow, Oxford
Number of Employees	300+
Foundation Year	2015
Specification	It specialises in personalised regenerative, preventive health checks, endocrinology, and women's health.

Services and Treatments

Hormonal therapies: Hormone Replacement Therapy (HRT), Licenced Body Identical Hormone Treatment

Women health: Premature Menopause Treatment, Gynaecological Interventions, Ovarian Cysts Management

Clinical Trials: Chemotherapy, Stem Cell Transplantations, Cardiovascular, Anti-Cancer Drugs

Advanced Assessments: DEXA Scan, Sonography, Nutritional Health Screening, Comprehensive Blood Tests

Sources

1. **A Comprehensive Approach to Longevity and Anti-Aging.** Aspire Regenerative Health
2. **A New Map of Life.** Stanford Center on Longevity
3. **Ageing and longevity in UK need more funding and research, peers are told.** BMJ
4. **America's Best Hospitals for Clinical Excellence Awards 2021 Methodology.** Healthgrades
5. **Anti-aging Medicine.** Indian Journal of Plastic Surgery
6. **Best Hospitals 2020 - United Kingdom.** Newsweek
7. **Best Hospitals Rankings: Methodology Updates.** U.S. News & World Report
8. **Britain's best hospitals: A Patient's Guide.** The Independent
9. **Charing Cross Hospital.** Imperial College Healthcare NHS Trust
10. **Extending Healthy Life Expectancy.** The Longevity Alliance
11. **Hammersmith Hospital.** Imperial College Healthcare NHS Trust
12. **Harpal Clinic London.** Harpal Clinic
13. **Hormone Health.** Designated Medical Hospital
14. **Ratings & Awards Methodologies.** Healthgrades
15. **Implementation of longevity-promoting supplements and medications in public health practice.** Journal of Translational Medicine
16. **Kuer Clinic Harley Street.** Harley Street Physiotherapy
17. **Life expectancies.** UK Office for National Statistics
18. **Life expectancy in England in 2020.** Public Health England
19. **London Bridge Hospital.** HCA Healthcare UK
20. **London Centre For Longevity And Metabolic Health.** LCLMH
21. **Longevity and the Future of Health.** Milken Institute
22. **Longevity Industry 1.0: Defining the Biggest and Most Complex Industry in Human History.** Deep Knowledge Group
23. **Longevity Medicine: Upskilling the Physicians of Tomorrow.** The Lancet Healthy Longevity
24. **Outlook for Longevity technology.** Longevity Technology
25. **Queen Elizabeth Hospital Birmingham.** University Hospitals Birmingham
26. **Regenerative Cell Treatment - London, UK.** Medica Stem Cells
27. **Royal Brompton and Harefield Hospitals.** NHS Foundation Trust
28. **St Mary's Hospital.** Imperial College Healthcare NHS Trust
29. **The Hamlet Clinic.** MedGrowth
30. **The Lister Hospital.** HCA Healthcare UK
31. **The London Cyberknife Center.** HCA Healthcare UK
32. **The Princess Grace Hospital.** HCA Healthcare UK
33. **The TA-Swiss Study on Anti-aging Medicine.** Revue Médicale Suisse
34. **Understanding Gartner's Hype Cycles.** Gartner Research
35. **Viewpoint: Hospital rankings should measure health equity progress.** Becker's Hospital Review
36. **Watson Health 100 Top Hospitals Study, 2021; 28th edition.** IBM Watson Health

About Aging Analytics Agency

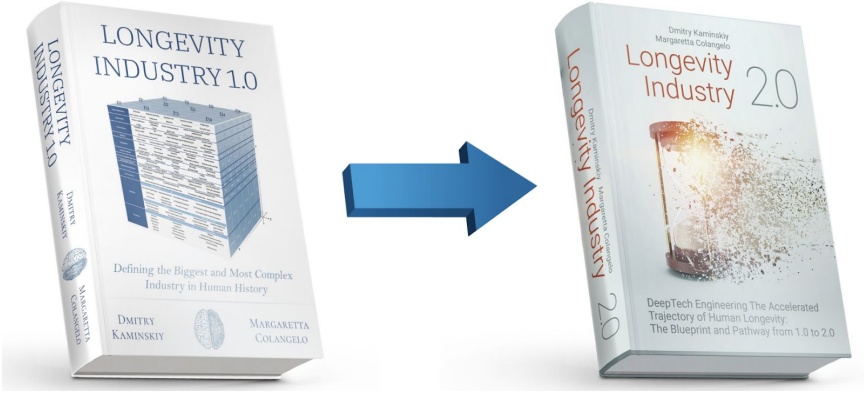
As a Supporting Partner for the UK All-Party Parliamentary Group for Longevity, a Founding Partner of the APPG for Longevity Secretariat Longevity International and an Official Member of the UN NGO Committee on Ageing, Aging Analytics Agency has been active in the realm of UK and international Longevity Policy and Governance for the past several years.

By committing available resources and mustering political will, governments of all countries can effectively tackle the aging population challenge. Doing so will help neutralise some of the most dangerous sources of economic and societal instability and help ensure economic prosperity worldwide.

Aging Analytics Agency sees its mission in transforming the ageing population challenge into an opportunity. By utilising AI-driven big data analytics, benchmarking and profiling national and local industry strategies, it aims to come up with Longevity policy initiatives and develop Longevity strategies.

It is the only specialised analytics agency in the world that focuses exclusively on the emerging Longevity Industry. Aging Analytics Agency is recognised internationally as the premier analytics agency for advanced data analysis, industry reports and next-generation infographics on the topics of Aging and Longevity.

Now in its 7th year, Aging Analytics Agency has been on the frontlines of Longevity Analytics since the inception of the industry.



Longevity Industry 1.0

- Defining the Biggest and Most
- Complex Industry in Human History

Longevity Industry 2.0

- DeepTech Engineering the Accelerated
- Trajectory of Human Longevity
- The Blueprint and Pathway from 1.0 to 2.0

www.longevity-book.com

Aging Analytics Agency (AAA) Disclaimer.

The information and opinions contained herein are provided by Aging Analytics Agency (AAA). AAA considers them to be reliable, however, it cannot vouch for their accuracy or completeness. There is no guarantee that the views and opinions expressed in this communication will come to pass. AAA may provide, may have provided or may seek to provide advisory services to one or more companies mentioned herein. In addition, employees of AAA may have purchased or may purchase securities in one or more companies mentioned in this report. Opinions, estimates and analyses in this report constitute the current judgment of the author as of the date of this report. They do not necessarily reflect the opinions of AAA and are subject to change without notice. AAA has no obligation to update, modify or amend this report or to otherwise notify a reader thereof in the event that any matter stated herein, or any opinion, estimate, forecast or analysis set forth herein, changes or subsequently becomes inaccurate. This report is provided for informational purposes only. It is not to be construed as an offer to buy or sell or a solicitation of an offer to buy or sell any financial instruments or to participate in any particular trading strategy in any jurisdiction.

www.aginganalytics.com	info@aginganalytics.com

AGING
ANALYTICS
AGENCY