Biomarkers of Longevity: Current State, Challenges and Opportunities Landscape Overview 2019

AGING ANALYTICS AGENCY

A comprehensive and open-access report featuring comparative analysis of actionable Biomarkers and Panels for biological age assessment, provides extensive profiles and benchmarks outlining challenges, opportunities and recommendations to advice industries in their development action plans and policy makers to combat the problem of Ageing Population and realize the opportunity of National Healthy Longevity.

Biomarkers of Longevity: Current state, Challenges and Opportunities Landscape Overview 2019, is a special analytical case study that uses comprehensive analytical frameworks to rank and benchmark existing panels of biomarkers of aging, health and Longevity according to their ratios of accuracy vs. actionability, identifying the panels of biomarkers that can have the greatest impact on increasing both individual and national Healthy Longevity in the next few years. The use of biomarkers is an indispensable component of industry analytics and assessment. It is the foundation upon which measurement of Healthy Longevity and the effectiveness of Longevity therapeutics is built. The report is designed as an in-depth review of the state of the art in biomarkers development to advise accurately the market, industry and public sectors.

The report finds that as the scope of P4 Medicine broadens, the number of biomarkers and measurement technologies and platforms will increase rapidly to the thousands in the coming years. This makes the implementation of P4 Medicine impractical by current, manual means. Aggregation of biomarkers of Longevity, rather than biomarkers of disease, and from healthy populations - among the young and the even younger, rather than bedside data from the hospital populations, will be part of everyday life due to the novel Digital Biomarkers capable of extracting truly massive amounts of clinical relevance data from a single patient through electronics.

The Increasingly Necessary Role of AI in Biomarker Monitoring and Research

The transformations already underway in biomarkers assessment modality will allow to move from the conventional therapeutic approach toward large-scale precision preventive medicine, and will also be the foundation for a unified theory of the root causes of aging and longevity; both providing a framework to intervene the process. Tech companies rather than healthcare companies will play the leading role in this process. The use of AI will give sense to the thumping amount of digital biomarkers data, and it will allow the development of surely multiple optimal panels of aging biomarkers as well as other health biomarkers (digital and non-digital) for AI-driven analysis of each person's outcomes, and for orchestrating extremely personalized therapeutic interventions in response to fluctuations in those biomarkers. As the number of data points increases, AI-driven analysis will be strictly necessary in the Longevity industry and the health industry as a whole.
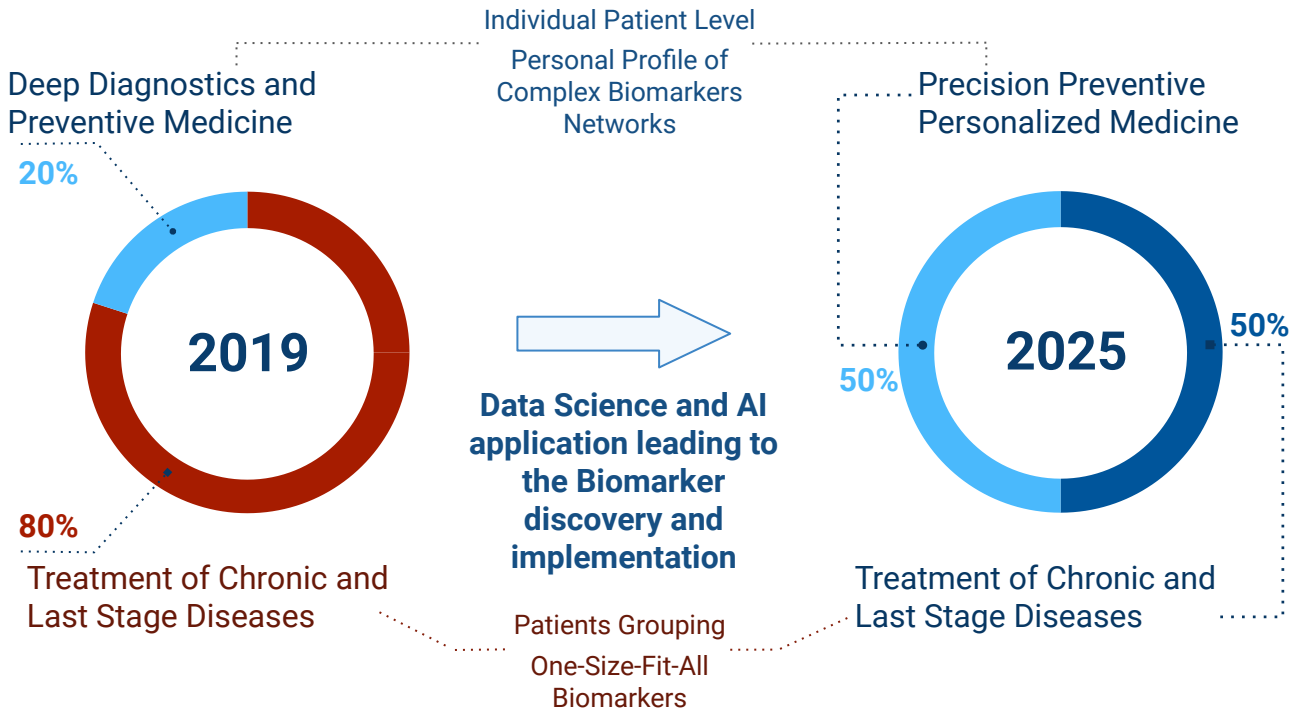
The Need for Maximally Actionable Biomarkers of Aging

It is impossible to determine whether biotechnologies for Longevity have been successful if we cannot tell how advanced the aging process is in any given individual; but at the same time the latter will not be feasible until successfully achieving High Actionability Panels that allow to evaluate the aging process in broad healthy and less healthy differentiated ranges of the population spectrum. It will be impossible to make concrete claims regarding global progress in health biotechnology, and in P4 Medicine in particular, without an agreed and accessible Panel of Biomarkers as a tool to standardize results. These biomedical markers, measurable indicators of the severity or presence of some disease state, are able to serve as the basis for building standard metrics for government programs and cost-effective healthcare policies, clinical implementations, and industrial output in global Longevity Industry.

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Biomarkers and AI for Paradigm Shift from Treatment to Prevention

Individual Patient Level
Personal Profile of Complex Biomarkers Networks

Deep Diagnostics and Preventive Medicine
20%

2019

80%
Treatment of Chronic and Last Stage Diseases

Data Science and AI application leading to the Biomarker discovery and implementation

Patients Grouping
One-Size-Fit-All Biomarkers

Precision Preventive Personalized Medicine

50%

2025

50%

Treatment of Chronic and Last Stage Diseases

Jamie Metzl for Longevity.Technology: "First, we're increasingly understanding the biomarkers of aging. And that is giving us a language of measurement. We can assess with more precision whether certain interventions are working or not working. With the new tools of AI and machine learning we're really seeing is a super convergence of different technologies that are all pushing forward, including the science of human Longevity."

Classification Framework for Biomarkers of Longevity

1st edition: Selection and Current Status, 2019

Approved for Clinical Use - 41
Research Use Only - 45
Healthcare-Ready - 33

Biomarker Panels → Digital Panel Platforms ← Single Biomarkers

Approved for Clinical Use

Healthcare-Ready
(waiting for clinical approval)

Research Use Only

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