Scientific Background: Clinician Scientist Program Rural_Age

Longer life expectancy and lower birth-rates have led to growth of the older population, with individuals aged 60 years and older now accounting for 20% of the population in high-income countries [1]. This demographic change is associated with increased rates of age-related diseases, such as dementia due to Alzheimer's disease, cardiac diseases, and cancer, with tremendous social and economic impact. Moreover, infectious diseases that are not unique to older adults, but often induce more severe disease courses in this age group (evidenced now in the COVID-19 pandemic) will play an increasing role. Demographic development is rather heterogeneous within Germany. In this regard, Western Pomerania can be seen as a model region, because every fourth person is older than 65 years, a rate that is expected to rise to 1/3 of the population by 2030; in most other parts of Germany this rate will not be reached until 2060 [2]. This development is exacerbated by a high burden of disease in Western Pomerania [3]. Additionally, recruiting appropriate medical staff is more difficult in this area. Finally, poor infrastructure in rural areas limits access to specialist care for patients with low mobility. In sum, in Western Pomerania, we have a high proportion of old and very old individuals, a high burden of age-related diseases, difficulties in recruiting adequate medical staff, and a lack of accessibility to specialist care for the rural population. This emphasizes the urgent need to recruit and train highly skilled and motivated physicians to adequately diagnose and treat common age-related diseases, to ensure efficient use of physicians' time by using machine learning to automate diagnostic processes, and to secure regional healthcare in rural areas by developing and implementing innovative approaches in telemedicine and digital health.

The specific scientific aims of the program are as follows:

1. To elucidate **central mechanisms of aging** in inflammatory and degenerative diseases, with a focus on age-related deterioration in **proteostasis**. This knowledge will be applied in proof-of concept studies that include elderly, frail and multimorbid individuals.
2. To use routine **digital data** from the Clinical Information Systems (CIS) for data-driven health research, empowered by advanced **data mining** and **machine learning** methods.
3. To transfer results from proof-of-concept studies to the **community** using Phase III trials and **home-based** settings.
4. To develop **digital tools for diagnosis**, monitoring of treatment effects, and for supporting **treatment** decisions, thereby improving patient care in a rural area where patients do not have immediate access to specialists, or difficulty reaching specialists due to reduced mobility.

The ultimate goal of the Clinician Scientist Program Rural_Age is the **translation** of findings from basic science and machine learning into clinical and community-based **applications** for **rural Western Pomerania**.

Bibliography

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