1.3 A LIFE COURSE APPROACH TO HEALTHY AGEING: THE HALCyon PROGRAMME

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A LIFE COURSE APPROACH TO PHYSICAL CAPABILITY

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Physical capability, the capacity to undertake the physical tasks of daily living, is an important component of healthy ageing, and can be assessed by objective tests of muscle strength and physical performance and self-reports of everyday function. There is growing evidence that social and biological factors across life affect the peak levels of physical capability achieved in adult life and/or their subsequent rate of decline, and that, in turn, physical capability predicts subsequent health and length of survival. Until recently, this evidence had been limited to separate studies.

We first present results from recent HALCyon systematic reviews and meta-analyses on lifetime determinants of physical capability, including growth and socioeconomic conditions early in life, and on the impact of impaired capability on risk of subsequent health conditions and survival time.

We then present new findings from the HALCyon cohort studies and future plans aimed at filling the research gaps identified by the systematic reviews and previous research. These include (1) the influence of age, gender and lifetime body size on physical capability; (2) the contribution of markers of muscle and neurological development to adult physical capability levels; (3) the concordance and discordance between muscle mass, strength, physical performance and limitations in everyday function.

In conclusion, understanding and promoting healthy ageing requires comparative and in-depth research on physical capability using longitudinal studies, preferably with data on characteristics across the whole of life.

AN EPIDEMIOLOGICAL PERSPECTIVE ON BIOLOGICAL MODELS OF AGEING

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There a wide variety of biological theories of ageing from macro-level concepts such as evolutionary trade-offs and reliability theory to system-based theories of neuroendocrine and immune function and molecular and cellular theories such as the role of a biological clock. Animal studies can elegantly demonstrate the role of specific pathways such as insulin signalling but their relevance to human ageing remains controversial. Fundamentally, the loss of homeostatic control across a wide range of systems may suggest that no single pathway is necessary or sufficient for ageing. New findings from GWAS studies of chronic diseases may also highlight commonality of pathways across phenotypes.

Within the context of the Halcyon programme, we will present preliminary results from the works on telomeres, the hypothalamic pituitary axis and genetic variants on potential ageing traits. We will discuss future outputs as well as the challenges of exploring these ideas within an epidemiological context.

In conclusion, while new biological understanding may enhance our ability to develop new targeted interventions, it is unlikely given the multi-faceted nature of ageing that any “magic bullet” will exist. Biological markers may be useful as additional predictors of frailty and as surrogate intermediary outcomes. Public health interventions are likely to be most effective if they focus across the life course in both maximising biological and psychosocial reserve as well as reducing adverse exposures that accelerate age-related decline in function.