MRC Unit for Lifelong Health and Ageing

Inter-cohort collaborations of life course studies: HALCyon Collaborative Research Programme

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MRC Unit for Lifelong Health and Ageing

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MRC National Survey of Health and Development: 1946 British birth cohort

- Nationally representative sample of 5362 men and women born in one week in March 1946 and followed up 21 times since
- Prospective information on health and life circumstances 0-60 years
- Baby boom cohort swelling the ranks of the elderly population

NSHD 60th birthday card

HALCyon
Healthy Ageing across the Life Course

The Halcyon is a fabled bird identified with the kingfisher (from the Halcyonidae family). The Halcyon is supposed to have the power to calm the wind & the waves during the winter solstice while it nested on the sea. 'Halcyon days' refer to a period of peace & prosperity.

LHA is leading a collaborative programme:

- 9 UK cohorts born 1921 to 1958
- 23 investigators, 19 collaborators
- 8 work packages

Aim is to improve the lives of older people by understanding how healthy ageing is influenced by factors operating across the whole of life.

Indicators of healthy ageing being studied include:

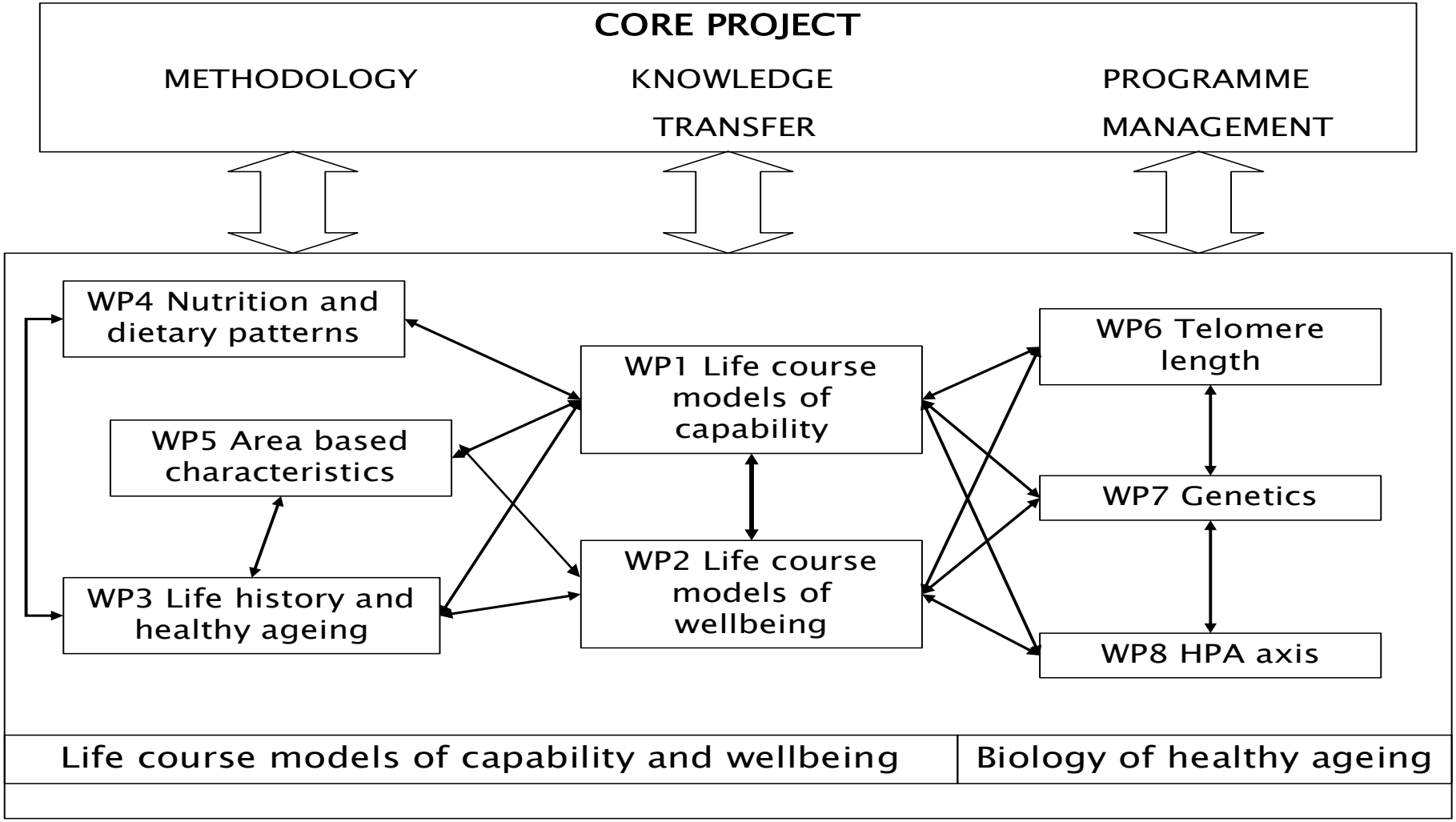
- the capacity to undertake the physical and mental tasks of daily living;
- social and psychological wellbeing;
- genetic and other biological ageing processes.

HALCyon cohorts

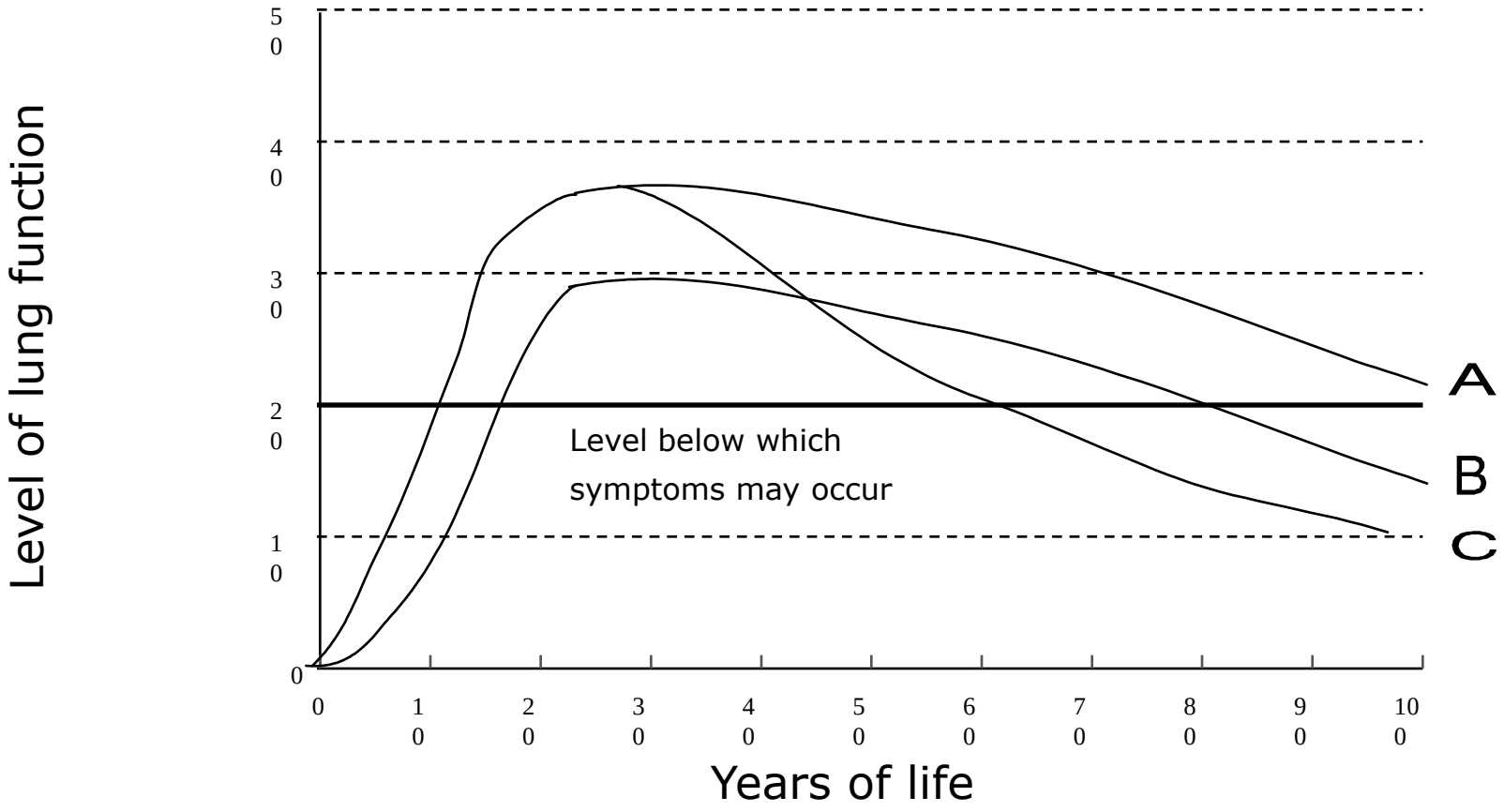
HALCyon
Healthy Ageing across the Life Course

Cohort (birth yr/s)	Birth	Childhood	Early Adulthood	Mid Adulthood	Late Adulthood
Lothian (1921)		→	- - -	- - -	→
Hertfordshire Ageing Study (1920-30)	→	- - -	- - -	- - -	→
Boyd Orr (1925-37)		→	- - -	- - -	→
Aberdeen (1936)		→	- - -	- - -	→
Hertfordshire Cohort Study (1931-39)	→	- - -	- - -	- - -	→
Caerphilly (1920-1934)				→	→
ELSA (early 1900s-1952/56)					→
NSHD (1946)	→	→	→	→	
NCDS (1958)	→	→	→	→	

HALCyon
Healthy Ageing across the Life Course



Schematic representation of life course function (e.g. lung, muscle)



Work Package 1 (Rebecca Hardy, Marcus Richards, Ian Deary, Avan Aihie Sayer, Diana Kuh, Rachel Cooper)

HALCyon
Healthy Ageing across the Life Course

Life course models of physical and cognitive capability

- Age and gender differences in capability
- Life course SEP and capability
- Birth weight, growth and BMI and physical capability
- Decline in physical and cognitive capability

HALCyon methodology core

HALCyon
Healthy Ageing across the Life Course

- Facilitates exchange of expertise on, and comparison of, different modelling approaches (e.g. regression, SEM, latent class models)
- Management of data from 9 cohorts and derived variables
  - Harmonization of outcomes, risk factors and confounding variables
- Strategy for inter-cohort comparisons
  - methods for data synthesis/pooling across cohorts

Obtaining the data - variables requested

- Basic demographics
- Physical capability
- Cognitive capability
- Wellbeing
- Personality
- Nutrition/Diet
- Lifetime SEP
- Growth and adult body size
- Physical health
- Physical activity
- Other lifestyle factors (e.g. smoking)
- Medication use

Practicalities of harmonization

- Data cleaning and preparation for 9 cohorts is time consuming
- Ensure all investigators using same variables
- Documentation/derivation and harmonization has to evolve with input of multiple investigators
- Avoid repetition of work
- HALCyon investigators website - library

Labelling and recoding variables

Labelling/renaming existing variables:

Recoding and generating new variables:

- publish syntax and any related documentation/user guides on library

- add new labels/variables to HALCyon datasets?

Ensure process is managed centrally

Common statistical package?

Fluid cognitive ability (6 cohorts)

HALCyon
Healthy Ageing across the Life Course

	LBC	HAS	ABC	NSHD	ELSA	CAP
AVLT (1)			XXX			
WAIS dig (1)			XXX			
Raven's (2)	XX		XXX			
Comm Obj (1)			XXX			
WAIS blk (1)			XXX			
reaction (1)						XXX
AH4 (2)		XX				XXX
CAMCOG (1)						XXX
V memory (2)				XX	XXX	
Letter srch (2)				XX	XXX	
Category fl (2)				X	XXX	
Wechsler (1)	XX					
Letter fl (1)	XX					

Physical capability (8 cohorts)

HALCyon
Healthy Ageing across the Life Course

Cohort	Grip (5)	Balance (6)	Chair rise (4)	Get up and go (4)	Walk speed (5)
Lothian	XX				X
HAS	XX	X	X	X	X
Boyd Orr		X		X	
Aberdeen 1936					X
HCS	XX	XX	XX	XX	XX
NSHD	X	X	X		
ELSA	X	X	X		XXX
Caerphilly		X		X	

Grip strength

- All 5 cohorts measured in kg
- Normally distributed
- Best performance –different cohorts use different numbers of trials/hands
- Different dynamometers

Timed walk

- Different distances walked in 6 different cohorts
- Convert all to walking speed (m/s)
- Normally distributed
- Most normal walking speed, one walk as fast as possible
- Exclusion criteria different?

Cohort comparisons of associations

- Meta-analysis approach

- Consistent even though different designs/measures
  - Evidence of effect
  - Consistent bias in all
  - Different settings – confounding structures etc.

- Differences
  - Interesting from public health perspective
  - Difficult to separate differences of time/place from differences in study design/measures etc.

Measurement and modelling of Function Across the Life Course - FALCon

- MRC PHSRN cross-unit project

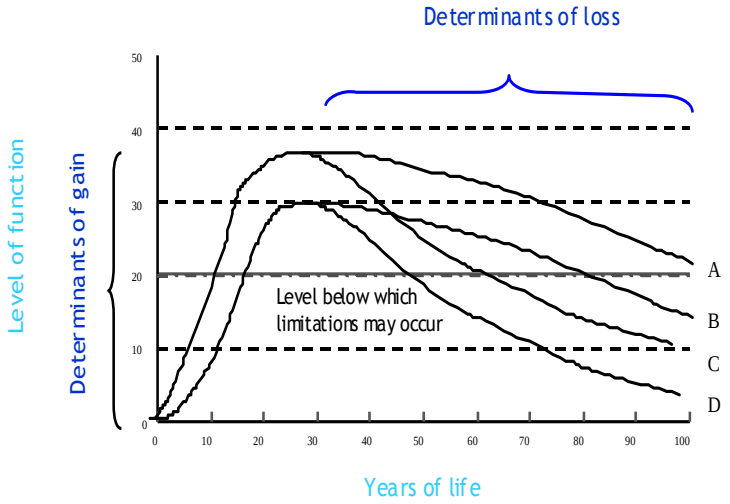
- MRC Biostatistics
- MRC CAiTE
- MRC Epidemiology Resource Centre
- MRC Social and Public Health Sciences Unit

Aim of FALCon

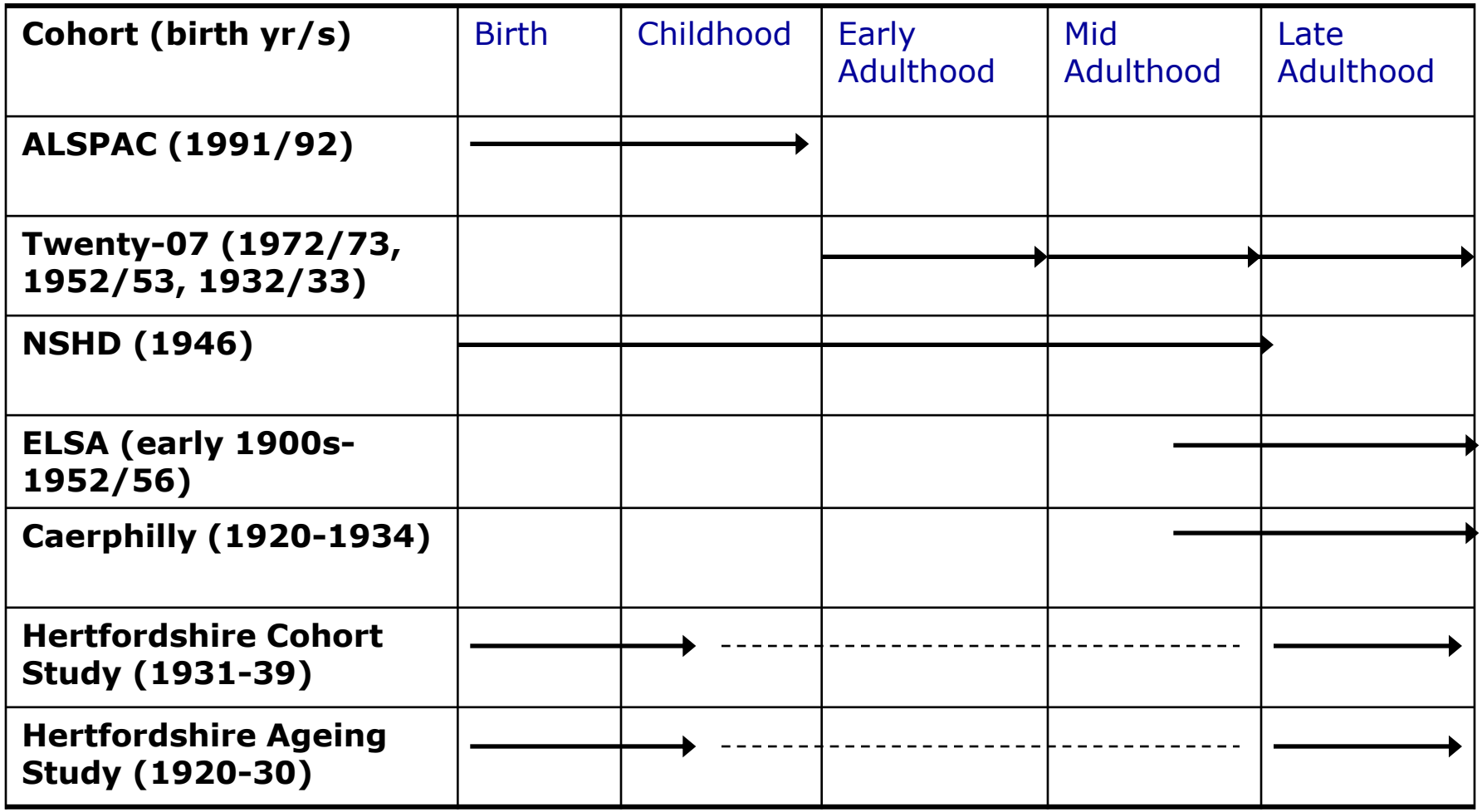
To develop and disseminate recommendations for the measurement of function and the modelling of functional trajectories within and across cohort studies.

- Assess value of function as predictors of mortality/morbidity
- Describe functional measures available in MRC funded cohort studies and assess the rationale for choice of measure and frequency of measurement.
- Develop statistical models for pooling functional trajectories across cohorts.

- Physical, cognitive and cardiovascular function



FALCon cohorts



Measurements across the life course

- Changing measures over the life course
  - technology
  - age
  - retrospective/prospective

- Changing associations across the life course
  - overlapping longitudinal studies
  - when should measurements be taken –age and how often

- Missing data and drop out
  - Require inclusion/exclusion criteria for tests/measures

Final comments

- Acknowledgement of time and work involved in data preparation and management
  - Funding
  - Capacity building
- Tools to improve and standardise management of cohorts
  - SWIFT

Final comments

- Tools/methods for harmonization
  - Different machines/tests
  - Prospective/retrospective
  - Latent variables/Bayesian models
- Harmonization of cohort data collection e.g. HALCyon well-being measures
  - Need for unique aspects of each study
  - Individual cohort versus inter-cohort publications