

Mouse Longevity App – an ongoing project to collect and make available mouse lifespan data

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Introduction

- Mice have been used as a model for human longevity and lifespan for decades, due to our shared mammalian ancestry and close genetic similarity
- These studies have been carried out in vastly different conditions, even when nominally described as controls
- No centralized repository for this data. This is important, as each of these studies represent years of effort and public funding
- We concentrated on isogenic animals (e.g. inbred strains and their F1s)
 - Replicable across studies, years and laboratories
- Exception for the UM-HET3
 - G2 population with excellent and well documented data
- We did not include animals on mixed backgrounds
 - Uncontrolled segregation of alleles in these populations, which cannot be replicated
 - Excludes many studies in transgenic animals

Aims

- Collect mouse longevity data
- Standardize the metadata where possible
- Create an interactive web service

Methods

- Manually examine papers and databases to identify mouse lifespan data
- Data has to come from an isogenic genotype or from the UM-Het3
- Data from transgenic animals has to be on an isogenic background
- Values from taken from the manuscript
 - or estimated from figures where possible
- If mean and n were given, plus any of SD, SE or CV, missing values (e.g. if mean, n and SE were reported, we used these values to estimate SD and CV)
- If results were given in terms of weeks or months, these were assumed to be exactly 7 or 30 days respectively
- If strain could be unequivocally determined, the official name was used

Current status

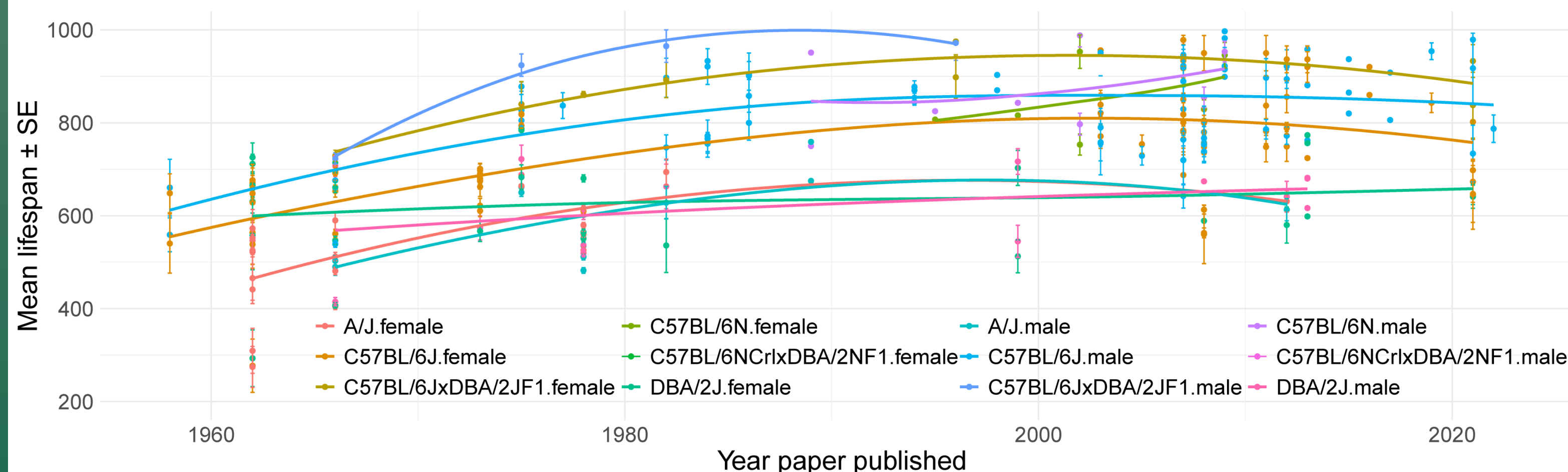
- Work in progress
- Current data comes from 56 studies (of 158 manuscripts examined)
- 523 further publications remain to be examined
- Made the data accessible using an R Shiny App
- Made this app publicly available

General observations

- 969 rows of nominal control data so far
- Approx. 300 genotypes represented
- Reporting was often poor
- Despite known effects of sex, light cycle, temperature, humidity, nutrition, and cage density, it was rare that all reported
- Often not all summary statistics given

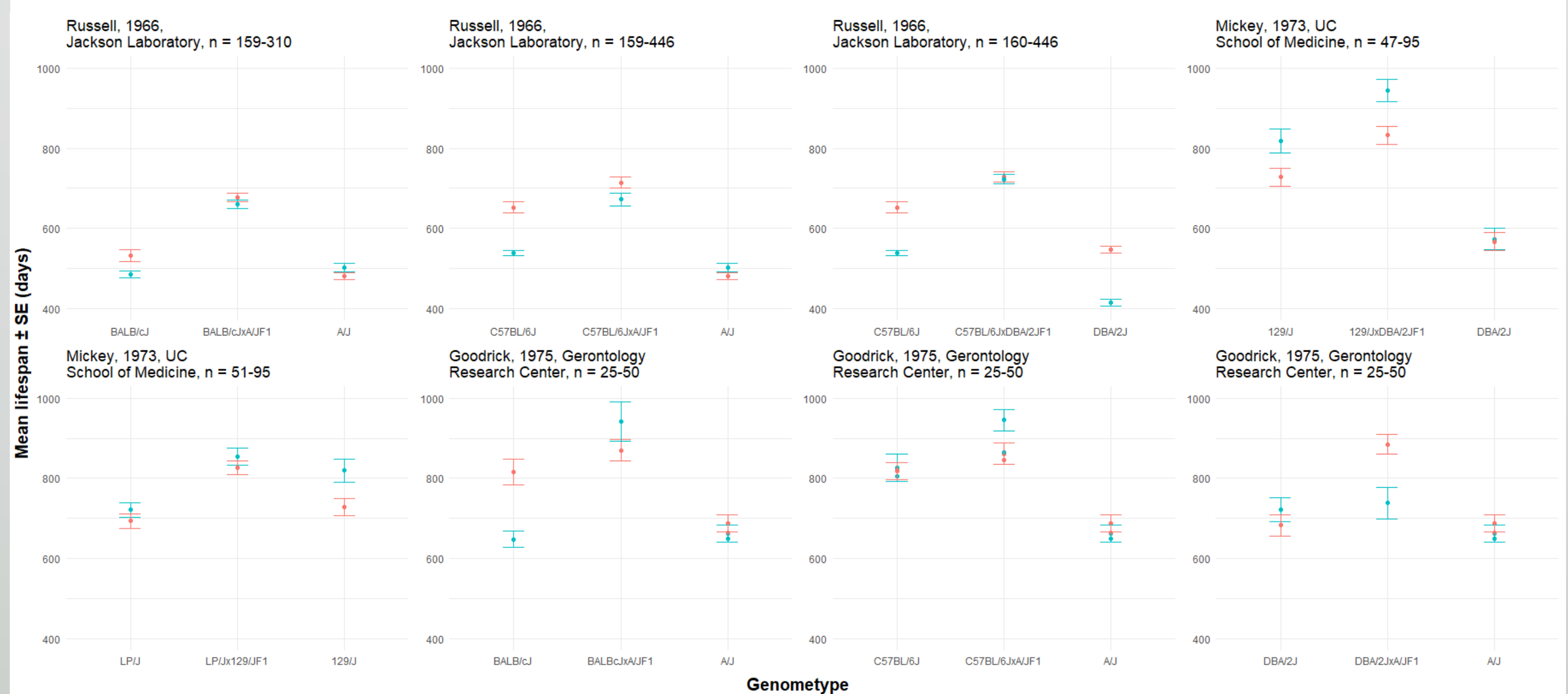
Increased lifespan in modern vivaria

- Mean lifespan has generally increased over time
- Plateaued around 2000



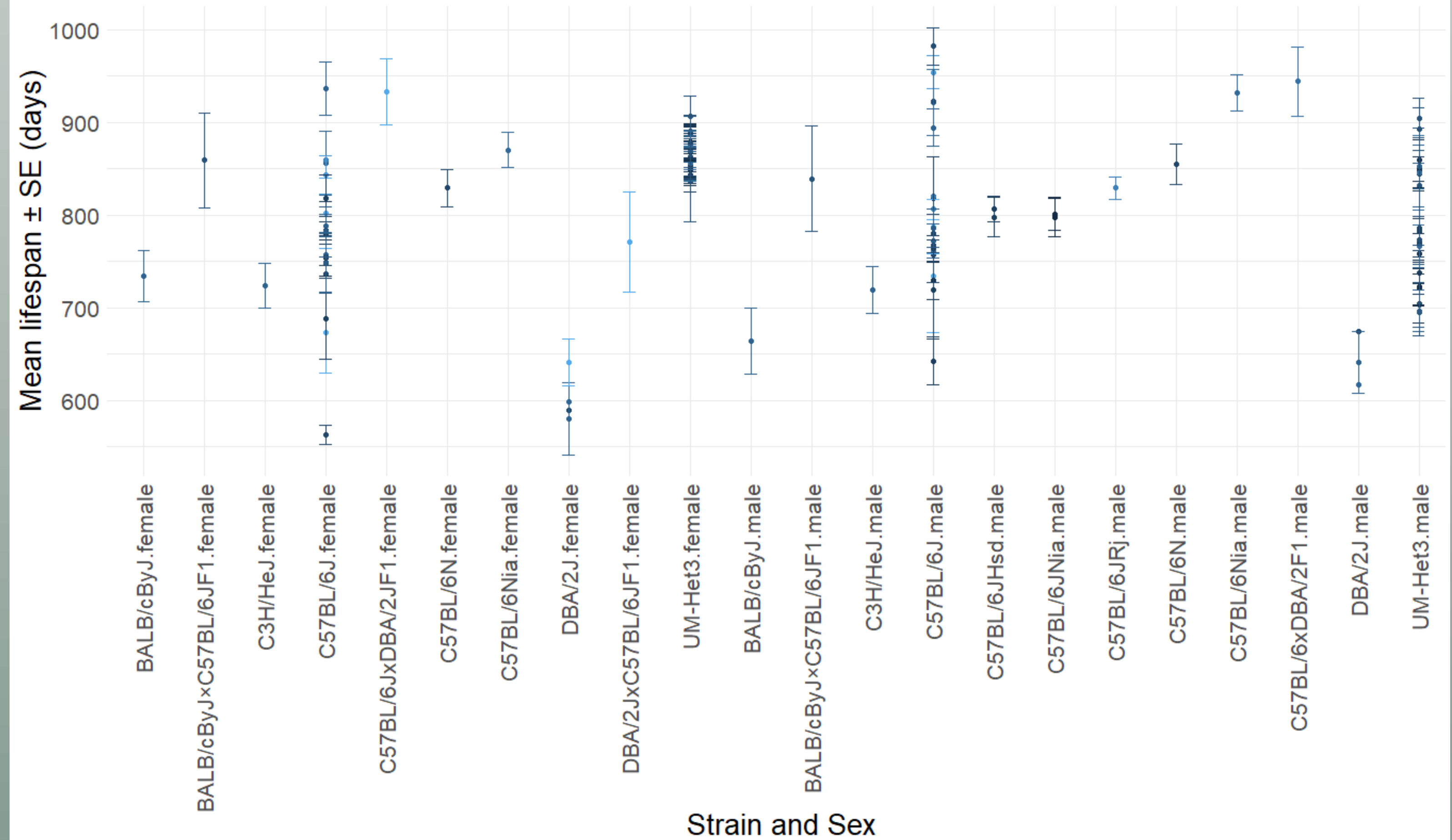
Heterosis

- Well replicated evidence for F1s living longer than their inbred parent



UM-Het3 G2 vs related isogenics

- UM-Het3 generally have a higher longevity than their four parental strains
- Little evidence that a G2 population have less variation than an inbred population



Website

- <http://longevity-explorer.genenetwork.org/>
- Currently limited to 'control' data



Conclusions

- A huge amount of data available
- A lot of data has been 'lost' due to incomplete reporting
- The first attempt at a comprehensive collection of mouse longevity data across strains

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