# Paper 1

**Suggested Journal**: European Journal of Public Health

**Main theme**:

An advancement of existing research/arguments by Mackenbach about convergence and divergence of life expectancies in different European nations since 1950.

**Main approach:**

1. To calculate period life expectancies for Europe as a whole, and show these both over the long term (since earliest available records), and since 1950.
2. To calculate Europe-wide period life expectancies for both e0 and e5 (and possibly e65), to be able to separate trends in reduced infant mortality from other mortality trends
3. To present variances in ex for Europe as a whole in order to track changes in ‘life riskiness’ (conditional on reaching the age of x) throughout Europe as a whole.
4. To present lattice plots/small multiples, showing how each country in Europe has compared against the European overall trend since 1950, with countries arranged by GDP per capita (PPP) in last year in series.
5. To summarise the trends-against-trend in the small multiples by calculating the root-mean-squared (RMS) ‘error’ for all countries against the European average over time. Whereas var(ex) is a measure of intra-continental variation in ex, RMS(ex) is a measure of inter-country differences in means.

**Suggested key findings:**

1. Since 1950, although var(e0) has continued to decrease, var(e5) increased from the 1980s, more for males than females.
2. RMS(e5) rose at the same time that var(e5) rose, suggesting that increased ‘life riskiness’ after childhood within Europe may have been driven by increased divergence in public health trajectories between European nations. Although var(e5) reduced following its peak in the mid 1990s, it has reduced since. Differences in RMS(e5), however, have exhibited more of a ratchet-like pattern, remaining at a high level since the mid 1990s. For males RMS(e5) is now at a similar level to the 1950s.
3. The small multiples show a number of clear clusters in the trajectories in different nations’ trends-against-the trend since 1950s, and that although national income is an important factor it is not the only one. Anglo-Saxon economies appear to have lost historical advantages in ex that they used to hold, whereas some Southern and Mediterranean nations have shown sharp increases in ex over the same period, changing from countries with much lower to much higher ex.

## Suggested paper structure and length:

Approx 4-5,000 words; around 25-40 paragraphs

**Introduction** [approx 10 paragraphs]

*Trends in PLE* [6 para]

*data vis* [2 para]

*rationale for what calculated* [2 para]

**Methods** [5 para]

*data* [2 para]

*calculations* [2 para]

*plumbing, e.g. software used etc.* [1 para]

**Results** [approx 10-14 para]

*Long term ex and var(ex)*

*Short term ex and var(ex)*

*small multiples : trends against trends*

*var(ex) and rms(ex)*

**Discussion** [15 para]

*Summary of results* [3 para]

*review of possible explanations* [6-8 para]

*e0 and improved infant mortality*

*political convergence and divergence and rms(ex)/var(ex) patterns*

*late transition countries and WW2 warfare exposure*

*anything else?*

*strengths* [1 para]

*limitations and challenges* [3 para]

*further research* [1 para]

*summary* [1 para]

# Paper 2

**Suggested Journal**: European Journal of Epidemiology

**Main theme**:

Visualisations of Lexis surfaces allow very large amounts of health data to be explored very quickly; their use should be encouraged

**Main approach:**

1. Present two figures: one showing shaded contour plots for the whole of Europe from 1950 to 2010; the other showing small multiples for six European countries which indicate age-specific mortality rates in that country compare against that European trend.
2. Introduce a web-based app which allows SCPs and CLPs to be generated and explored by users.

**Suggested key findings:**

1. More than 46,000 values can be shown on a single image, without this amount of data being overwhelming or unintelligible.
2. The mortality disadvantage in Scotland is larger for females than males, and used to begin in late adulthood. France has comparatively high mortality rates at working age, but lower in late working age and into retirement ages. There is evidence of positive cohort effects for people born in Scotland, england and Wales in the 1940s, and Italy in the 1950s.
3. An interactive graphical toolkit for generating and comparing SCPs and CLPs is available and linked to this paper.

**Suggested discussion points/conclusion:**

1. Shaded contour plots were developed by Vaupel and colleagues in the 1980s, and rediscovered/reinvented in 2013 by Minton and colleagues. The concept of the Lexis surface, and use of contours and level plots to explore such data, has much older origins.
2. Lexis surface visualisations can help to identify patterns within large amounts of public health data; anything that is recorded at different ages, for different groups, and in different years, can be represented as a Lexis surface. These Lexis surfaces can be represented using the conventions and methods of map-making, using contour lines and symbols to represent how the height of a surface varies; or the Lexis surfaces can be rendered and visualised more directly, using CGI and 3D printing technologies. The merits of different approaches depend on the circumstances, applications and intended audiences.
3. Lexis-surface-based visualisations are now easier to generate and develop than ever before, due both to rapid improvements in computing power, and better access to more comprehensive sources of data, such as from the Human Mortality Database.

## Suggested paper structure and length:

Short methods paper only; 1,000 words. 8-10 paragraphs

**Introduction** [2]

**Methods** [2]

**Results** [3]

**Discussion** [3]

# Suggested EJPH Papers

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Prioritise | Author | Year | Volume (Issue) | DOI |
|  | Richardson | 2013 |  | 10.1093/eurpub/ckt084 |
|  | Mackenbach | 2015 | 25(2) | 10.1093/eurpub/cku217 |
|  | Malmusi | 2015 | 25(2) | 10.1093/eurpub/cku156 |
|  | Maruthappu | 2015 | 25(2) | 10.1093/eurpub/cku167 |
|  | Clemens | 2015 | 25(1) | 10.1093/eurpub/cku136 |
|  | Chen | 2014 | 24(4) | 10.1093/eurpub/cku014 |
| Yes | White | 2014 | 24(4) | 10.1093/eurpub/ckt074 |
| Yes | Richardson | 2014 | 24(3) | 10.1093/eurpub/ckt084 |
|  | Kulhanova | 2014 | 24(3) | 10.1093/eurpub/cku006 |
|  | Mackenbach | 2014 | 24(1) | 10.1093/eurpub/ckt183 |
|  | Jagger | 2013 | 23(5) | 10.1093/eurpub/ckt030 |
|  | Dibben/Popham | 2013 | 23(1) | 10.1093/eurpub/cks019 |
| Yes | Mackenbach | 2012 | 22(6) | 10.1093/eurpub/cks137 |
| Yes | McCartney | 2012 | 22(6) | 10.1093/eurpub/ckr136 |
|  | Kilpelainen | 2012 | 22(6) | 10.1093/eurpub/ckr195 |
|  | Duncan | 2010 | 20(6) | 10.1093/eurpub/ckp230 |
| Yes | Walsh | 2012 | 20(1) | 10.1093/eurpub/ckp063 |
|  | Lahelma | 2009 | 19(5) | 10.1093/eurpub/ckp120 |
|  | Subramanian | 2009 | 19(5) | 10.1095/eurpub/ckp077 |
|  | O’Hara | 2008 | 18(6) | 10.1093/eurpub/ckn094 |
| Yes | Eikemo | 2008 | 18(6) | 10.1093/eurpub/ckn092 |
| Yes | Zatonski | 2007 | 17(2) | 10.1093/eurpub/ckm006 |
|  | Stickley | 2007 | 17(5) | 10.1093/eurpub/ckl275 |
|  | Zatokski | 2007 | 17(5) | 10.1093/eurpub/ckl276 |
|  | Bronnum-Hansem | 2005 | 15(1) | 10.1093/eurpub/cki106 |