LIFE EXPECTANCY AND HEALTHY LIFE EXPECTANCY IN PLYMOUTH

DPH October 2022



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EXECUTIVE SUMMARY

Nationally;

Life expectancy (LE) had been increasing, with a relatively steady gradient over the last 50 years. This gradient reduced over the last decade meaning that LE on average was increasing, but increasing slowly. Further analysis shows that LE was still increasing quickly for wealthier groups but was actually dropping for more deprived groups, for females in particular. This was reported on in the Plymouth DPH Annual Report 2019 <u>'Building wellbeing and resilience in a time of austerity'</u>

The Covid-19 pandemic caused a sudden reduction in LE; with a larger drop for men than for women. Again, this was larger in more deprived groups than in wealthier ones.

In Plymouth;

Smaller numbers make the trends more difficult to prove but we believe we had seen similar patterns in LE general trends pre-pandemic.

Our lower death rates due to Covid 19 during the pandemic mean that for the pandemic year 2020, Plymouth's LE was very similar to England average. LE in Plymouth for both males and females compares very well to statistically similar neighbours. The inequality gap by deprivation was lower in Plymouth for female than for England, and the same for males.

Healthy life expectancy for males in Plymouth is good, ranking at the top of our statistical neighbours and similar to England. However, there is a different story for females, with HLE being low compared to England and also compared to our statistical neighbours. The reasons for this are not understood, especially as the same risk factors are indicated for both LE and HLE.

This requires further work to understand the issues and to address them, both locally and nationally.

DEFINITIONS

Life Expectancy (LE)

Life expectancy is an estimate of how long someone might live; it can be calculated from any age e.g. LE at birth. We use LE at birth throughout this document.

It is worth noting that someone who has already survived past childhood will have a longer LE than given at birth. For example, if someone had a life expectancy at birth of 88 years but has lived to 88, then their life expectancy is now 93 years.

This is based on the age that people in the area die, and is calculated using death certification data; three years worth of data is used to help us to see trends.

Healthy Life Expectancy (HLE)

Healthy life expectancy is an estimate of the average number of years a person would expect to live in good health based on contemporary mortality rates and prevalence of self reported good health. The prevalence of good health is derived from responses to a survey question on general health. For a particular area and time period, it is an estimate of the average number of years a newborn baby would live in good general health if he or she experienced the age-specific mortality rates and prevalence of good health for that area and time period throughout his or her life. Figures are calculated from deaths from all causes, mid year population estimates, and self reported general health status, based on data aggregated over a three year period. Figures reflect the prevalence of good health and mortality among those living in an area in each time period, rather than what will be experienced throughout life among those born in the area. The figures are not therefore the number of years a baby born in the area could actually expect to live in good general health, both because the health prevalence and mortality rates of the area are likely to change in the future and because many of those born in the area will live elsewhere for at least some part of their lives.

This is calculated from responses to a question on general health in the Annual Population Survey (APS) conducted by the Office for National Statistics (ONS) and therefore is self-reported.

Statistical significance

Both of these measures are calculated, and are therefore estimates. We use the term statistical significance to consider whether the difference between two numbers such as LE is likely to be a genuine difference in real terms (statistically significant) or whether it might just be due to the way in which the estimates are calculated. The smaller the dataset, the more difficult it can be to see whether two measures are really different; for example, the smaller the geographical area, the fewer deaths will have occurred and so it is more difficult to make meaningful comparisons. There are mathematical equations that allow us to say whether we think two numbers are similar, or whether we think there is a genuine difference between them.

BACKGROUND

What causes differences in life expectancy?

Life expectancy is a calculation of the average age that people living in the area live to. Much information is contained within this, and it does not take account of the distribution of the deaths other than the average. You could have a similar life expectancy for an area caused by a small number of deaths in children or the large number of deaths in older people; the average figure does not tell you this level of detail. Therefore the life expectancy data which has to be interpreted along with other sources of information. It is worth considering historical data to put this into context.

Historical changes

We have some measurements for life expectancy going back to the 1700's but these became more accurate from 1837 when registration of all deaths became required; the life expectancy for a baby girl born in England then was 43 years.

Although the average Life Expectancy was 43, we know that many children died in infancy. There were no vaccinations or antibiotics and many of the illness that we consider to be minor – or that have been eradicated – would have killed many of the children affected. The reduction in childhood deaths has made a massive difference to overall life expectancy. [2]

- Many women died giving birth; without many of the healthcare treatments that we take for granted today, childbirth was a lottery, but was also difficult to avoid.
- Work tended to be a dangerous place to be, and many men in particular worked in environments where serious accidents and exposure to dangerous materials without any protection were the norm. We see the legacy of this still in Plymouth's high rates of mesothelioma caused by asbestos, for example.
- If someone survived childhood, then it was not unusual for them to live to their 70s; life expectancy for someone who survived childhood was mid 70's from 1837 up until around 1920's.[2]

There is a persistent story of improvement since records began. Childhood vaccinations and antibiotics made a huge positive difference, as did improvements in living and working conditions. As healthcare improved, and became accessible to all, we have continued to see improvements.

Though the main trend has been to improve, there have been variations to this. Some events had an immediate and marked effect; the two World Wars, and particularly virulent strains of influenza. Others have a more gradual impact, which can be much harder to spot, such as the rise of smoking where the impact can be seen from years to decades after the behaviour starts. It can be difficult to understand how much of a contribution each element makes, and of course different things can interact at the same time.

This highlights that the 'average life expectancy' hides a great deal of information that we need to know more about to understand what is really going on.

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England and Wales, 1841-2000



Figure ILE at birth, England and Wales, Kings Fund [Error! Bookmark not defined.]

RECENT TRENDS IN LIFE EXPECTANCY

National trends pre-Covid-19

In my Annual Report 2019, I highlighted that there had been a slow-down in the increasing trend of life expectancy. This was highlighted by the Office of National Statistics

Life expectancy at birth in the UK did not improve in 2015 to 2017 and remained at 79.2 years for males and 82.9 years for females.

ONS, September 2018

In England, the growth in the female inequality came from a statistically significant reduction in LE at birth of almost 100 days among females living in the most deprived areas between 2012 to 2014 and 2015 to 2017, together with an increase of 84 days in the least deprived areas.

ONS, March 2019

The slowdown had been seen across the UK, at similar rates but with some slight differences in details of trends. The UK is not alone is seeing this slowdown of improvements; many other developed countries have seen this too. However, the UK is second only to the US in terms of severity of the slowdown.



This was especially important as there was a very clear change with deprivation (see

Source: Office for National Statistics

Figure 2), which showed that LE had continued to grow for the less deprived groups (male and female) but had reduced for women in the more deprived groups.

Since then, further data has been released still covering the pre-covid-19 times, which uses data from 2017-2019. That showed a slight improvement in LE; positive news, although still well below the trajectory which might have been expected had the slow down not occurred.

Gender gap

Since records began, women have tended to live longer than men. The extent of the gap has varied, as have the underlying patterns; the gap is driven by a combination of occupational risk (historically much higher for men than women), healthcare provision around maternity (including contraception), and risk-taking behaviours.

In the 19th century, the gap was relatively small as infectious diseases (often but not always in childhood) killed many and so dominated the statistics. The gap began to widen, peaking at over 6 years in 1971 as poor working conditions and smoking reduced men's LE, but improved maternity care and lower rates of TB increases women's LE.

Recently the gap narrowed to below 4 years, with LE increasing more quickly in males (largely due to reduced smoking and better treatments for cardio vascular diseases).



Source: Office for National Statistics

Figure 2 Change in LE in days between 2012 to 2014 and 2015 to 2017, by national deprivation decile, England and Wales, 2015 to 2017, ONS published March 2019 Health state life expectancies by national deprivation deciles, England and Wales: 2015 to 2017, ONS, published March 2019

In summary, prior to Covid19, we were seeing a national trend of a slowing down of LE improvements, with in fact a shortening of life expectancy for the most deprived groups of females.

National trends through Covid-19

The official ONS figures for LE are robust and are preferred as a reference source. They use an average of three years of deaths data, and so information for the impact of covid is limited as only one data point including the pandemic impact has been published, for 2018- 2020 (Figure 4), which obviously dilutes the impact since only 1 of the 3 years on the average was impacted by the pandemic. However, this is government data and is therefore the most reliable and robust source to use.

In Figure 3, shading has been added to the ONS graph to help to differentiate the three trends which can be observed; zone I green is showing a broadly steady increase of LE over time, zone 2 (blue) is still showing an increase, but one which is much slower than before, and then zone 3 (orange) which includes the initial pandemic impact. This has shown a reduction in LE for men, and no change for women, even when considering that this is the average over the three years, two of which were not within the pandemic.

Figure 4 uses the same data but displays it differently, taking the change in LE in between the sets of 3 years. This also shows the zones described above, with a relatively uniform change from year to year becoming much small, and then showing an actual reduction in LE in 18-20.

and 2018 to 2020



Figure 3 LE at birth for males and females, UK, between 1980 to 1982 and 2018 to 2020 (colours added by

https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/bulletins/na

Life expectancy at birth for males and females, UK, between 1980 to 1982

40 20

with previous non-overlapping time period, UK, 1997 to 1999, to 2018 to

Change in life expectancy at birth for each period, in weeks, compared

2020

60

-20

2000-02

2002-04

tionallifetablesunitedkingdom/2018to2020

Males

Weeks

Females

author)

Figure 4 Change in LE at birth for each period, in weeks, compared with previous non-overlapping time period, UK. 1997 to 1999, to 2018 to 2020.

2008-10

2010-12

2012-14

2014-16

2016-18

2018-20

2004-06

2006-08

The Kings Fund produce their own analysis, based on the same raw data. They show the LE per year, rather than using the average of three years which the ONS analysis uses. This means that each point is slightly less accurate; one would be careful not to read too much into very slight changes year – on-year, but is very useful.

They report that;

By 2019, life expectancy at birth in England had increased to 79.9 years for males and 83.6 years for females. However, the Covid-19 pandemic caused life expectancy in 2020 to fall to 78.6 years for males and to 82.6 years for females, the level of a decade ago.

As can be seen on the graph, the data for 2021 is a little better, but still a very significant drop from pre-pandemic levels.



Figure 5 LE at birth for single years, including 2020 and 2021 (What is happening to Life expectancy? Updated Aug 2022, Kings Fund)

Forward Look

Although it is not advisable to calculate LE for part years, we can look at the mortality data and in particular excess deaths which means a higher number of deaths than one might expect to see, using historical data (2015-2019).

Overall, from the start of the pandemic (taken as 21st March 2020) to date, there have been around 10% more deaths than expected.

So far, the number of excess deaths in the year 2022 has been significantly less than the same period in 2021, or 2020.

However, we do not yet have a stable pattern to covid peaks, and we have also seen concerning excess mortality when we are not in high rates of covid, and so it is difficult to predict what might happen in 2022 overall.

Local trends in life expectancy

Comparative data is provided by UK Health Security Agency as part of the Public Health Outcomes Framework (PHOF). This is calculated both as the three year rolling average, but is also shown as a yearly figure. Both of these are shown in Figure 6, for males and females. The three year average curves have the same issue as the ONS data previously mentioned which is that the impact of the pandemic is less clear since it is one of the years of the 2017-19 rolling average, and two of the 2018-2020 years.

Life expectancy at birth	Plymouth Value	England Value	Gap	Rank compared to similar areas	
Using three- year rolling average for 2018-2020					
Females	82.5	83.I	0.6	l (Best)	
Males	78.8	79.4	0.6	1	
Using one year data for 20					
Females	82.4	82.6	0.2	1	
Males	78.8	78.7	0.1	I	

Table 1 Showing data taken from the UK HSA PHOF. The rank uses 15 comparator areas identified by Chartered Institute of Public Finance and Accountancy (CIPFA) and a high rank means that LE in Plymouth is high

This shows that;

- LE in Plymouth is consistently below the England average for both males and females. This is closely associated with levels of deprivation.
- However, LE in Plymouth is consistently high compared to the similar comparator areas.
- In the pandemic years, LE for England dropped overall due to excess deaths
- It also dropped in Plymouth but by a lesser amount. This reflects the lower Covid-19 death rate in Plymouth which is one of the lowest across the country.
- This meant that the gap between Plymouth and England reduced during the pandemic.

Although of course the reduction in the gap is a positive outcome, this has been achieved through the LE for England worsening which is not the way in which we would have wanted to see this come about. Our aim is of course to see increasing LE for all, but with faster increases for the more deprived groups pushing the overall average up.

Comparisons with similar areas

Comparing Plymouth's LE with other similar areas, identified using CIPFA

- Male LE in Plymouth is equal highest
- Female LE is second highest

Inequality in LE

Inequality in Life Expectancy is also shown in the PHOF; this shows the gap in LE between the most deprived and least deprived deciles. It is calculated using three year averages, and so, although it does include 2020, this averaging will reduce the impact of pandemic. This shows that;

• For males, in England the gap in LE at birth has increased slightly (by 0.6 of a year) over the last decade

- $\circ\;$ for Plymouth the gap is approximately the same as for England, within statistical significance
- For females, in England the gap in LE at birth has increased (by 1.1 of a year) over the last decade
 - for Plymouth the gap in LE at birth has remained has reduced and is now statistically significantly below that for England



Figure 6 Public Health Outcomes Framework Life expectancy in Plymouth compared to England



Figure 7 Inequality in Life Expectancy in Plymouth compared to England for women and for men (PHOF). The points represent the gap between LE in the most deprived 10% and the least deprived 10%.

RECENT TRENDS IN HEALTHY LIFE EXPECTANCY

Healthy life expectancy is a measure of how long a person would expect to live in good health based on contemporary mortality rates and prevalence of self reported good health. This is calculated from responses to a question on general health in the Annual Population Survey (APS) conducted by the Office for National Statistics (ONS).

This has only been calculated since 2011 and so is a relatively new data set, with limited trend data.

National Trends

HLE for England has shown little change since 2009-11 when the data was first calculated.

- HLE for males at birth in 2009-11 was 63.0 years. It reached a peak of 63.4 between 2012 and 2018, and has slight reduced since them to 63.1 years for 2018-20.
- HLE for females at birth in 2009-11 was 64.0 years. It has fluctuated a little and was 63.9 in 2018-20.

Local trends

HLE for Plymouth population is;

- 59.3 years for women (significantly lower than England). There has been a reduction over time, though this is not statistically significant, and there is no evidence of a worsening trend.
- 64.3 years for men (similar to England). There have been changes over time but these are small; previously (up until 2015-17) Plymouth was significantly below England but is now similar.

When we consider Plymouth's HLE compared to similar areas using the CIPFA comparator areas, we see that;

- For females, despite having the highest ranking LE, the HLE is one of the worst compared to similar areas (12/16)
- For males, as well as having the highest LE of the comparators, Plymouth also has the highest HLE

This means that a female in Plymouth tends to report worse health than a similar woman (age, deprivation etc), but does not die any earlier. This is illustrated in Figure 9.



Figure 8 Health life expectancy trends with time, for Plymouth and for England.



Figure 9 Length of life (life expectancy) split into healthy LE showing time lived in poor health in orange; for Plymouth and statistical (CIPFA) neighbours. Using data from PHOF.

Why is female HLE lower in Plymouth than we would expect?

Looking at the range of information available, there are some statistics around health and wellbeing that appear to support this HLE and some which do not, and no clear cause for this difference. For example;

- Plymouth does have a low disability-free LE for women below the England average,
- Social isolation is highlighted as an issue for adults in Plymouth often (but not always) women
- In terms of self reported wellbeing, Plymouth does not have low rates for satisfaction, happiness, or high rates for anxiety.

- Under 75 mortality rate considered preventable Plymouth has higher rates than England, but is one of the lowest rates compared to similar areas.
- Health improvement
 - Adult obesity is slightly worse than England but mid table compared to similar areas
 - Adult smoking is much worse than England and high compared to similar areas
 - Physical inactivity is similar to England and mid table compared to similar areas
 - Admissions due to alcohol are similar to England and low compared to similar areas

There is emerging evidence around female employment in Plymouth;

Although there may be some pointers, there is no conclusive reason as to why Plymouth female HLE is low. HLE has not been used for long enough to have evidence from places who have managed to improve HLE; there is no concrete evidence to differentiate between the risk factors for LE and for HLE. And yet, there are large variations. This is an area for further work and research.

APPENDIX I

LE calculated for Plymouth Neighbourhoods

Neighbourhood	Life expectancy 2018-	Range of estimate	
in alphabetical order	2020	Lower	Upper
Barne Barton	79.3	76.6	81.9
Beacon Park	82.8	80.5	85.1
Chaddlewood	85.9	83.1	88.6
City Centre	80.5	78.4	82.6
Colebrook, Newnham, & Ridgeway	82.9	81.7	84.1
Derriford West & Crownhill	82.4	80.1	84.6
Devonport	76.1	74.4	77.8
East End	77.6	75.4	79.9
Efford	79.9	78.4	81.4
Eggbuckland	85.3	83.5	87.1
Elburton & Dunstone	82.2	80.5	83.8
Ernesettle	78.8	76.7	80.9
Estover, Glenholt & Derriford East	81.8	80.1	83.6
Ford	82.2	80.0	84.4
Goosewell	85.4	82.3	88.5
Greenbank & University	76.0	74.0	77.9
Ham & Pennycross	81.5	79.6	83.4
Higher Compton & Mannamead	82.6	81.4	83.7
Honicknowle	81.4	79.9	82.9
Keyham	80.2	77.6	82.7
Leigham & Mainstone	81.7	79.1	84.4
Lipson & Laira	82.5	79.4	85.5
Manadon & Widey	82.0	80.3	83.7
Morice Town	75.9	72.6	79.2
Mount Gould	80.3	78.2	82.4
Mutley	76.1	73.9	78.4
North Prospect & Weston Mill	78.7	76.6	80.7
Peverell & Hartley	81.6	80.2	82.9
Plympton St Maurice & Yealmpstone	82.2	80.9	83.6
Plymstock & Radford	83.7	82.4	85.0
Southway	81.2	79.0	83.3
St Budeaux & Kings Tamerton	79.0	77.3	80.6
Stoke	77.9	76.6	79.1
Stonehouse	75.9	74.1	77.7
Tamerton Foliot	80.3	77.9	82.7
Turnchapel, Hooe & Oreston	82.3	80.5	84.1
Whitleigh	80.6	78.3	82.9
Widewell	83.3	80.6	86.1
Woodford	81.9	80.0	83.9
Plymouth	80.6	80.3	80.9

REFERENCES

PCC reports

DPH Annual Report 2019 Part 2

https://www.plymouth.gov.uk/sites/default/files/Thrive%20report%20year%204%20%2011_19%20v2%2 0web_1.pdf

ONS

https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/bul letins/nationallifetablesunitedkingdom/2018to2020

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