

Today's high paternal ages at childbirth are not exceptionally high

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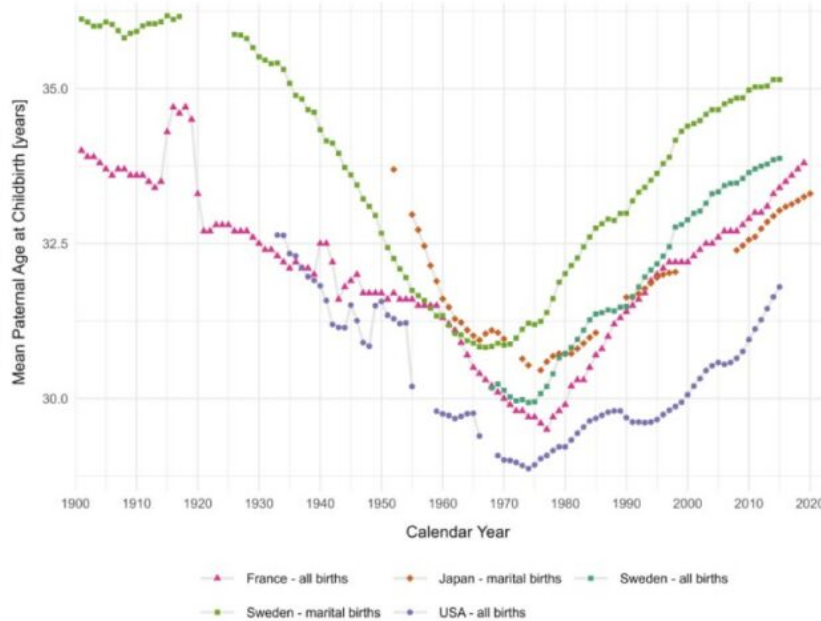
Recently, mean paternal ages at childbirth have risen sharply. This has alarmed researchers from a wide range of fields as offspring of older fathers have higher health risks. However, existing studies lack a long-term perspective. Kai Willführ and Sebastian Klüsener show that in many countries current mean paternal ages at childbirth are not unprecedented.

Trends in mean maternal ages at childbirth in western Europe have evolved along a U-shaped curve over the last 150 years. From rather high levels in the late 19th and early 20th centuries, they declined to low levels during the so-called “golden age” of marriage in the 1950s and 1960s, before rising again in subsequent decades.

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For fathers, it is much more difficult to study such trend patterns as only a few countries provide long-term time series on paternal ages at childbirth. This likely explains the current lack of data collection and of comprehensive comparative studies. We addressed this gap by identifying and harmonizing the existing data based on state-of-the-art demographic methodological standards and integrating them into the LPAC database (long-term trends in paternal ages at childbirth; <https://lpac-database.shinyapps.io/Data/>). To our knowledge, this is by far the biggest global database ever created to document and compare trends in mean and advanced (>45 years) paternal ages at childbirth (MPAC and APAC, respectively). The LPAC database currently contains data from 4,172 country-year observations for 140 countries. For some countries, the database covers more than a century. We complemented this free access database with an R-Shiny-App for visualization, including data tables and supplementary information.

Figure 1. Mean paternal ages at childbirth (MPAC) in selected countries, 1900–2020



Source: own calculations on the LPAC database.

Our research on long-term MPAC trends indicates that the current high paternal ages at childbirth are not unprecedented (Willführ and Klüsener, 2024). In all study populations for which long time series are available, MPAC and APAC exhibit virtually the same U-shaped pattern, with current levels comparable to those about a century ago (a selection of countries with long time series is shown in Figure 1). This trend in MPAC is related to major changes in family structures and fertility patterns and is well-documented for Europe and North America (Lesthaeghe, 1980; Hajnal, 1965; Lam, 2011; Ruggles 2015). However, our global comparison shows that U-shaped MPAC patterns are also observed in other parts of the world, such as in Chile, Japan, and Australia. Also, the share of “late fathers” in historical populations does not substantially differ from that in contemporary ones. Finally, it is worth noting that in many contemporary populations of sub-Saharan Africa north of the equator, MPAC often exceeds current western levels by many years (Schoumaker, 2019).

Should we be concerned? At individual level...

The fact that today’s MPAC and APAC levels are comparable to those of the early 20th century is not automatically a reason to be less concerned. Scientists from various disciplines, including epidemiologists, medical researchers, and psychologists, have expressed worries about the possible consequences of high paternal age at childbirth (e.g., Bray et al., 2006 and many more). These concerns are further fueled by demographic evidence showing that maternal age at childbirth has also increased considerably in recent decades (see the [Human Fertility Database](#)).

At individual level, the association between paternal age and offspring’s health is well-documented. To a certain degree, it is influenced by genetic mechanisms: for instance, the number of de-novo-mutations in sperm cells increases with fathers’ age (Kong et al., 2012). However, it is not clear to what extent changes in MPAC affect health and human cognitive development at the population level or if, and to what extent, biological disadvantages related to paternal age may be counterbalanced (or amplified) by individual-level factors. One reason for this knowledge gap is the lack of exchange between researchers and disciplines focused on

individual-level mechanisms and those investigating population-level phenomena and implications. Some of these important knowledge gaps are highlighted below (for a more detailed discussion, see Willführ and Klüsener, 2024).

At the individual level, biological disadvantages related to paternal age may be counterbalanced by social resource accumulation. In many studies on the effects of parental age, the role of social resources in offspring health is ignored. Further, it is important to note that the epidemiological transition has not only increased life expectancy but has also significantly affected biological processes and the speed of aging in the human body. To our knowledge, no study has investigated whether this also affects age-related patterns like the aforementioned accumulation of de-novo-mutations. Further, slower attritional processes in the body due to better standards of living could have changed the meaning of having older parents.

... and population level

At population level, it is not well understood how individual-level effects are linked to population-level outcomes. The offspring of older fathers exhibited higher mortality in historical populations and have fewer children in contemporary ones, which tends to dilute the consequences of these cases at population level (Arslan et al., 2017). However, the extent to which this selection affects genetic health at population level, especially in modern societies, is largely unknown (Billari, 2015). Besides, improvements in medical care and assistive technologies have not only increased the likelihood of survival, but also enabled people with special needs to participate in society in a way that was unknown in the past. In addition, technical advances in prenatal diagnostics and medical care might have relevant beneficial effects at population level (Wilkinson, 2015). Later-life pregnancies often receive increased medical attention due to the higher health risks involved, thus improving the chances of detecting fetal impairments. In addition, medically indicated abortions because of fetal impairment and disability are today common in most high-income countries.

Conclusion

MPAC and APAC are on the increase, but current levels are not unprecedented, as our newly collected data show. Although not new, the current levels and potential further increases may be a cause of concern for their possible health consequences on future generations, but current knowledge is still too limited to substantiate these fears.

References

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Source figure 1 - <https://lpac-database.shinyapps.io/Data/>