So Much **Life**

Demographics must be biological and political, says **James Vaupel**. This approach makes him a rule-breaker – and not just in Germany. For the Director at the **Max Planck Institute for Demographic Research** in Rostock, going against the norm is the norm.

A PORTRAIT BY **BJÖRN SCHWENTKER**

James Vaupel can't take it any longer. The ideas want out. He had patiently spooned up the beetroot soup with chocolate ice cream, but now he pushes the plate with the nicely browned steak medallions aside, half uneaten. He needs room to write. Vaupel, who prefers to be called "just Jim," hastily rummages through his jacket for a pen. He can't find a piece of paper. No matter, the napkin will have to do. Then Jim starts drawing. Survival lines, mortality rates, one diagram after the next takes form on the soft paper.

While he draws, he lectures, speaking quickly, sometimes hastily – and always aggressively. The demographer is used to having to convince people, even today, 20 years after his greatest discovery: life expectancy is increasing, and there is no discernible limit. "People simply don't want to believe it," says Vaupel and draws a line upward so vigorously that he accidentally extends it onto the table. The napkin is too small for life.

The wait staff at "Goodfellas" – Jim's favorite restaurant in Rostock due to its bold and unusual taste creations – has grown accustomed to the lively American with the white hair and round face, who always orders his meals in this funny mixture of German and English. He comes here once a month to eat with staff members, junior scientists and research colleagues from around the world. It is hard to imagine him not winning them over, or them not pushing their plates aside just as quickly in order to launch a new research project with Jim, preferably starting yesterday.

A MAJOR CHANGE IN AGING RESEARCH

It is this mixture of determined conviviality, keen intellect and an unerring feel for research topics with the potential to offend that has already made James Vaupel one of the great demographers of our time. Even before he moved to Rostock in 1996 to make the Max Planck Institute for Demographic Research, of which he is the founding Director, one of the world's leading demography institutions within a matter of years, Vaupel had already radically changed the face of his field. And with it, that of aging itself.

Today, his research is highly topical – everyone is talking about demographic change. But the driving force behind it, as James Vaupel has shown, is much older than the current commotion about it: lifespans in industrialized countries have been steadily increasing for the last 200 years. Demographers have repeatedly defined upper limits for life expectancy, but every one of these limits has been surpassed – some even by the time they were published. Through meticulous data analysis, Vaupel proved that the maximum age is increasing by two and a half years each decade. It was this finding that led him to remark: "Live nine months and you get three additional months free."

People haven't yet grasped just what this means. It seems so logical: those who live longer are old longer. But being old is not good. "Old age" is still considered to be a period in life that is filled with disease and infirmity. Unjustly so, Vaupel stresses: as life expectancy increases, so, in fact, does the share of healthy years. On the whole, people have more health, more vitality and more time to work.

James Vaupel is a prime example of this. Flashing a boyish smile while brushing off the suggestion of retirement, few people would guess that he will soon be 65. "I was never more productive than I am now," he says. And: "My best ideas are still ahead of me." Sixty-five? That's not old. Retirement? Thanks to new German regulations on extending service periods, he's allowed to continue working as a Director at the Max Planck Institute for Demographic Research until he

Photo: Norbert Michalke

Taking the ferry to the institute: James Vaupel lives in Denmark and works in Rostock. This makes the ferry the vehicle of choice.

turns 70. After that, he's assured of a professorship in Denmark, where his family lives. He says he is in top form, especially intellectually. No one would doubt him. The man is pure life.

TURNING NUMBERS AND DATA INTO A MATHEMATICAL THEORY

And yet it was death that brought him to demographics. He was already 30 years old and actually on his way to a professorship in public policy at Duke University in Durham, North Carolina, when suddenly three of his relatives died unexpectedly. This hit Vaupel hard. "I resolved to give some thought to how untimely death might be prevented." He read everything he could get his hands on about premature death. Data series were particularly revealing, as they showed that his compatriots' chances of survival were miserable. Many died young, most before the age of 65. Those who did grow older, however, lived very long. Why? Vaupel discovered how much the mortality rate varied from one person to the next. He excitedly wrote down what the numbers were telling him. His text was accepted as an article in the journal Demography – and immediately cited extensively. "I really hit something," says Vaupel today.

He had discovered the heterogeneity of demographics and began to expand his ideas into a mathematical theory. This work later garnered him the prestigious Population Association of America award for mathematical demography.

James Vaupel was 39 when he finally became a professor of demography at the University of Minnesota. He was

Keen intellect, determined conviviality and an unerring feel for research topics: James Vaupel, who goes by Jim, is one of the great demographers of our time.

Photos: Björn Schwentker (2)

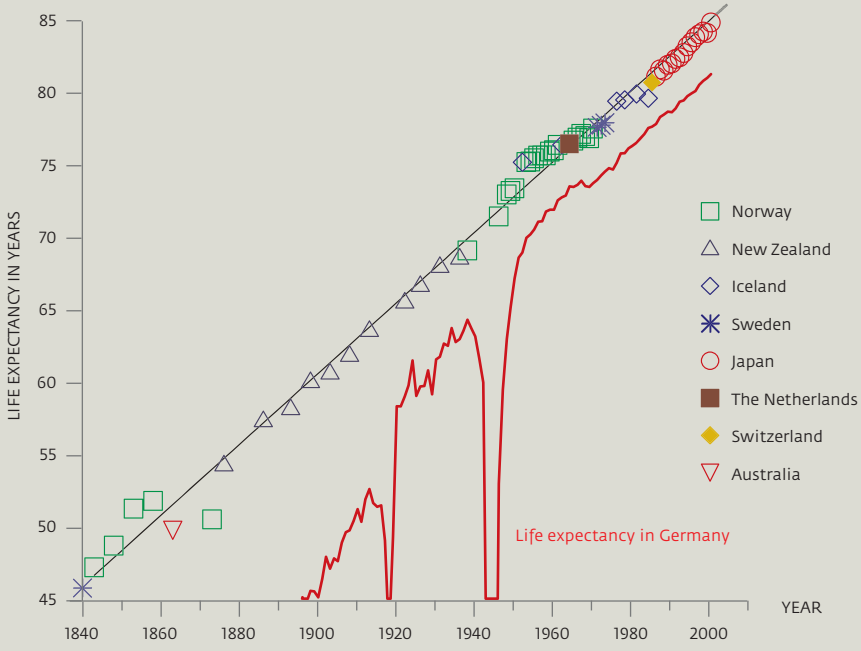
» His parents had a small optical shop. It didn't earn a lot, and they had no money for Jim's education. Jim, however, had plenty of curiosity.

proud of this achievement. No one in his family had ever made it to college. His parents had a small optical shop in Islip, New York (USA). It didn't earn a lot, and they had no money for Jim's education. Jim, however, had plenty of curiosity. He earned top grades in school. Jim would never say that he had always been a bright student, or an innovator. But he was, even if he tells the story differently.

At the small table in "Goodfellas," he leans back contentedly, sipping on his dry Riesling, and relates the tale of how he more or less stumbled upon the world of academia. Having graduated from high school at the top of his class, he received a scholarship for college: Harvard was his ticket to the temple of science. He later received additional scholarships, and even earned his Ph.D. But his path to demography was anything but "straight."

Vaupel studied business for a while at Harvard Business School, but he didn't like it there: "My classmates were only interested in money. I was interested in ideas." He transferred to the Kennedy School of Government with the intention of going to work for the government. He thought that government officials were the ones who had the real power to change the world. Vaupel had already joined the Harvard Republican Club while still in college, and was very interested in politics. At that time he was still oblivious to what would eventually become his current passion, demography.

Jim had been taking statistics courses ever since his college days. He first registered for them because he knew the professor from television. As a teenager, he had loved the 6:30 a.m. show with the professor lecturing on mathematics. The world of numbers has not released its grip on him since. Regardless of what field Vaupel happened to be drawn to in his early years at the university, he always studied it from a mathematical standpoint. It would be many years before he would realize just how much his later success benefited from this approach.



Aging without limit: The record life expectancy (points on the line) is increasing without limit. The countries with the highest figures change from time to time, but the increase is constant: about two and a half years per decade. The figures in Germany (red curve) are slightly lower, but they are rising just as quickly.

THE DEDICATED DEMOGRAPHERS SOCIETY

When he finally arrived in Minnesota, and thus in the field of demographic research, the first thing Jim did was consult the telephone book. He had combed through citation lists and come up with 180 scientific authors in Minnesota who had published papers on population. He called every one of them, arranged to have lunch with 100 of them, and formed a scientific demography research club with 35: mathematicians, physicians, economists, psychologists. Vaupel had always considered population research to be an interdisciplinary field.

All of these researchers had one thing in common: they felt it was time for a new paradigm in aging research. It quickly became clear to Vaupel who his scientific opponent was: medical expert James Fries. Fries had published an article a few years earlier that had received much attention. In it, he summarized the established notion of how life ends: every person has a natural lifespan that is determined by genetic makeup. It cannot be changed. Even

Graphic: designergold, based on original material from James W. Vaupel and James Oeppen

» Old age is being delayed – people are staying young longer. And it has nothing to do with genes.

Aristotle believed something similar, 2,500 years ago. James Vaupel didn't believe it. He wanted to refute Fries – and thus the impossibility of postponing death.

He devised an action plan: He needed to verify whether, based on the population average, people who had nearly made it to the supposed maximum age always died after the same number of years, or whether the probability of dying might not change over the course of history. But it wasn't very easy to make this determination. There was no data on the aged. Vaupel began his search, surveyed statisticians and combed through archives around the world. He found what he needed in Sweden. There, reliable data on citizens' ages and death dates has been recorded since 1860. This statistical goldmine was designed to ensure that the King of Sweden always had enough tax revenues and soldiers. For Vaupel, it ensured a scientific breakthrough.

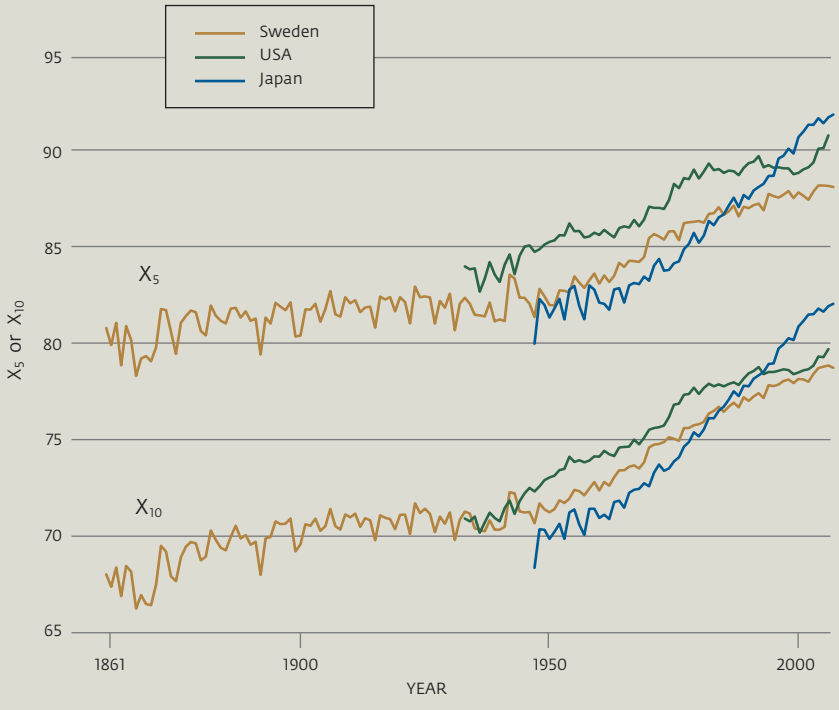
NO SUCH THING AS AN INNATE LIFESPAN

He raised funding and used it to pay for the digitalization of the files that documented the deaths of people over the age of 80. Then he was able to see the truth about aging: people were dying later and later. Even among those in the highest age group, over 85, the probability of dying at a certain age declined steadily over the decades. Life expectancy rose at a constant rate, so there couldn't be any such thing as a maximum age. Fries was wrong.

Vaupel also found out that life expectancy is not increasing as a result of a slowdown in the aging process. Rather, the aging process is being postponed. Old age is being delayed – people are staying young longer. And it has nothing to do with genes. So there is no such thing as an innate and immutable lifespan. Studies on twins demonstrated this. Aging, as Vaupel found, is anything but set in stone. It is pliable.

None of Vaupel's scientific successes would have been possible if he had not always had excellent datasets to work with. In most cases, he had to generate them himself. He tracked down the twin data in the files of the Danish statistical office; a student entered the data into the computer. Now he has established large-scale data collection at the Max Planck Institute in Rostock. The data lab at the institute maintains the "Human Mortality Database," the world's largest list of mortality figures from around the globe.

However, James Vaupel wasn't content to hoard measured data on just humans. After all, man is not the only organism that ages and dies. Do different creatures have different survival strategies? Or are they similar? Right after the study with the Danish twins, Vaupel investigated fruit flies. He was able to breed thousands of "twins" simultaneously in their population. Vaupel was the first demographer to establish a database that doesn't archive human mortality figures – something that was almost unheard of in his discipline. Many peo-



The body is staying healthy increasingly longer: The average age at which women have ten (X_{10}) and five (X_5) years left to live is increasing at an equal rate. The curves are nearly identical, just offset – the aging process is setting in later and later, but it is not slowing down.

Graphic: designergold based on original material from James W. Vaupel

The research approaches of the Director at the Max Planck Institute for Demographic Research in Rostock are rather unconventional, and in any case interdisciplinary. In the basement laboratory, he experiments with, for instance, persistent polyps.

ple therefore consider Vaupel to be the revolutionary of demography.

He delights in breaching the methodological limits of his field: for instance when he screwed hundreds of small light bulbs into a board and wired them to measure their service life. Or when he analyzed the "mortality" of cars in his search for universal patterns of mortality. They could, in fact, exist: the life and death of insects appears to obey similar mathematical laws as that of light bulbs.

For James Vaupel, there is method to the madness of such deviation from the norm. Of course his staff is surprised when their boss shows up at the office wearing bright red socks again, or with flowers on his lapel or a particularly odd tie. But it isn't absentmindedness – it is intentional. When Jim, at 18 years of age, read the works of John Stuart Mill, he decided that he would do something unusual every day: utter a particular thought, tell an interesting story – or just wear red socks. Like the British Mill, a liberal free-thinker of the 19th century, Vaupel believes in the need for personal individuality: the only progress is that against the tyranny of convention.

HIS CREDO: TRANSPARENT KNOWLEDGE FOR ALL

Today, he experiments with persistent polyps in the service of research in the basement laboratory at the Max Planck Institute. A couple of floors up, the staff in the research group on the evolutionary theory of demographics recently set up their workspace. Ultimately, believes Vaupel, what determines aging and life expectancy can be understood only with the aid of biology. "I am proud to have ushered in the renaissance of biodemography," says Vaupel – and considers himself to be following in a fine tradition: in the early 20th century, it was normal to understand demographics as the population science of all living beings. This approach was lost during the Second World War – just like demographic research in Germany. After Hitler, there were only a handful of population researchers left, spread throughout the German Republic. Teaching and education were nearly dead.

In a sense, Vaupel revived them. He established a world-class demographic research facility at the Max Planck Institute. Its reputation made it easy to re-establish education, as well: one can now study demography at the University of Rostock. And Vaupel founded, sponsored and continues to sponsor multiple post-doc programs, such as the Max Planck Research School for Demography or, at the European level, the European Doctoral School of Demography. >

Photo: Norbert Michalke

Red socks – by no means a political statement. For James Vaupel, deviating from the norm is simply how he works.

It's a matter of course that the Director keeps coming back to participate here. "I actually consider myself first and foremost a teacher," he says. He wants his findings to benefit mankind. His unconventional approach also extends to his communication: when the Internet journal Demographic Research that Vaupel established in 1999 went online, it was one of the first open access journals ever created. His credo: Transparent knowledge for all.

THE DISTRIBUTION OF LABOR

In "Goodfellas," Jim hunches over his napkin. He has since switched from white wine to red, and taken off his jacket. He writes "Demography" on a blank corner of the white scrap. Above it, he draws a fat circle. That's politics. That's what gives the whole thing meaning. In the end, only politics can ensure the quality of life he so loves. Research, Vaupel believes, must aid politicians in making decisions, and can do so only through knowledge transfer. That is why, at the institute in Rostock, there is a research group on population and politics. And that is why the Director is always prepared to openly disseminate his knowledge, for example in the media. But take note: "I want to convey facts," says James Vaupel, "not a political opinion."

With one exception: When it comes to retirement age, the American doesn't understand the Germans. If it were up to him, there would be no such limit. Everybody would be allowed to work as long as he or she wants. He himself wants to continue doing research until he is no longer able. He doesn't consider this a hindrance to simultaneously enjoying leisure time, be it as an enthusiastic amateur chef or as a passionate equestrian. Vaupel once worked it out in the journal Science: If older people were to work just a few years longer, it would take only a few hours per day to make demographic change less daunting. The feared shortage of workers would be alleviated just as quickly as the problem of financing pension funds.

Our modern life will undergo a revolution, believes Vaupel: "The 20th century was the century of distribution of wealth. The 21st will be that of distribution of labor." If work were organized more cleverly, there would even be more free time for the young generation. Time to have children, for instance.

Politically speaking, for Vaupel, family is not something the government should force. Personally speaking, family is his greatest joy. The younger of his two daughters just recently bore him a grandson. He hopes to watch him grow for a couple of decades yet. And if his gut feeling is right, he will. Jim has never calculated his own life expectancy – although he could. He relies on his inner voice, which tells him that he has another 30 years yet. Or more. So much life! ◀

Photo: Björn Schwentker