

Can exercise help you live longer and better?

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Credit: photos.com

The red double-decker buses that are symbolic of the city of London have an altogether different significance if you study heart disease. Sixty years ago, these iconic buses helped a Scottish medical doctor named Jerry Morris discover the link between physical activity and heart attacks.

The buses offered a perfect way to study the puzzle of what was behind an epidemic of [coronary heart disease](#) that arose in [developed countries](#) after the Second World War.

Researchers could compare two groups of people who came from similar backgrounds and who worked in the same environment. The only difference was that London bus drivers sat all day, driving their buses. Their conductor colleagues spent their [workdays](#) walking the length of the bus and climbing up and down the double decker stairs, sometimes climbing 750 steps a day.

In 1953, Morris and his colleagues published their first findings in the [British medical journal](#) *The Lancet*. Bus drivers, the researchers found, were twice as likely to die from [heart disease](#) as conductors. The same pattern held true in mail carriers, dockworkers, [office workers](#) and more.

Six decades after Morris's ground-breaking work, his findings are medical gospel. Exercise is good for you, and can drastically cut deaths from heart disease. But what if you are elderly? Can exercise help the growing numbers of people 70 and older live longer and better?

A growing problem

Norway, like every other nation in the world, faces the challenge of a growing, increasingly elderly citizenry, all of whom will need additional health care if trends continue as they are today.

In 1950, when Jerry Morris was watching bus conductors scramble up and down stairs, there were 205 million people in the world aged 60 and older.

Fifty years later, that number has tripled. And by 2050, 16 per cent of the world's population will be 65 or older, compared to just 8 per cent

today.

By some measures, Norway is ageing even faster than the average. The number of Norwegian retirees 67 years and older will double between 2010 and 2040.

Providing health care for all of these retirees will stress the country's health care system to its limits, says Dorte Stensvold, a researcher at the Norwegian University of Science and Technology's Cardiac Exercise Research Group (CERG).

"One-third of all people being educated in Norway now will have to work in health care services if we are to offer the same level of care to this group of people in the future," she says.

Finding a magic pill

But what if there was some way to intervene right now, so retired Norwegians were able to stay healthy and live independently for longer than is currently the norm? What if there was a magic pill to give them, so they could cut their risks of being crippled by heart disease, stroke or Alzheimer's disease?

Stensvold and her colleagues have started to hunt for the "magic pill," with one of the largest randomized clinical trials of its kind in the world.

Their study, which started in September 2012, is called "Generasjon 100," or "[Generation 100](#)" in English. It builds on the findings of Morris and many others, who have shown without a doubt that exercise is good for us – no matter what our age.

While studies have shown that exercise can be as beneficial for the elderly as for the young, just how intense that exercise should be "has

not been addressed yet," Stensvold says.

Generasjon 100 will allow researchers to study precisely what intensity of exercise works best in protecting the elderly from a host of health-related woes.



The Generasjon 100 study involves testing blood levels of haemoglobin, glucose, long-term blood sugar, three different types of cholesterol, triglycerides and high-sensitivity C-reactive protein. Researchers hope that participant blood levels, which will be retested over the course of the three-year-long project, will show the benefits of exercise. Credit: Nancy Bazilchuk

High intensity training

In younger age groups, the benefits of high intensity training have been shown by researchers across the globe, including Ulrik Wisløff, Stensvold's supervisor, CERG's director and the head of the Generasjon 100 study. Wisløff has become something of a guru when it comes to an approach to exercise called high-intensity aerobic interval training (AIT).

Interval training involves exercising at very high intensity (85-95% of maximum heart rate) for short periods, with more relaxed breaks of 60-70 % of maximum heart rate in between each period. Long a favourite of endurance athletes looking to build cardiovascular capacity (also called VO₂ max), Wisløff and others have found that AIT has other beneficial effects on health.

The question then becomes how the elderly can reap those benefits, Stensvold says. "Up until now, we know that physical training improves risk factors," she says. "It has been proven in younger age groups that higher cardiovascular capacity (VO₂ max) is also associated with lower risks for diabetes and other parameters for metabolic syndrome, and that high intensity is better than moderate intensity. But is it good for the elderly?"

Better quality of life

Sverre Kirksæther, 72, was one of the first called in to the Generasjon 100 study. As a retired police chief for an area called Utrøndelag, or the towns surrounding Trondheim city, he's no stranger to exercise. It's not hard to see the years of police work in his square shoulders and straight posture.

He says he's convinced that continuing to exercise will give him a better quality of life than if he were to spend his golden years relaxing on the couch watching TV. "It's better to die on a jog in the local forest than to die after lying in a hospital bed for four or five years," he said.

Kirksæther, like all participants in the study, undergoes a battery of tests. There are blood tests to check his levels of haemoglobin, glucose, long-term blood sugar, three different types of cholesterol, triglycerides and high-sensitivity C-reactive protein. There are balance tests, strength tests, and lung function tests.

And there are three detailed questionnaires, 16 pages in total, that ask about everything from how many candy bars the respondent eats in a given day to how the respondent sees his or her own health and well-being.

Your physical age

Then there's the gold standard measure of fitness – the VO₂ max measurement, which quantifies cardiovascular fitness with a treadmill test.

When Aud Hepsø Johansson, 70, steps up to take the test, she's a little uncertain about the treadmill, which she hasn't used before, but is confident about her fitness.



Nina Zisko (right), a PhD candidate whose research will use results from the Generasjon 100 study, fits Aud Hepsø Johansson with a special mask for measuring maximal oxygen uptake. Credit: Nancy Bazilchuk

She says she likes to jog with a group of women, some of whom are 20

years younger than she is. Her goal when she runs is to stay with the group, and push herself.

Her VO2 max test is proof that she's been running with the girls a lot. Her results, the technicians tell her, put her physical age closer to 50 than to 70 – news that she greets with a smile.

Later, as she sits and works her way through the extremely detailed food questionnaire, another reason behind her fitness emerges. "Salty snacks like potato chips and nuts – how much do I eat in a week?" she says, pondering. "I don't really eat those snacks at all."

High intensity key

All told, it takes each participant a good half-day to finish all the tests – which is one reason researchers decided that retirees would be their target group.

"We wanted to start after retirement age, which is 67," Stensvold said. "It's a new phase in people's lives, and we know they have more time. But there was also the fact that this age group and older is expanding rapidly."

The design of the study splits participants into three groups. Half of the participants will be "controls," who are told to exercise in accordance with government recommended guidelines, but who are not given specific goals or encouragement.

The other half is the exercise group, but these participants will be divided into those who will exercise at high intensity for 30 minutes twice a week, and those who will exercise at moderate intensity for 50 minutes twice a week.

Researchers most wants to know if high intensity training is better than moderate intensity training in keeping people healthy. Although many of the participants who agree to the study are already active, most have never exercised at high intensity before the study started, Stensvold says.

Never too late

Sixty years ago, when Morris first reported the trends in cardiovascular disease in bus drivers, the world was in transition, a place where motors, not men, did physical labour.

Morris and his colleagues concluded their ground-breaking study by wondering whether physical activity outside of work could compensate for a lack of activity during work.

And what would happen if "the increasing numbers of men engaged in management, administration and the bureaucracy" that characterized the British workforce started to exercise later in life? "If exercise is taken up late in a chairborne life, it may conceivably be harmful," the researchers speculated – erroneously, we now know.

The Generasjon 100 study should help researchers recommend exactly what kind of exercise – moderate or intense – can be taken up, even late in a "chairborne life".

"I believe that [exercise](#) leads to good health," Stensvold says, "and it is never too late to start exercising."

Provided by Norwegian University of Science and Technology

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