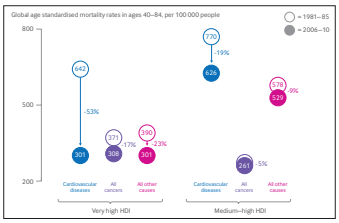
research

GETTY

No beneficial effect of exercise on cognition, but activity before dementia declines p 513



Global inequality in longevity gains reflects inequities in cancer control p 514

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ORIGINAL RESEARCH 28 year follow-up of Whitehall II cohort study

Physical activity, cognitive decline, and risk of dementia

Sabia S, Dugravot A, Dartigues JF, et al

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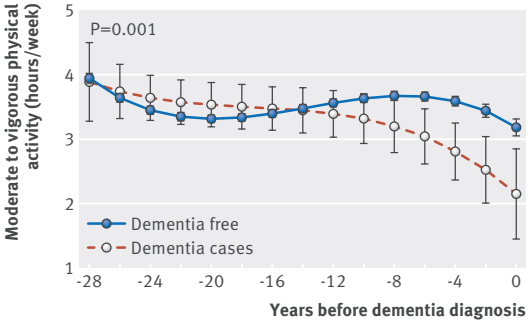
Study question What is the association of physical activity with dementia over almost 30 years' follow-up?

Methods This study used data from 10 308 participants of the Whitehall II cohort study aged 35-55 years at study inception (1985-88). Exposures included time spent in mild, moderate to vigorous, and total physical activity, assessed seven times between 1985 and 2013. Incident dementia cases (n=329) were identified through linkage to hospital, mental health services, and mortality registers until 2015.

Study answer and limitations Cox regression showed no association between physical activity and risk of dementia over an average 27 year follow-up. Trajectories of hours/week of total, mild, and moderate to vigorous physical activity in people with dementia compared with those without dementia (all others) showed no differences between 28 and 10 years before a diagnosis of dementia. However, physical activity in people with dementia began to decline up to nine years before diagnosis (difference in moderate to vigorous physical activity −0.39 hours/week; P=0.05), and the difference became more pronounced at diagnosis (−1.03 hours/week: P=0.005). Limitations of the study include self reported measure of physical activity and ascertainment of dementia based on linkage to electronic health records.



Trajectory of physical activity over 28 years preceding diagnosis dementia

What this study adds The results, reflecting findings from recent intervention studies, do not support the hypothesis of a beneficial effect of physical activity on cognitive outcomes but rather suggest that a decrease in physical activity could be part of the cascade of changes occurring in the preclinical phase of dementia. Studies with short follow-up, which show a protective association of physical activity for dementia, may be subject to reverse causation bias.

Funding, competing interests, data sharing The Whitehall II study is supported by grants from the US National Institutes on Aging, Medical Research Council, and British Heart Foundation. Whitehall II data are available to the scientific community (www.ucl.ac.uk/whitehallII/data-sharing).

Cancer and the limits of longevity

ORIGINAL RESEARCH Global comparison with cardiovascular disease 1981-2010

Benchmarking life expectancy and cancer mortality

Cao B, Bray F, Beltrán-Sánchez H, Ginsburg O, Soneji S, Soerjomataram I

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Study question What was the effect of cancers on longevity worldwide compared with cardiovascular disease during 1981-2010?

Methods The authors extracted mortality data for all causes, all cancers (combined and major sites: lung, stomach, female breast, colorectum, and prostate) and cardiovascular disease from the World Health Organization's mortality database 1981-2010 in 52 populations with moderate to high quality data on causes of death. A retrospective demographic analysis was carried out to estimate disease specific contributions to changes in life expectancy in ages 40-84 (LE40-84) over time in populations grouped by Human Development Index (HDI) values.

Study answer and limitations During 1981-2010 declining mortality rates from cardiovascular disease and cancer contributed to, on average, over 50% and about 20% of the gains in life expectancy in ages 40-84, respectively. Declining mortality rates due to lung cancer brought about the largest gain in men in very high HDI populations (up to 0.7 years in the Netherlands), whereas in medium and high HDI populations its contribution was smaller. Among women, declining mortality rates from breast cancer were largely responsible for the improvement in longevity in very high HDI populations (up to 0.3 years in the United Kingdom). By contrast, losses were observed in many medium and high HDI populations owing to increasing breast cancer mortality rates. Lacking high quality data, the analysis was limited to only 25% of all eligible populations. Also, the estimates might be biased owing to potential inconsistency in coding for cause of death.

Average contribution (in years) of each cause of death to change in life expectancy in ages 40-84 years, between 1981-85 and 2006-10

	Men				Women			
	Very high HDI		Medium and high HDI		Very high HDI		Medium and high HDI	
Causes of death	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Cardiovascular diseases	2.3	60.9	0.5	43.2	1.7	67.3	0.8	56.8
All cancers	0.8	22.6	0.2	14.4	0.5	20.5	0.2	11.1
Lung cancer	0.3	7.6	0.1	7.0	0.0	−1.7	0.0	0.3
Stomach cancer	0.2	5.8	0.1	13.3	0.1	5.5	0.1	7.3
Colorectal cancer	0.1	2.0	0.0	−1.1	0.1	3.5	0.0	0.5
Prostate cancer	0.1	1.8	0.0	−2.3	-	-	-	-
Breast cancer	-	-	-	-	0.1	4.5	0.0	−1.3
All other cancers	0.2	5.5	0.0	−2.5	0.2	8.7	0.1	4.2
All other causes	0.6	16.5	0.4	34.0	0.3	12.2	0.4	26.5
Overall change	3.7	100.0	1.1	100.0	2.5	100.0	1.4	100.0

HDI=Human Development Index.

COMMENTARY Global inequality in longevity gains reflects inequities in cancer control

We need scientific reasoning to pave the way for a shared understanding of global health data and the world it represents. For some time now, online data visualisation tools have made it easy for lay people to navigate and explore the treasures of public data. Today, we can sit comfortably at home and discover a world in motion, with animated statistics—and actually see longevity increasing all over the world. But online global statistics do not automatically prompt important discussions about the transitions we see, nor necessarily help us gain a collective understanding of why they are happening.

This is why epidemiological transition studies, such as the one by Cao and colleagues, are important.[1] Against a backdrop of noticeable worldwide reductions in mortality from infectious diseases and cardiovascular disease (CVD), the authors set out to understand changes in life expectancy over the past three decades, with a specific focus on the role of cancer as a barrier to reaching old age.

Cao and colleagues had access to high quality cause specific mortality data from 52 populations in the national civil registration system of the World Health Organization. They use it to quantify the impact of cancer (all cancers combined and major sites) compared with CVD on longevity among 40-84 year olds. They highlight global inequities by grouping countries according to two levels of the Human Development Index (HDI)—a social indicator, which measures national wellbeing in terms of wealth, health, and education.

Blind spot

The study has some limitations and blind spots. Firstly, grouping data by HDI level may inform global policy actions, but it cannot evaluate the impact of national health policies. A so-called ecological fallacy would happen if we used the grouped analysis to infer anything about the individual countries within each HDI group.

The findings of Cao and colleagues might also prompt us to think more about cancer as a natural ceiling on human longevity rather than as a rising epidemic

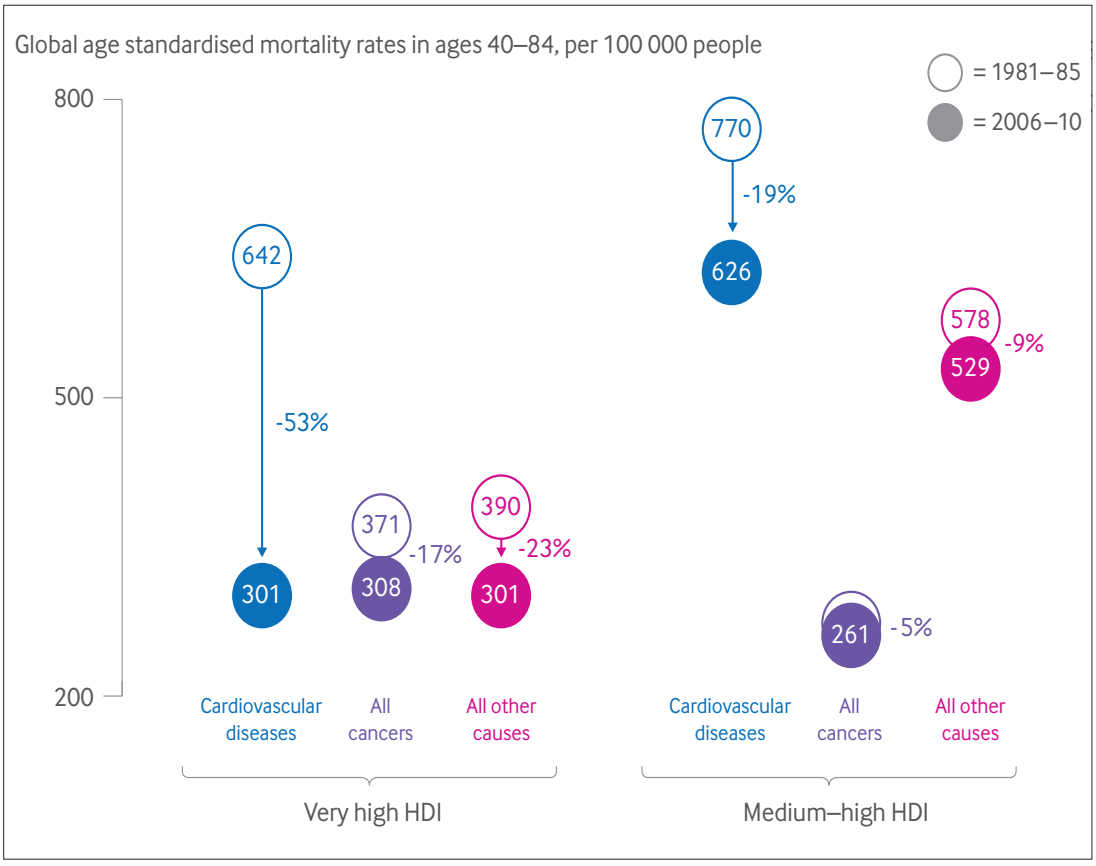
Secondly, a gaping hole remains in our knowledge about epidemiological transitions in low HDI countries. Less than 30% of the world's countries contributed data to Cao and colleagues' study. The

Marie Louise Tørring
mlt@cas.au.dk
See bmj.com for author details

What this study adds

The authors used change in life expectancy in ages 40-84 as a measure to assess the progress of cancer control worldwide during 1981-2010, with corresponding changes in cardiovascular disease used as a benchmark. They found the inequality in longevity improvement attributed to declining cancer mortality rates reflects inequities in implementation of cancer control, particularly in less resourced populations and in women.

Funding, competing interests, data sharing This study received no funding. The authors have no competing interests. The full dataset is available online and can be requested from the corresponding author.



Changes in age standardized mortality rates in ages 40-84 years between 1981-85 and 2006-10 due to cardiovascular disease (CVD), all cancers, and all other causes of death. HDI=Human Development Index

52 included countries represent the most dedicated biopolitical nations of the world, with governments that have meticulously collected health and development data on every citizen for more than three decades.[2]

With these caveats in mind, the study shows that declining mortality from CVD was responsible for over half of the gains in life expectancy between 1981 and 2010. The contribution from cancer was much smaller (up to one fifth of gains in life expectancy) and inextricably linked to level of development. Many populations, particularly those with greater resources, benefited from an increasing life expectancy as a direct result of decreasing cancer mortality rates since the 1980s, presumably through early detection and better access to effective treatment. In many lower resourced populations, however, these gains have yet to materialise.

Ceiling effect

Researchers in epidemiological transition predict a global epidemic of cancer, synergistically linked with the so-called "double burden" of economic growth and an ageing population.[3-5] A widely acknowledged projection is that emerging and transitioning countries such as Russia, China, and Brazil (presently characterised as medium HDI) will be increasingly affected by cancer in the future if their economic growth continues. In line with this theory, Cao and colleagues construe cancer as an environmental and economic disorder rooted in material practices such as eating habits and smoking, as well as access to screening, diagnostics, and treatments, which vary among nations distributed along a continuum from resource rich to resource poor.

Extra resources for poorer countries are a reasonable response.[6] But the findings of Cao and colleagues might also prompt us to think more about cancer as a natural ceiling on human longevity rather than as a rising epidemic. Cancer incidence (although not necessarily death from cancer) rises exponentially with age, beginning at about the mid-point of the maximum human lifespan—that is, for most cancers after age 50-60 years.[7] As populations continue to grow older, nations will increasingly have to assess cancer control measures in terms of their scalability—their potential for controlling an accelerating incidence rate of cancer.

Over the past 30 years, lower income and middle income countries evidently did not have the scalable solutions and resources to handle the growing numbers of people with non-communicable diseases. Resource-rich countries did. The question is whether rich countries will eventually reach a ceiling where their economic and social power is no longer enough to overcome cancer as a natural break on the human lifespan.

While even rich countries may fail to control cancer as their populations grow older, there is plenty that can be done now about current inequities in cancer control identified by Cao and colleagues, including priority funding for poorer countries and for women.

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ORIGINAL RESEARCH
Retrospective cohort study

Outcomes after observation stays among older adult Medicare beneficiaries in the USA

Dharmarajan K, Qin L, Bierlein M, et al

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Find this at: http://dx.doi.org/10.1136/bmj.j2616

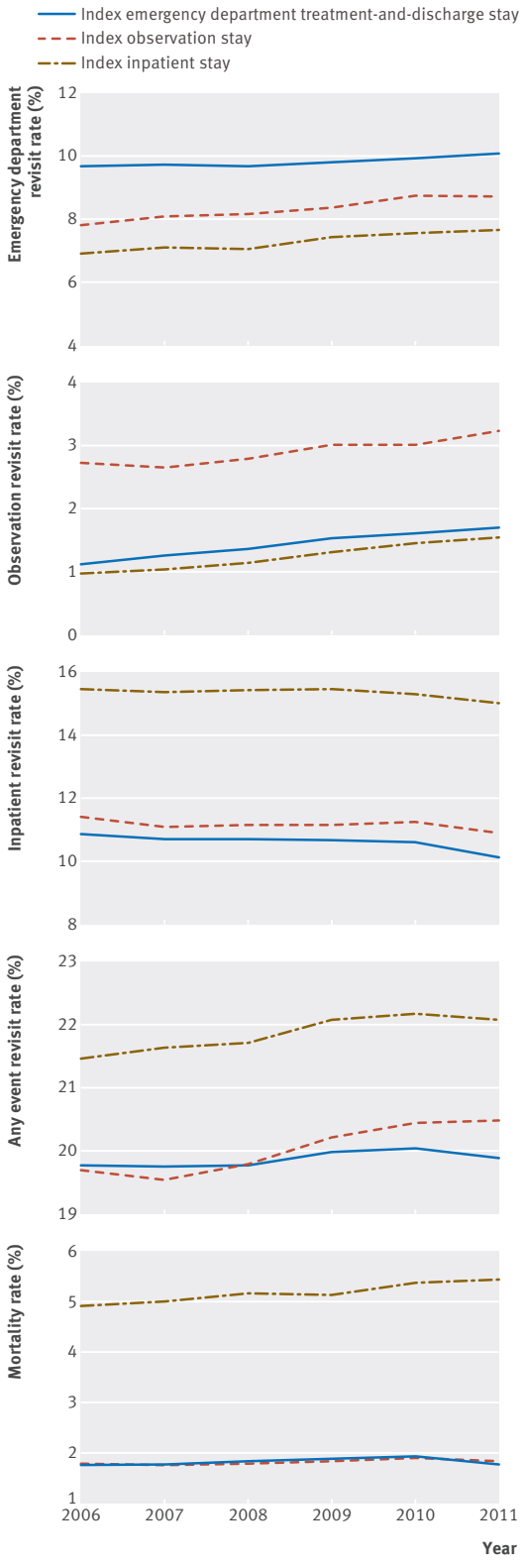
Study question What are the rates and trends over time in hospital revisits and death within 30 days of discharge from observation stays among older American Medicare beneficiaries?

Methods Participants were a nationally representative sample of American Medicare fee for service beneficiaries aged 65 years and over, discharged after index observation stays from from 2006 to 2011. Observation stays typically follow emergency department care and are being increasingly used in the USA as an alternative to short stays in hospital. The main outcomes were rates of emergency department treatment-and-discharge stays, observation stays, inpatient stays, any hospital revisit, and death within 30 days of discharge from index observation stays. Rates were compared to corresponding outcomes within 30 days of discharge from both index emergency department treatment-and-discharge stays and index inpatient stays.

Study answer and limitations Following discharge from 363,067 index observation stays, 30 day rates of emergency department treatment-and-discharge stays were 8.4% (95% confidence interval 8.3% to 8.4%), repeat observation stays were 2.9% (2.9% to 3.0%), inpatient stays were 11.2% (11.1% to 11.3%), any hospital revisit was 20.1% (19.9% to 20.2%), and death was 1.8% (1.8% to 1.9%); rates of any hospital revisit have increased over time (P<0.001 for trend, slope 0.01 (95% confidence interval 0.01 to 0.02)). These results were limited to data from American Medicare fee for service beneficiaries aged 65 years and over.

What this study adds Hospital revisits are common after discharge from observation stays, frequently result in inpatient hospital stays, and have increased over time among American Medicare beneficiaries.

Funding, competing interests, data sharing The authors declare receipt of research funding from the US National Institutes of Health and the Agency for Healthcare Research and Quality. The authors also work under contract with the Centers for Medicare & Medicaid Services (CMS) to develop and maintain performance measures. No additional data are available for sharing due to data use agreement with CMS.



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