

# Abstract

JAMA. 2010 Jul 7;304(1):69-75.

## Telomere length and risk of incident cancer and cancer mortality.

Willeit P, Willeit J, Mayr A, Weger S, Oberhollenzer F, Brandstätter A, Kronenberg F, Kiechl S.

Department of Neurology, Innsbruck Medical University, Anichstrasse 35, 6020 Innsbruck, Austria.

**CONTEXT:** Telomeres are essential to preserve the integrity of the genome. Critically short telomeres lead to replicative cell senescence and chromosomal instability and may thereby increase cancer risk.

**OBJECTIVE:** To determine the association between baseline telomere length and incident cancer and cancer mortality.

**DESIGN, SETTING, AND PARTICIPANTS:** Leukocyte telomere length was measured by quantitative polymerase chain reaction in 787 participants free of cancer at baseline in 1995 from the prospective, population-based Bruneck Study in Italy.

**MAIN OUTCOME MEASURES:** Incident cancer and cancer mortality over a follow-up period of 10 years (1995-2005 with a follow-up rate of 100%).

**RESULTS:** A total of 92 of 787 participants (11.7%) developed cancer (incidence rate, 13.3 per 1000 person-years). Short telomere length at baseline was associated with incident cancer independently of standard cancer risk factors (multivariable hazard ratio [HR] per 1-SD decrease in log(e)-transformed telomere length, 1.60; 95% confidence interval [CI], 1.30-1.98;  $P < .001$ ). Compared with participants in the longest telomere length group, the multivariable HR for incident cancer was 2.15 (95% CI, 1.12-4.14) in the middle length group and 3.11 (95% CI, 1.65-5.84) in the shortest length group ( $P < .001$ ). Incidence rates were 5.1 (95% CI, 2.9-8.7) per 1000 person-years in the longest telomere length group, 14.2 (95% CI, 10.0-20.1) per 1000 person-years in the middle length group, and 22.5 (95% CI, 16.9-29.9) per 1000 person-years in the shortest length group. The association equally applied to men and women and emerged as robust under a variety of circumstances. Furthermore, short telomere length was associated with cancer mortality (multivariable HR per 1-SD decrease in log(e)-transformed telomere length, 2.13; 95% CI, 1.58-2.86;  $P < .001$ ) and individual cancer subtypes with a high fatality rate.

**CONCLUSION:** In this study population, there was a statistically significant inverse relationship between telomere length and both cancer incidence and mortality.

PMID: 20606151