Prenatal Famine and Mortality between Age 18-63 Years from Cancers, Cardiovascular Disease and Other Causes

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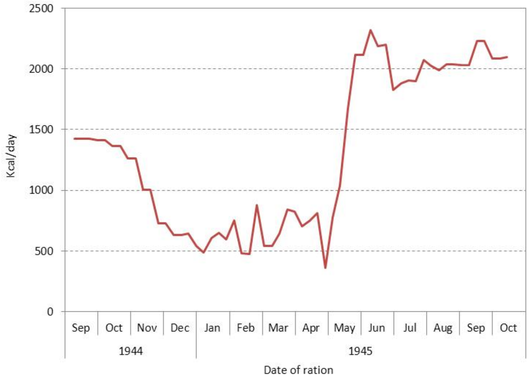
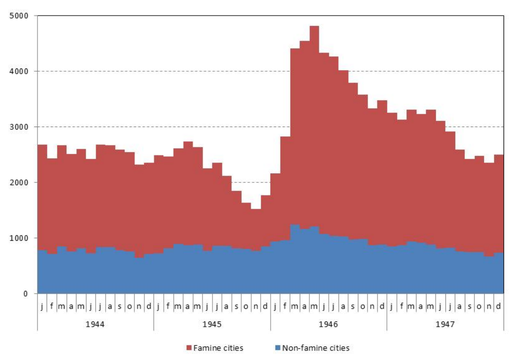
BACKGROUND and STUDY QUESTION

Several studies have examined long term health effects of famine exposure during pregnancy. Little is known however about possible effects on adult survival. We here provide preliminary results on mortality through age 63 years by cause of death in a national birth cohort of men examined for military service at age 18. Outcomes are presented for men who were born during the Dutch famine of 1944-1945, time controls born before or after the famine in the same cities and place controls born in areas not affected by the famine.

Average Daily Rations, 1944-1945 (kcal/day)



Men examined for military service at age 18 by date of birth and region



METHODS

Study population

We selected all individuals with potential prenatal exposure to the Dutch famine of 1944-1945 from the national birth cohorts 1944-1947 of men examined at age 18 for military service in the Netherlands (n=408,015). Selection was based on place and date of birth. The study includes 25,283 men born around the time of the Dutch famine of 1944-1945 in six affected cities in the Western Netherlands (Amsterdam, Haarlem, Rotterdam, the Hague, Leiden, and Utrecht), 10,667 time controls born before or after the famine in the same cities and 9,087 place controls born in areas not affected by the famine.

Timing of exposure

Famine exposure was defined based on date of birth in relation to distributed food rations of less <900 kcal/day during specific time windows of interest. Accordingly, births between November 1944 and March 1945 were defined as famine exposed in the immediate post-natal period, between February and May 1945 in the third trimester of pregnancy, between April and August 1945 in the second trimester, between July and December 1945 in the first trimester, and between November 1945 and March 1946 around the estimated date of conception.

Follow-up

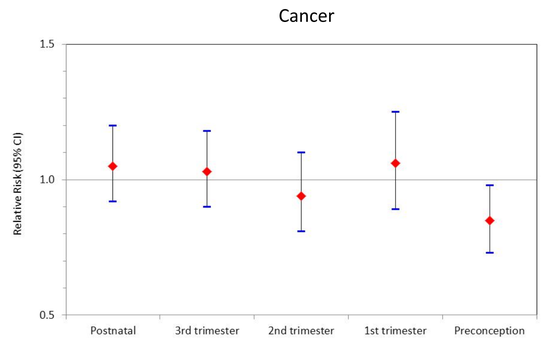
Under approved confidentiality procedures all men were traced through the national population and death record systems to establish vital status and cause of death at age 63.

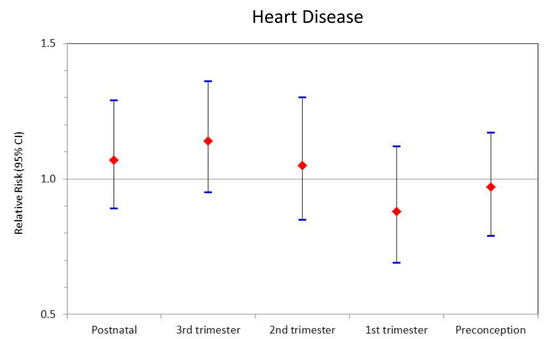
Statistical analysis

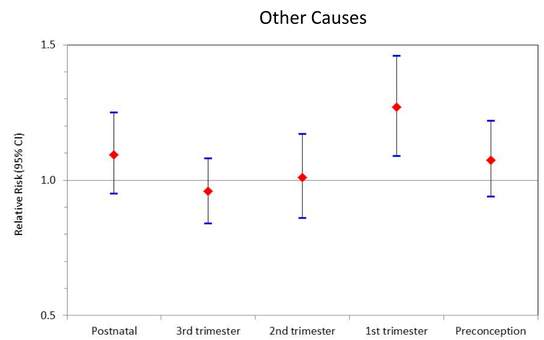
Cox proportional hazards models with competing risks were used to estimate adjusted hazard ratio's (HR) and 95% confidence intervals (CIs) for selected causes of death.

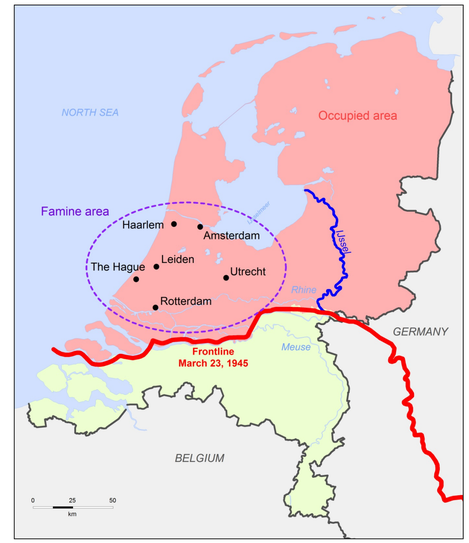
OVERALL RESULTS

Risk of death in selected famine exposure groups compared to unexposed controls by cause of death; hazard ratios (95% confidence intervals) from Cox proportional hazards models with competing risks









Affected Region in Western Netherlands 1944-1945

SUMMARY of RESULTS

During the follow-up, 1,938 deaths were reported from cancers, 1,038 from heart diseases, and 2,032 from other causes. There was no relation between prenatal famine in the three pregnancy trimesters combined and deaths from cancers, heart disease or from other causes. Prenatal famine in early gestation was associated however with an increase in deaths from other causes, both natural external.

DISCUSSION

Further follow-up will be needed with additional deaths as the cohort ages to determine if there is an increased risk for specific causes after famine exposure in some pregnancy trimesters.

CONCLUSIONS

Prenatal famine exposure across pregnancy trimesters was not associated with deaths from cancers or cardiovascular disease in men traced between 18-63 years. Specific patterns among other causes of death are still being explored.

FUNDING

NIH RO1 AG028593 (PI; LHL)

Mailman School of Public Health
Columbia University

NiDi NETHERLANDS INTERDISCIPLINARY DEMOGRAPHIC INSTITUTE

EMORY ROLLINS SCHOOL OF PUBLIC HEALTH