

General Health Checks in Adults for Reducing Morbidity and Mortality From Disease

Clinical Question What are the benefits and harms of general health checks for adult populations?
Bottom Line Compared with usual care, offers of health checks were not associated with lower rates of all-cause mortality, mortality from cardiovascular disease, or mortality from cancer. Health checks may be associated with more diagnoses and more drug treatment. Morbidity was infrequently reported, as were most harms, such as use of diagnostic procedures.

Lasse T. Krogsbøll, MD
 Karsten Juhl Jørgensen, MD, DMSc
 Peter C. Gøtzsche, MD, DMSc, MSc

GENERAL HEALTH CHECKS ARE included in the Affordable Care Act in the United States and are widely used in many other countries. However, the balance between the benefits and harms of general health checks has been unclear, with some studies showing favorable associations with surrogate outcomes such as cardiovascular risk factors^{1,2} or delivery of preventive services,³ but without a clear effect on morbidity or mortality. In addition, if general health checks result in unnecessary testing, treatment, and labeling, they could be harmful. This JAMA Clinical Evidence Synopsis summarizes a Cochrane review⁵ of the evidence from randomized trials of general health checks with clinically meaningful outcomes. Health checks were defined as screen-

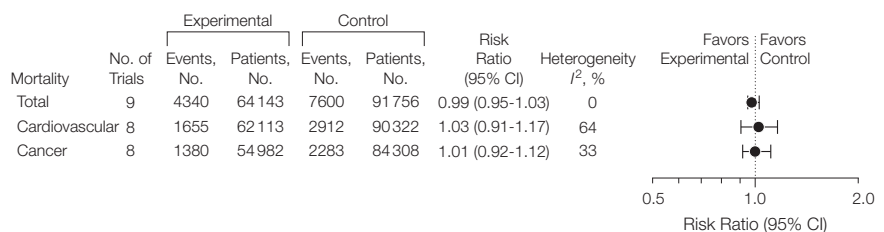
ing for more than 1 disease or risk factor in more than 1 organ system.

SUMMARY OF FINDINGS

We identified 16 eligible randomized trials, of which 14 reported data on 1 or more primary or secondary outcomes (182 880 participants). Median participation was 82% (range, 50%-90%). Nine trials (155 899 participants and 11 940 deaths) reported on total mortality with a median follow-up of 9 years. In the pooled analysis, the risk ratio (RR) was 0.99 (95% CI, 0.95-1.03), with no statistical heterogeneity ($I^2=0\%$) (FIGURE). Eight trials reported on cardiovascular mortality (RR, 1.03 [95% CI, 0.91-1.17]) with substantial heterogeneity ($I^2=64\%$), and 8 trials reported on cancer mortality (RR, 1.01 (95% CI, 0.92-1.12) with moderate heterogeneity ($I^2=33\%$).

Few studies assessed morbidity. Two trials reported on fatal and nonfatal coronary heart disease, one of which also reported on fatal and nonfatal stroke, and another trial reported on cancer incidence. There were no statistically significant favorable or harmful associations of general health checks with these outcomes. There was no association with hospital admission rates, disability, worry, additional physician visits, or absence from work. We found no data on referrals to specialists, the number of follow-up tests, or the number of surgical procedures. One trial (10 674 participants) compared the total number of new diagnoses in a 40% subsample and found 20% more new diagnoses per participant in the intervention group

Figure. Mortality Outcomes for Health Checks vs Usual Care



Author Affiliations: Nordic Cochrane Centre, Rigshospitalet, Copenhagen, Denmark.
Corresponding Author: Lasse T. Krogsbøll, MD, Nordic Cochrane Centre, Rigshospitalet Department 7811, Blegdamsvej 9, 2100 København Ø, Denmark (ltk@cochrane.dk).
JAMA Clinical Evidence Synopsis Section Editor: Mary McGrae McDermott, MD, Contributing Editor. We encourage authors to submit papers for consideration as a JAMA Clinical Evidence Synopsis. Please contact Dr McDermott at mdm608@northwestern.edu.

Based on data from Krogsbøll LT, Jørgensen KJ, Grønhoj Larsen C, et al. General health checks in adults for reducing morbidity and mortality from disease. *Cochrane Database Syst Rev.* 2012;10:CD009009.⁵

Evidence Profile

No. of trials: 14 (plus 2 without primary outcome data)

Study years: 1963-1999 (trial start) to 1970-2009 (end of follow-up)

Median follow-up: for total mortality, 9 years (range, 4-22); cardiovascular mortality, 10.4 years (range, 4-22); cancer mortality, 10.4 years (range, 4-22)

No. of participants: 182 880 (155 899 in trials reporting on mortality)

Men/Women: 5 trials only enrolled men; in the remaining trials, the proportion of men ranged from 41% to 58% (unclear in 2 trials)

Race/ethnicity: Unavailable

Settings: General population, primary care, workplace

Countries: Belgium, Denmark, Italy, Poland, Sweden, United Kingdom, United States

Comparison: Invitation to 1 or more health checks vs usual care

Primary outcomes: All-cause mortality, cardiovascular mortality, cancer-related mortality

Secondary outcomes: Morbidity (eg, myocardial infarction), new diagnoses (total and condition-specific), hospital admissions, disability (preferably patient-reported), patient worry, self-reported health, referrals to specialists, unscheduled visits to general practitioners, additional diagnostic procedures due to positive screening results, new medications prescribed, frequency and type of surgery, absence from work

after 6 years. Two of 4 trials found increased use of drugs for hypertension in the intervention group, and 2 of 4 trials found improved self-reported health in the intervention group, but these results were at risk of reporting bias.

DISCUSSION

In 14 trials involving 182 880 participants, general health checks were not associated with lower rates of mortality or morbidity. However, general health checks may increase the number of diagnoses and the use of medications.

Limitations

Most trials were old, and there have been changes in thresholds for risk factor treatment, risk assessment

methods, and available preventive drugs. One recently conducted large trial (Inter99⁴) will inform about the association of general health checks with morbidity and mortality. Trials differed in the type of tests and counseling used, although nearly all trials assessed standard cardiovascular risk factors (blood pressure, serum cholesterol, and weight). There were also differences in the number of health checks offered and in the risk of bias in the included trials. We excluded trials that only enrolled people older than 65 years.

Comparison of Findings With Current Practice Guidelines

The US Preventive Services Task Force recommends several preventive mea-

asures but does not specifically advocate routine check-ups. Our results suggest that health checks may not be associated with reduced mortality or morbidity.

Areas in Need of Future Study

Harmful effects of some tests and subsequent treatment could have balanced out possible beneficial effects of others. Future research should focus on individual components of health checks, rather than bundled tests and counseling services

Conflict of Interest Disclosures: The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr Krogsbøll reported that his institution has received a grant from the nonprofit foundation Trygfonden. No other disclosures were reported.

Additional Contributions: Christian Grønhoj Larsen was a coauthor on the Cochrane review. The search strategy was developed with the Cochrane Effective Practice and Organization of Care group trials search coordinator Michelle Fiander, who also conducted the searches.

REFERENCES

1. Family Heart Study Group. Randomised controlled trial evaluating cardiovascular screening and intervention in general practice: principal results of British Family Heart Study. *BMJ*. 1994;308(6924):313-320.
2. Imperial Cancer Research Fund OXCHECK Study Group. Effectiveness of health checks conducted by nurses in primary care: final results of the OXCHECK study. *BMJ*. 1995;310(6987):1099-1104.
3. Boulware LE, Marinopoulos S, Phillips KA, et al. Systematic review: the value of the periodic health evaluation. *Ann Intern Med*. 2007;146(4):289-300.
4. Jørgensen T, Borch-Johnsen K, Thomsen TF, Ibsen H, Glümer C, Pisinger C. A randomized non-pharmacological intervention study for prevention of ischaemic heart disease: baseline results Inter99. *Eur J Cardiovasc Prev Rehabil*. 2003;10(5):377-386.
5. Krogsbøll LT, Jørgensen KJ, Grønhoj Larsen C, Gøtzsche PC. General health checks in adults for reducing morbidity and mortality from disease. *Cochrane Database Syst Rev*. 2012;10:CD009009.