Mortality impact, risks, and benefits of general population screening for ovarian cancer: the UKCTOCS randomised controlled trial

Usha Menon,[1*] Aleksandra Gentry-Maharaj,[1] Matthew Burnell,[1] Andy Ryan,[1] Jatinderpal K Kalsi,[2,3] Naveena Singh,[4] Anne Dawnay,[5] Lesley Fallowfield,[6] Alistair J McGuire,[7] Stuart Campbell,[8] Steven J Skates,[9] Mahesh Parmar[1] and Ian J Jacobs[10] on behalf of the UKCTOCS team

[1]MRC Clinical Trials Unit, Institute of Clinical Trials and Methodology, University College London, London, UK
[2]Department of Women's Cancer, Institute for Women's Health, University College London, London, UK
[3]CRUK UCL Centre, UCL Cancer Institute, London, UK
[4]Department of Cellular Pathology, Barts Health NHS Trust, London, UK
[5]Department of Clinical Biochemistry, Barts Health NHS Service Trust, London, UK
[6]Sussex Health Outcomes Research and Education in Cancer (SHORE-C), Brighton and Sussex Medical School, University of Sussex, Brighton, UK
[7]London School of Economics and Political Science, London, UK
[8]Create Health, London, UK
[9]Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA
[10]Department of Women's Health, University of New South Wales, Sydney, NSW, Australia

[*]Corresponding author u.menon@ucl.ac.uk

Published April 2023
DOI: 10.3310/BHBR5832

Plain language summary

Mortality impact, risks, and benefits of general population screening for ovarian cancer: the UKCTOCS randomised controlled trial

Health Technology Assessment 2023
DOI: 10.3310/BHBR5832

NIHR Journals Library www.journalslibrary.nihr.ac.uk

Plain language summary

What was the question?

Most women with ovarian cancer are diagnosed after the disease has spread widely (advanced stage – III and IV) and more than half die within 5 years. We wanted to find out if testing women without symptoms could pick up ovarian cancer at an earlier stage before it has spread beyond the ovaries and tubes and reduce deaths. We also wanted to assess the risks and benefits of such screening.

What did we do?

We invited over 1.2 million women living near 13 centres in England, Wales and Northern Ireland. Of them, 202,638 joined the trial. All women were between 50 and 74 and were no longer having periods. They had never been diagnosed with ovarian cancer or were not having treatment for any other cancer. They did not have many relatives with ovarian or breast cancer.

The volunteers were placed into one of three groups at random:

1. The blood test group contained 50,640 women who had yearly CA125 blood tests. If these showed a moderate or high chance of ovarian cancer, they had repeat CA125 tests and a scan.
2. The scan group contained 50,639 women who had yearly internal scans of their ovaries and tubes which were repeated if they showed an abnormality.
3. The no-screening group contained 101,359 women.

Those in the blood and scan groups had screening every year until December 2011.

We sent all women health questionnaires and also, with their permission, received information about them from the national cancer and death registries till mid-2020.

What did we find?

Women in the screened groups had an average of eight years of screening.

We followed them for approximately 16 years after they had joined the trial.

During this period, 2055 women were diagnosed with ovarian and tubal cancer. It was about 1 in 100 women (1%) in all three groups:

- 522 of 50,625 in the blood group
- 517 of 50,623 in the scan group
- 1016 of 101,314 in the no-screening group

More women were diagnosed with early-stage cancer and fewer were diagnosed with advanced cancer in the blood group compared to the no-screening group. There was no difference in the number diagnosed with early or advanced disease between the scan and no-screening group.

Despite this difference, the number of women in each group who died from ovarian and tubal cancer was similar in all three groups: 296 of 50,625 (0.6%) in the blood group, 291 of 50,623 (0.6%) in the scan group and 619 of 101,314 (0.6%) in the no-screening group.

Other results showed:

- Overall, 81% women in the blood group and 78% in the scan group attended all of their annual screening appointments.
- In the blood group, screening detected 84% of ovarian and tubal cancers diagnosed within one year of the test and correctly classified as normal 99.8% of women who did not have ovarian and tubal cancer.
- In the scan group, screening detected 72% of ovarian and tubal cancers diagnosed within one year of the last test and correctly classified 99.5% of those who did not have ovarian and tubal cancer.
- Both screening tests were associated with minor complications.
- While screening did not increase anxiety, there was slightly increased worry in women who were asked to return for more intense repeat testing.
- Both screening methods picked up changes that were in fact not ovarian cancer. This meant that women had unnecessary surgery together with the worry and risk of complications that go with it.
    - In the blood group 14 women had unnecessary surgery for every 10,000 women screened annually. This means that for each woman found to have ovarian cancer, an additional 2 women had unnecessary surgery.
    - In the scan group 50 women had unnecessary surgery for every 10,000 women screened annually. This means that for each woman found to have ovarian cancer, an additional 10 women had unnecessary surgery.
- A biobank with all the donated data and over 0.5 million serum samples, including yearly samples from women in the blood group, was built and continues to be used in many new studies, mainly focused on early detection of cancer.

What does this mean?

Screening using the CA125 blood test or transvaginal ultrasound scan to test for ovarian cancer did not save lives. Additionally, it was associated with some harm. Therefore, an ovarian cancer screening programme for most women cannot be currently recommended.

The trial also showed for the first time that ovarian cancer can be detected earlier through screening. However, for screening to save lives, the test needs to pick up many more women earlier in the course of the disease so that available treatments are effective.

The biobank provides an opportunity for scientists to see if newer tests for cancer can detect the disease earlier.