Identifying Women at High Risk of Ovarian Cancer Via Routine Lab Tests

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Goal

Early identification of ovarian cancer

Background

- 5% of cancer deaths among women
- Most dx at advanced stages; Survival is 47%
- Early stage survival is 92%
- No reliable method for early detection

Preliminary Studies

Women with ovarian cancer have significantly higher serum calcium and lower serum albumin than women with benign ovarian tumors [1].

This is likely a paraneoplastic effect of the cancer.

We found higher serum calcium 15-20 years prior to ovarian cancer dx, suggesting that these changes begin long before cancer is detected [2,3].

Fig.1. Albumin-adjusted serum calcium levels are significantly higher among women with malignant tumors regardless of cancer histology. Data from Kelly [1].
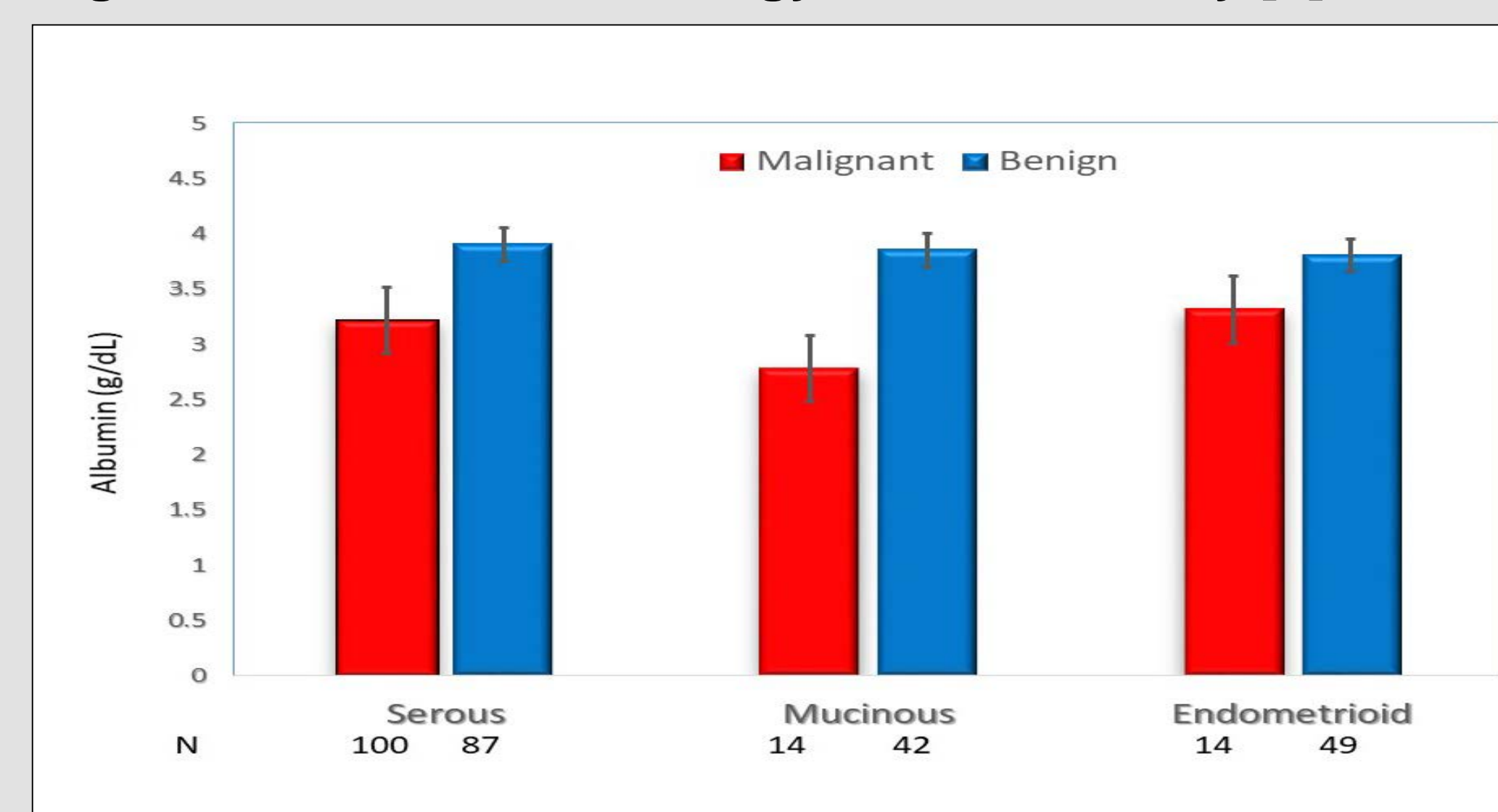

Fig 2. Serum albumin levels are significantly lower among women with malignant tumors, regardless of histology [1].

Fig. 3. Albumin-adjusted calcium levels increase significantly with tumor stage [1].
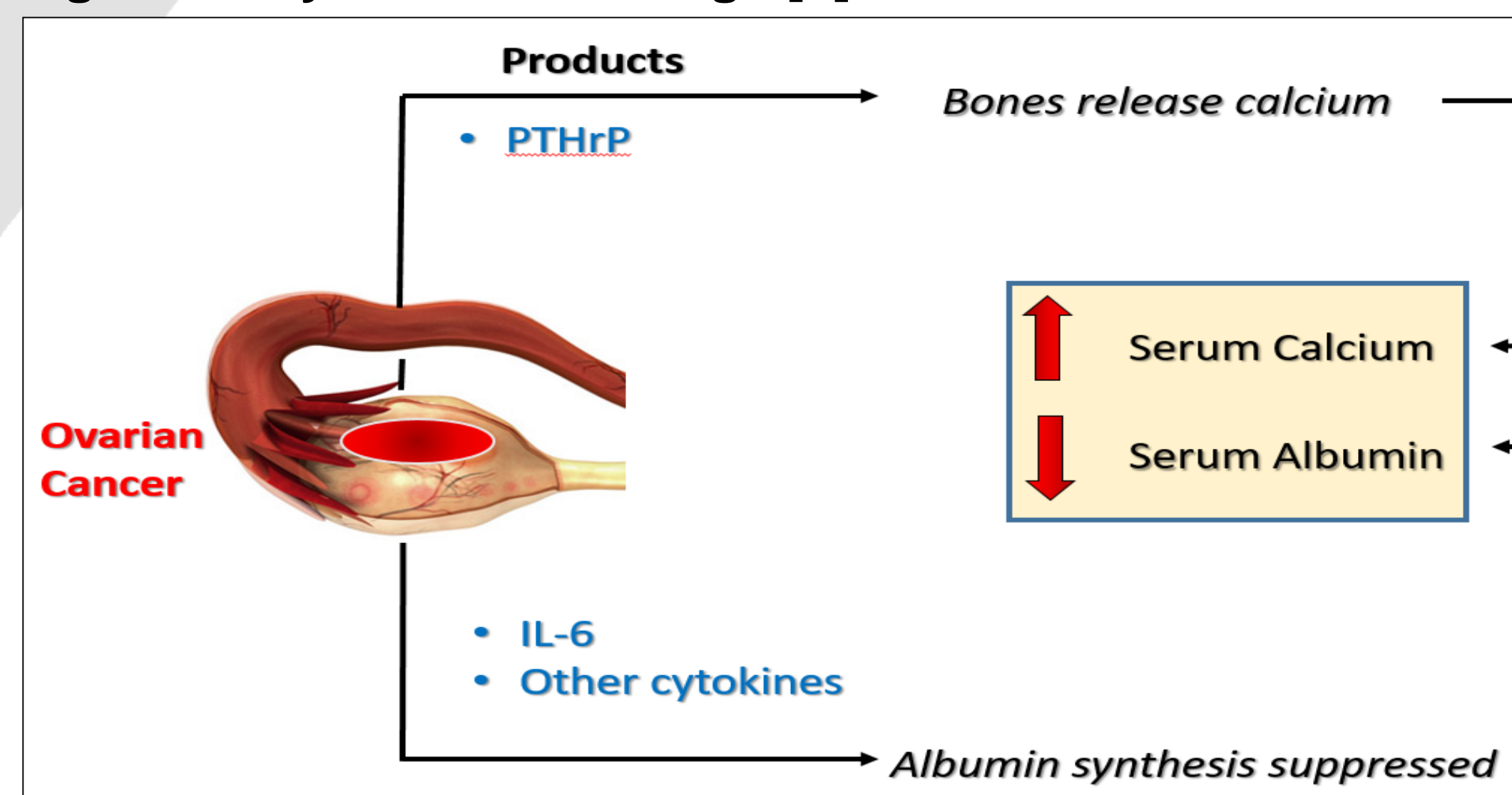

Fig.4. Mechanistic model. Malignant ovarian tumors are associated with increased serum calcium and decreased serum albumin. This likely results from the production of hormones (PTHrP) and cytokines (IL-6) by malignant ovarian cells.

Specific Aims

Test the hypotheses that: 1. Compared to women without a diagnosis of ovarian cancer, in the months prior to diagnosis, women with ovarian cancer will show a significant increase in their albumin-adjusted serum calcium and a decrease in their serum albumin;

2. Alkaline phosphatase levels also may aid in cancer detection. This enzyme is increased in sera from women with ovarian cancer.

Values for these tests are recorded In the Comprehensive Metabolic Panels (CMPs).
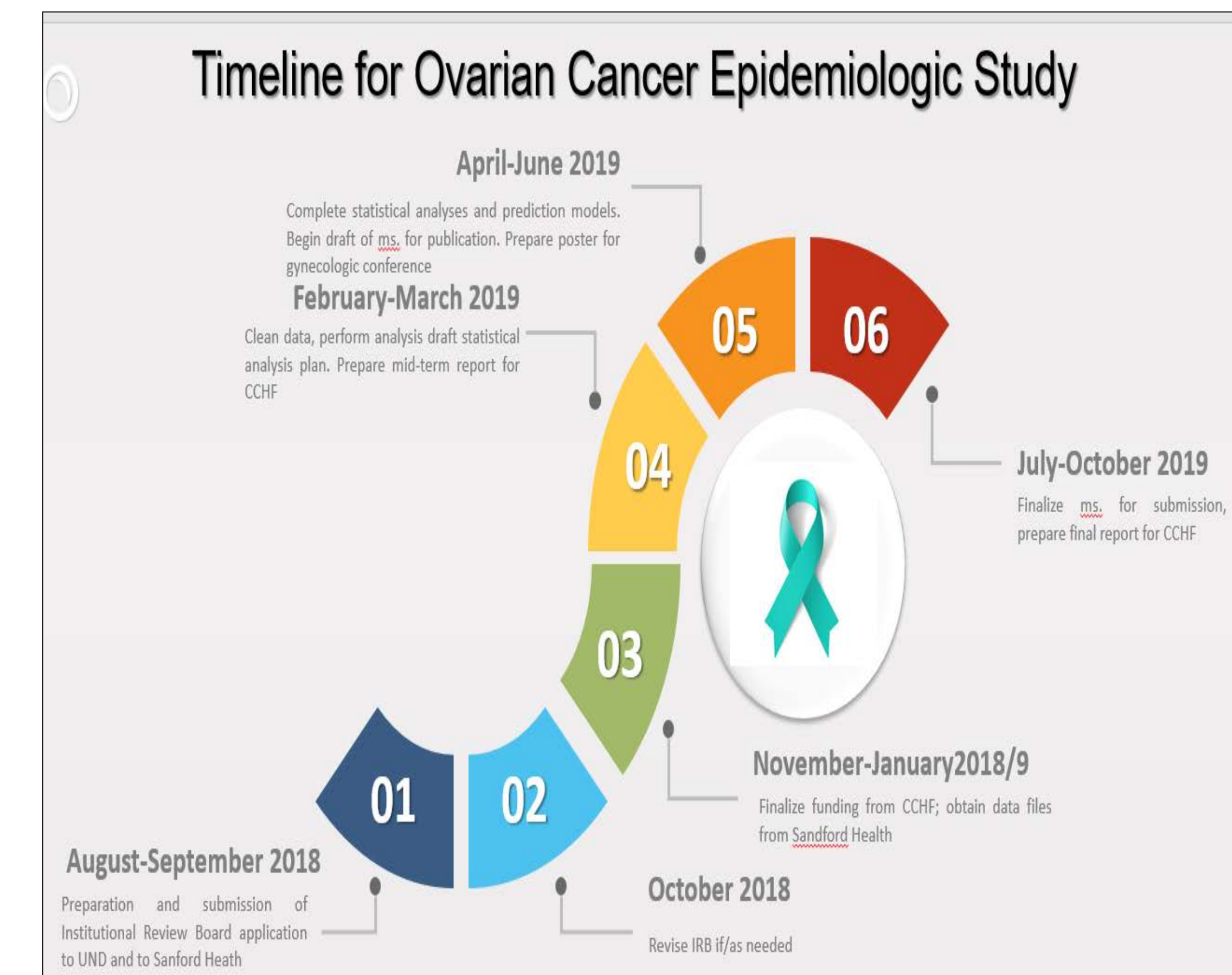
Approach

Population-based case-control study. Cases are women with epithelial ovarian cancer. Controls are women without cancer seen for an annual "well woman" exam at the same facility.

Exclusions are a history of thyroid or parathyroid disease, history of cancer, and medications that influence serum calcium. **The data will be obtained from patients' CMPs.**

We confirmed the availability of multiple CMPs for > 126 pathology-verified cases diagnosed at Sanford Health, the largest rural, not-for-profit health care system in the nation.

Deliverables

Progress/Next Steps

- IRB applications submitted to UND and to Sanford Health

- Grants submitted to Covarys Health Foundation and Dept. of Defense

References

[1] Kelly MG, et al. Cancer Epidemiol Biomark Preven 2016; 10:1593-1598.

[2] Schwartz GG, Skinner HG. Gynecol Oncol 2013;129:169-172.

[3] Schwartz GG, et al. Cancer Epidemiol 2017;49:235-240.

Acknowledgments