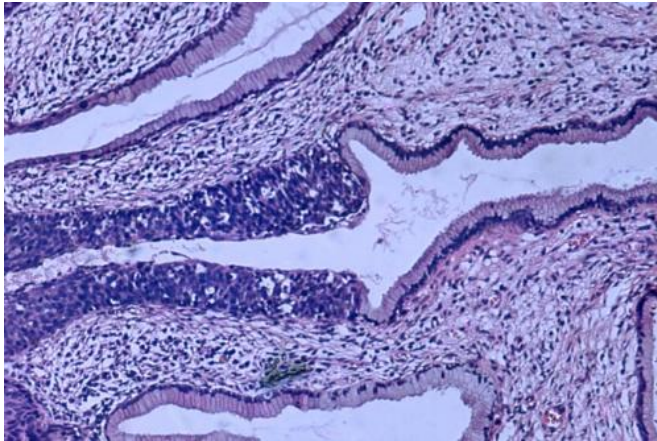


# Women with cervical cancer may have increased risk of injury during diagnostic workup

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High grade dysplasia (carcinoma in situ) in the uterine cervix. The abnormal epithelium is extending into a mucus gland to the left of centre. This disease can progress to invasive cancer (squamous cell carcinoma) of the cervix. Credit: Haymanj/public domain

Among women participating in cervical cancer screening in Sweden, those with a diagnosis of invasive cervical cancer had an increased risk of iatrogenic injuries (as a consequence of medical intervention) and non-iatrogenic injuries (caused by accidents and self-harm) requiring hospitalization, according to results published in *Cancer Epidemiology, Biomarkers & Prevention*, a journal of the American Association for Cancer Research.

"Cervical [cancer](#) screening is one of the most successful cancer prevention programs which has greatly reduced cervical cancer incidence and mortality," said Qing Shen, Ph.D., corresponding author of the study and researcher in the Department of Medical Epidemiology and Biostatistics at the Karolinska Institutet in Stockholm. "Despite these substantial benefits, our research indicates that women with [invasive](#)

[cervical cancer](#) experienced medical complications and [psychological stress](#) during their diagnostic workup, although at a very low level."

Previous work conducted by Shen and colleagues demonstrated an increased risk of injuries during the [time period](#) before and after a diagnosis of any cancer. "These injuries were likely a result of invasive procedures and the severe psychological distress experienced during the clinical evaluation of a potential cancer," Shen explained. Whether there is a similar increase in risk among patients screened for cervical cancer, when an organized cancer screening program was largely accessible, was unknown, she added.

Using data from the Swedish Total Population Register, the researchers identified over 3 million women who participated in [cervical cancer screening](#) during 2001-2012. Cross-linkage with multiple Swedish registries allowed for the identification of women within this cohort who received a diagnosis of invasive cervical cancer, cervical cancer precursor lesions, or had a normal smear during follow-up. The final cohort included roughly 1.85 million women with a normal smear, roughly 22,000 women with cervical intraepithelial neoplasia (CIN) grade 1, roughly 21,000 women with CIN2, roughly 37,000 with CIN3/adenocarcinoma in situ (AIS), and roughly 5,000 women with invasive cervical cancer.

The researchers examined the incidence of injuries during the diagnostic workup of patients who participated in cervical cancer screening. Among women with precursor lesions or cervical cancer, the diagnostic workup was defined as the time interval between the first Pap smear or punch biopsy until surgical treatment, or two months after the last smear or punch biopsy, if not treated surgically. Among women with normal smear

results, the diagnostic workup was defined as the two months following the smear.

The researchers calculated incidence rates of both iatrogenic injuries and non-iatrogenic injuries that occurred during the diagnostic workup. Iatrogenic injuries, which were mostly related to receipt of a punch biopsy, and which required at least two days of hospitalization, were included in this analysis. Non-iatrogenic injuries, which included accidents and intentional self-harm, and which required at least one day of hospitalization, were included. Incidence rate ratios for injuries that occurred during the diagnostic workup, which were calculated by comparing women with a diagnosis of cervical cancer or its precursor lesions with women with a normal smear, were adjusted for age, calendar period, screening adherence, education, income, and marital status.

Compared with women with a normal smear, women with a diagnosis of invasive cervical cancer had eight times the incidence of iatrogenic injuries, and women with CIN3/AIS had three times the incidence of iatrogenic injuries. Women with CIN1-2 did not have a significantly increased rate of iatrogenic injuries compared with women with a normal smear.

"Women with invasive cancer can have greater vascularity due to tumor growth, which can lead to hemorrhage and hematoma following a biopsy," Shen explained.

Compared with women with a normal smear, women with a diagnosis of invasive cervical cancer had about twice the incidence of non-iatrogenic injuries. Women with CIN1-2, CIN3, or AIS did not have a significantly increased rate of non-iatrogenic injuries compared with women with a normal smear. The most common type of non-iatrogenic injuries were unintentional falls, Shen said.

"An increase in non-iatrogenic injuries points to high levels of psychological distress in relation to receiving a diagnosis of cervical cancer," said Shen.

"This study for the first time systematically examined the risks of injuries during the cervical

diagnostic workup. Although the chance of having such injuries was rare, we found an increased risk of inpatient care for iatrogenic and non-iatrogenic injuries for women with invasive cervical cancer. It is important to emphasize, however, that cervical cancer screening is greatly beneficial for the early detection of cancer and is largely safe."

Limitations of the study include a lack of information on non-surgical treatments among [women](#) with invasive cervical cancer, such as palliative care, chemotherapy, and radiotherapy, which could have potential implications for injuries. Further, because the authors only included iatrogenic injuries that required at least two days of inpatient care, only the more severe forms of these injuries were captured in this analysis.

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