Eliminating cervical cancer in the COVID-19 era

The COVID-19 pandemic, caused by the SARS-CoV-2 coronavirus, poses a clear and present danger to the health and well-being of populations. Here we discuss its indirect impact on global cancer prevention and control efforts, particularly for cervical cancer. We suggest some comparisons between the COVID-19 pandemic and the human papillomavirus–induced cancer burden, as well as opportunities for translating pandemic-control strategies into effective cancer control.

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In 2015, the United Nations put forth a set of Sustainable Development Goals to achieve by 2030, as a global initiative for the future—including targets for poverty reduction, climate action and health. For example, Sustainable Development Goal target 3.4 aims to reduce the premature mortality from non-communicable diseases, including cancer, by one third. Likewise, a 2020 World Health Assembly Resolution has set ambitious targets for the elimination of cervical cancer as a public-health problem[1]. As the first initiative to eliminate a specific cancer from the globe, this historic resolution calls on the 194 member states of the World Health Organization (WHO) to achieve specific targets by 2030. The '90–70–90' triple-intervention elimination scale-up targets are as follows: 90% of girls fully vaccinated against human papillomavirus (HPV) by age 15; 70% of women screened at least twice in their lifetime with a high-performance test such as HPV testing (at around 35–45 years of age); and 90% of women identified with cervical disease (including pre-cancerous and invasive cervical cancer) given appropriate treatment and care.

The elimination of cervical cancer has been defined as achieving an incidence rate low enough for the disease to be considered controlled as a public-health problem; this threshold has been defined by the WHO as fewer than 4 cases per 100,000 women per year. Globally, widespread coverage of vaccination and quality-assured screening with HPV testing has the potential to avert up to 12.5–13.4 million cases of cervical cancer in the next half-century[2]. In high-income countries, elimination is anticipated in the near or intermediate term—within a decade for Australia[3], and within two to three decades in the USA[4]. For many low- and middle-income countries (LMICs), elimination is a longer-term goal, but the crucial insight is that if countries can successfully scale-up to the WHO's 'triple-intervention' targets by 2030, many women's lives will be immediately saved along the way[5].

The three interventions will have effects over different time frames: whereas vaccination against HPV is the longer-term 'game changer' for prevention, saving lives in the interim decades depends on the effective scale-up of cervical screen-and-treat initiatives, as well as treatment for women with invasive disease, including supportive and palliative care[5]. Critical cancer-treatment services are currently available to less than 30% of women in low-income countries[6]; however, if access could be rapidly expanded to most women, premature mortality from cervical cancer would drop by one third in a mere decade and would thus achieve the Sustainable Development Goal 3.4 for cervical cancer. Over the longer term, if all three pillars of the WHO cervical cancer–elimination strategy are effectively implemented, more than 74 million cases of cervical cancer could be prevented and 62 million women's lives could be saved over the course of the next century—an extraordinary prospect[5].

Beyond its direct effects on mortality, the indirect consequences of the COVID-19 pandemic, particularly on national economies, are predicted to have catastrophic and lasting effects on progress toward all 17 United Nations Sustainable Development Goals. Just as it was gaining momentum, the cervical cancer prevention and control agenda is facing substantial threats due to indirect consequences of the COVID-19 pandemic on health-services delivery. There are several ways in which fallout from the pandemic may derail national and global cancer prevention and control efforts, including disruptions in funding and access to cancer screening programs, as well as delays and logistical challenges to treatment services such as surgery, radiotherapy and systemic therapy[7]. In the context of urgent efforts to control the spread of SARS-CoV-2, it will also be essential to understand the economic and societal impacts and set in motion strategies for maintaining progress toward addressing existing global health concerns.

The classic definition of a pandemic is based on the concept of an infectious disease occurring "worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people"[8]. Although the WHO also considers a pandemic to involve the global spread of a new pathogen, it is time for the world to recognize that for decades, HPV has caused a slow-moving health crisis akin to a pandemic that is hiding in plain sight. Some comparisons between the COVID-19 pandemic and the HPV-induced cancer burden might be useful for appreciating the urgency and importance of carrying out elimination efforts, and opportunities for translating pandemic-control strategies to cancer prevention. Cervical cancer takes the lives of hundreds of thousands of women each year, and deaths are rising, with 342,000 deaths estimated in 2020 (ref. [9]). This annual number of deaths represents about 19% of the 1.8 million COVID-19 deaths in 2020 (ref. [10]), an enormous toll incurred over the past year. Furthermore, for both diseases, the societal burden has been disproportionate: the cervical-cancer crisis has its greatest effects on women living with human immunodeficiency virus (HIV) and women from marginalized populations in countries of all income levels, but particularly in LMICs, where almost 90% of these deaths occur[9].

As is the case for COVID-19, cervical cancer is both preventable and treatable. The data on vaccines against SARS-CoV-2 are now emerging; vaccines against HPV have proven efficacy of >95% in HPV-naive people. Rapid developments in diagnostic testing for SARS-CoV-2 has proven critical to the success of test-and-trace approaches to COVID-19. Diagnostic tests for HPV have been available for some years, and recent developments include self-collected samples and point-of-care testing modalities, but these advances remain unaffordable and out of reach for the majority of women at greatest risk of death from cervical cancer. Finally, effective treatments are emerging

for symptomatic patients with COVID-19, with early data suggesting reductions in the case-fatality rate in some settings[11]. Highly effective treatments for women with invasive cervical cancer have existed for decades, including surgery, radiotherapy and chemotherapy, but access to these can be profoundly inequitable. Radiotherapy, for example, is entirely unavailable in over 80% of low-income countries and over half of lower-middle-income countries[6], including several countries in sub-Saharan Africa, the region with the highest age-standardized mortality rates[9]. This is a tragedy, when the net overall 5-year survival for cervical cancer is greater than 60–70% for women who are receiving appropriate treatment[12].

The COVID-19 pandemic has severely affected routine HPV-vaccination programs, with major decreases in the daily average total number of vaccinations reported during national lockdowns—a delay already felt in the initiative to eliminate cervical cancer[13]. Success in re-establishing HPV-vaccination programs has been variable, as both high-income countries and lower-income countries continue to grapple with controlling COVID-19 and returning to a state of normalcy[14,15]. Channeling of resources to prioritize vaccination against COVID-19 may come with the tradeoff of derailing the planned introduction of vaccines against HPV in LMICs with underfunded cancer-control programs. There is also concern that vaccine hesitancy in the rapid rollout of the vaccines against COVID-19 might also affect the uptake of vaccines against HPV now and in the future. Established cervical screening programs have also experienced pauses and/or reduced participation, along with supply disruptions that have affected the ability to scale-up testing for HPV (since the same reagents and systems may be needed for COVID-19 testing), and there are major consequences of health-services disruptions for cancer-treatment services.

As has been seen with the rapid scientific and technological response to the COVID-19 pandemic, innovation will be critical for mitigating the impact of its ripple effects on the triple-intervention elimination targets. An extended research-and-development pipeline is needed to generate effective and affordable options for prophylactic vaccines, for self-collected and point-of-care HPV-detection tests, and for more-affordable and more-accessible triaging and diagnostic tests for readily identifying those at highest risk of having pre-cancerous lesions, as well as safe, effective and affordable options for treating women with cervical pre-cancers and invasive cervical cancer. While dozens of companies and academic institutions were in the race to develop rapid at-home tests for and vaccines against SARS-CoV-2 within 6 months of declaration of the COVID-19 pandemic, a decade has passed since HPV testing was established as the most effective screening tool, yet only a handful of broadly regulatory body–approved HPV-detection technologies are available. An effective global partnership of public, private and civil-society organizations is needed now that will transcend political boundaries to accelerate the scale-up of HPV-vaccination programs, the development and global implementation of an HPV-detection test that is as simple, quick and affordable as a pregnancy test, and capacity building for the treatment of invasive cervical cancer.

The global response to the COVID pandemic catalyzed remarkable innovations and adaptations at the health-system level that can be applied to ramp-up capacities, improve access and disseminate information in the context of HPV vaccination and cervical-cancer screening. The COVID-19 and Cancer Global Modelling Consortium is bringing together public-health and modeling experts to evaluate emerging strategies to support decision-making in cancer control, and to ensure recovery of the implementation efforts toward the 2030 targets for the elimination of cervical cancer. Technical innovations always have the risk of increasing inequities due to their limited access among marginalized populations. Despite the emergence of COVAX, an initiative that includes Gavi, the Vaccine Alliance, the WHO and the Coalition for Epidemic Preparedness Innovations, considerable challenges remain for LMICs in mobilizing adequate funds to achieve adequate population coverage for emerging prevention and control interventions for COVID-19. Likewise, innovations for accelerating the elimination of cervical cancer must reach those most in need with great urgency. Immediate, coordinated action is needed to bring together global partners into collaboration with private-sector manufacturers of vaccines, diagnostics and cancer treatments. This is critical for facilitating effective intervention to prevent nearly 350,000 cervical-cancer deaths in 2021 and in the future. ❐

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Competing interests

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