REVOLUTIONISING CANCER PREVENTION WITH VACCINES

Photo: GAVI/2012 Youngblood

Infectious causes of cancer

The identification of clear links between infections and human cancers is a recent advancement in our understanding of the underlying causes of certain cancers, and opens new opportunities for preventing their occurrence.

Latest data shows that worldwide 16% of all cancer cases are caused by infections. The four main cancer-causing infectious agents are hepatitis B and C viruses, human papillomavirus and Helicobacter pylori which together are responsible for 1.9 million cases of cancer every year, mainly liver, cervix uteri and gastric cancers.

The proportion of cancers related to infections is far higher in less developed countries than in developed countries. In Sub-Saharan Africa, one in three cancer cases are attributable to infectious agents, compared to one in 35 cases in the United States and Australia.

Currently, two safe and effective vaccines can prevent infection-related cancers: liver cancer with the hepatitis B vaccine, and cervical cancer with the human papillomavirus vaccine.

GAVI Alliance accelerates hepatitis B vaccine introduction in developing countries

In 1992, WHO recommended global immunization against hepatitis B infection but uptake of the vaccine was slow in poorer countries due to the high price of the vaccine. GAVI Alliance's support for hepatitis B vaccines began in 2000, the year that GAVI was launched. It spurred a spectacular acceleration of the vaccine's introduction in low-income countries. By 2004, half of the world's poorest countries had introduced hepatitis B vaccines. Today, almost all low-income countries have introduced hepatitis B vaccines into routine immunisation programmes.

Today, most GAVI-supported countries provide pentavalent vaccine, a 5-in-1 shot vaccine that combines protection against hepatitis B with diphtheria, tetanus, pertussis and Haemophilus influenzae type b (Hib). The combination vaccine makes it easier to deliver and thus accelerate widespread protection. GAVI support has encouraged new manufacturers to enter the market, helping to stimulate healthy competition and lower prices. The price of pentavalent vaccine has dropped by 30% from US$ 3.61 per dose in 2007 to US$ 2.49 per dose in 2011.

"We have two really good vaccines which can knock off about 10% of global cancers. But we also need vaccines against other viruses and bacteria that cause cancer. Vaccines can potentially get rid of about 20% of the global cancer burden."

Prof. Ian Frazer, HPV vaccine creator

hepatitis b vaccine provides effective **long-term cancer prevention**

Hepatitis B virus infection in infancy and childhood increases the risk of developing cancer later in life. In highly endemic areas, the most common routes of transmission are mother to newborn (perinatal transmission) or infection in early childhood. Where there are high rates of hepatitis B infection, vaccination of newborns has not only reduced the risk of infection, but has also led to a marked reduction in the number of chronic carrier rates.

GAVI ALLIANCE

uicc global cancer control

UICC – a founding member of the NCD Alliance – to push for international action to combat the global epidemic of non-communicable diseases including Cancer

Fast-rising immunisation with hepatitis B vaccine

By 2011, countries had immunised an additional 296 million children against hepatitis B with GAVI support. As a result, an estimated 3.7 million future deaths from liver cancer and other hepatitis B-related illnesses have been prevented. GAVI will accelerate this effort and plans to support the immunisation of a further 230 million children with pentavalent vaccines by 2015.

HPV vaccines: the front line in tackling cervical cancer

Cervical cancer is the leading cause of cancer death among women in sub-Saharan Africa. In Latin America and Asia, more women die from cervical cancer than from childbirth. Without changes in prevention and control, the number of cervical cancer deaths each year is expected to rise from 275,000 in 2008 to 433,000 by 2030, with almost all of this increase occurring in developing countries.

Virtually all cervical cancers are caused by human papillomavirus (HPV). HPV is highly transmissible through sexual contact and most sexually active men and women are infected at some time in their lives. Vaccination against HPV is preventative and therefore only effective before a person is infected. Immunising girls before they become sexually active, that is before her first potential exposure to HPV, is a key strategy to prevent cervical cancer.

immunisation **coupled with screening and treatment** is the best strategy

The currently available HPV vaccines can prevent about 70% of cervical cancer cases and are expected to significantly reduce the incidence of and mortality due to cervical cancer. However, they do not protect against all cancer-causing types of HPV. Cervical cancer can be easily treated if pre-cancerous lesions are detected and treated early. Routine screening and treatment has dramatically reduced cervical cancer morbidity and mortality in wealthier nations and innovative "screen and treat" approaches for lower income settings have been shown to be effective. Coupling the vaccination of girls with screening and treatment of women will be the most effective strategy to reduce rapidly the cervical cancer burden.

Prevention is critical to tackling the cancer burden. For developing countries, both vaccines and screening for pre-cancerous cervical lesions, provide technological solutions to help win that fight.

The World Health Organization recommends HPV vaccination of girls aged 9-13 years through national immunisation programmes in countries where:

- cervical cancer constitutes a public health priority
- where vaccine introduction is feasible
- sustainable financing can be secured
- vaccines are considered cost-effective

The Global Alliance for Vaccines and Immunisation (GAVI) is a global public-private partnership that brings together developing country and donor governments, WHO, UNICEF, the World Bank, the vaccine industry, research and technical agencies, civil society organisations, the Bill & Melinda Gates Foundation and other private philanthropists. GAVI's mission is to save children's lives and protect people's health by increasing access to immunisation in the world's poorest countries.

GAVI support to the HPV vaccine roll-out

Following the first licensing of two HPV vaccines in 2006, wealthier countries quickly introduced the vaccines into routine immunisation programmes. By the end of 2010, HPV vaccines had been introduced into 37 countries, of which only two were developing countries[1].

GAVI aims to bridge the inequity in accessing HPV vaccines in poorer nations. It has worked with manufacturers to significantly reduce HPV vaccine prices to make them affordable to developing countries.

In 2012, GAVI invited eligible countries to apply for support to introduce HPV vaccines into their routine immunisation programmes. Countries can apply through one of two pathways. Funding proposals for nationwide introduction will need to demonstrate the country's ability to successfully deliver vaccines to 9–13-year-old girls. Countries lacking experience can apply for support for two-year demonstration projects that will allow countries to learn by doing before applying for national introduction. With the first vaccine introductions starting in 2014, HPV vaccines will provide tens of millions of girls with a future free of the threat of cervical cancer.

Promise of new vaccines against cancer

Vaccines offer a giant step forward in the prevention of cancer caused by infectious agents. As research accelerates and technology evolves, new vaccines are on the horizon against other infections associated with cancer like H. pylori, Epstein-Barr and hepatitis C virus, bringing the promise of a quiet revolution in cancer prevention.

1. Rwanda (low-income) and Bhutan (lower middle-income) have introduced nationwide immunisation programmes with donations of the vaccines by end of 2010. In September 2012, Uganda introduced HPV vaccine nationally through donation of vaccines.

Sources: GAVI Alliance website: www.gavialliance.org • de Martel C, Ferlay J, Franceschi S et al. Global burden of cancers attributable to infections, Lancet Oncology, published online May 9, 2012 www.thelancet.com/oncology • Protection against cancer-causing infections http://www.uicc.org/programmes/report-protection-against-cancer-causing-infections • Prevention of Non-Communicable Diseases HBV and Liver Cancer, UICC • Non-communicable diseases: a priority for women's health and development http://www.ncdalliance.org/women • Progress in Cervical Cancer Prevention: The CCA Report Card • www.cervicalcanceraction.org/pubs/CCA_reportcard_low-res.pdf • Cancer fact sheet No 297 Feb, 2012 World Health Organization www.who.int/mediacentre/factsheets/fs297/en/ • Global Immunization Data, May 2012, World Health Organization • Non-communicable diseases: a priority for women's health and development http://www.ncdalliance.org/node/3283

gavialliance.org uicc.org

2 Chemin des Mines
1202 Geneva
Switzerland

Tel. + 41 22 909 65 00
Fax + 41 22 909 65 55

www.gavialliance.org
info@gavialliance.org

UNION FOR INTERNATIONAL CANCER CONTROL
UNION INTERNATIONALE CONTRE LE CANCER

62 route de Frontenex • 1207 Geneva • Switzerland
Tel. +41 (0)22 809 1811 • Fax +41 (0)22 809 1810 • info@uicc.org • uicc.org

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