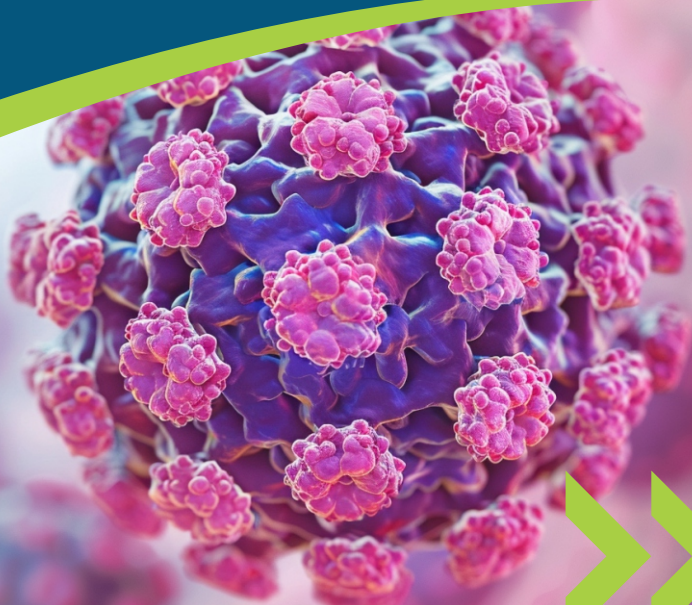




International HPV Awareness Day  
March 4<sup>th</sup>



## HPV as sexually transmitted infection



Human Papilloma Virus (HPV) infection is the **MOST** frequent Sexually Transmitted Infection (STI)

## HPV types responsible for cervical cancer



**2 HPV** types (HPV 16 and 18)  
are responsible for  
**70%**  
of **cervical cancer** cases



342.000 women die of cervical cancer yearly

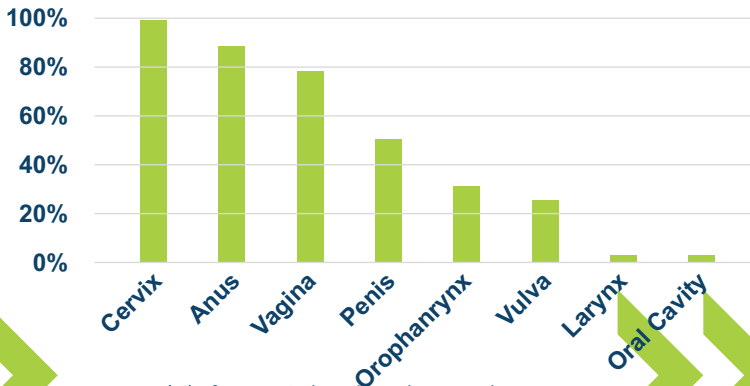
Every  
**90 seconds**  
a woman dies of  
cervical cancer



# HPV-related cancers in women and men

HPV infections can cause cancer in **men** too.

- **570.000** HPV related cancer cases per year in **women**
- **60.000** HPV related cancer cases per year in **men**



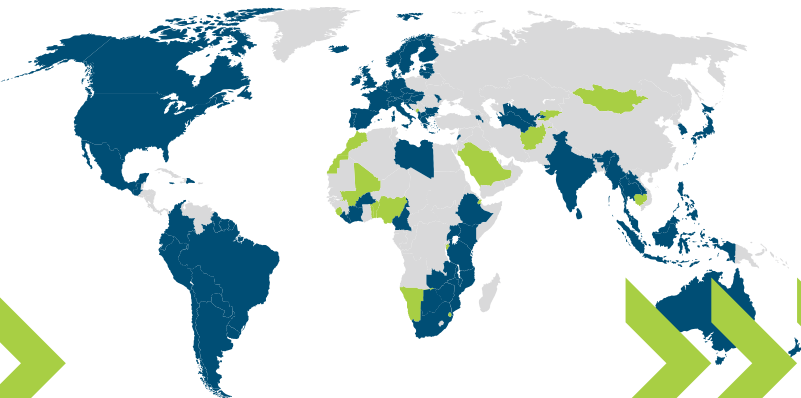
*Frequency (%) of anogenital- and oropharyngeal cancers caused by HPV infection.*

# HPV vaccine uptake

HPV vaccine uptake  
is **unevenly** distributed  
across the world

## Current Vaccine intro status

	Global	Gavi
■ Introduced	120	21
■ Planning	21	10
■ Not Introduced	53	23



*World map for HPV vaccines introduction into national immunization program*

# Prophylactic and Therapeutic vaccines

Prophylactic HPV vaccines work on inducing neutralizing **antibodies**.

Therapeutic HPV vaccines aim at generating **cell-mediated immunity**



# HPV vaccination

HPV Vaccine	BIVALENT	QUADRIVALENT	NONAVALENT	
HPV Types	16	6	6	33
	18	11	11	45
		16	16	52
		18	18	58
			31	

A recent study published in **The Lancet** showed that **no cases of cervical cancer** have been detected in Scotland in anyone who received the **HPV vaccine** when they were 12 or 13 years.

## THE LANCET

[https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045\(24\)00074-3](https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(24)00074-3)

# WHO GLOBAL STRATEGY

**90%**

**Vaccination**



**70%**

**Screening**



**90%**

**Treatment**



## WHO GLOBAL STRATEGY FOR CERVICAL CANCER ELIMINATION

<https://www.who.int/publications/i/item/9789240014107>

# SKIN vaccination

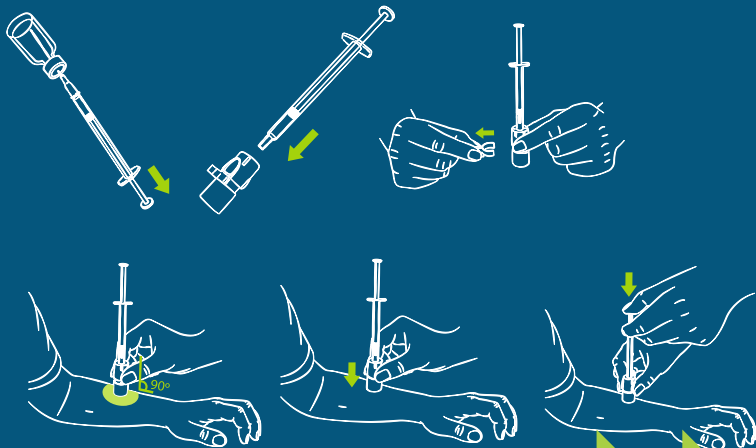
SKIN vaccination at **1/5<sup>th</sup>** of the full dose can resolve **supply constraints**



**VAX-ID** offers a **reliable** solution for an **accurate intradermal vaccination** with a **high ease of use**



# Instructions for Use



**VAX-ID**®

# HPV White Paper

# VAX-ID®

## New insights into the potential of prophylactic and therapeutic intradermal vaccination against Human Papilloma Virus (HPV)

Momen Elzein<sup>1</sup>, Danielle Pastans<sup>1</sup>, Danielle S. Wästerfors<sup>1</sup>, Kim C. Beyers<sup>1</sup>, Vanessa Vanlerikhoven

<sup>1</sup>Antwerp, Belgium | January 2023

### Human Papilloma Virus & Cancer

Human Papilloma Virus (HPV) infection is the most frequent sexually transmitted infection (STI) and the second most common cause of cancer attributable to an infectious agent globally [1].

HPV is not limited to females only, while HPV is well-known to be the key cause of cervical cancer in women, it causes various cancers in men as well [2, 3]. Indeed, HPV is responsible for a substantial fraction of other anogenital and oropharyngeal cancers resulting in 1,700 HPV related cancer cases per year in women and 60,000 cases per year in men (Figure 1&2) [4].

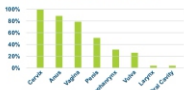


Figure 1. Frequency (%) of anogenital and oropharyngeal cancers caused by HPV infection, adapted from [2].

### Oral and oropharyngeal cancers



Figure 2. World cancer rates accessible in HPV, Adapted from [2].

A call for elimination of cervical cancer was issued by the World Health Organization (WHO) in May 2020, followed by the American Cancer Society in June 2020. In September 2020, the European Cancer Organisation issued the first ever higher by passing a resolution for the elimination of all HPV-associated cancers [1].

### HPV virology & epidemiology

The science of virology classifies HPV as a non-enveloped, double-stranded, and a circular DNA virus [5]. The HPV genome encodes six early proteins (E1, 2, 4, 5, 6, 7) and two late proteins (L1 and L2). E1 and E2 proteins are essential for HPV replication, while E4 and E5 are expressed early in the virus life cycle. L1 and L2 viral capsid proteins are necessary for the initial infection of the basal layer of the epithelium [6].

In many HPV-associated lesions that progress into cancers, the HPV viral DNA genome integrates into the host's genome.

This process often leads to the deletion of many early E1, E2, E4, and E5) and late (L1 and L2) genes. The deletion of E2 during integration leads to elevated expression of E6 and E7 who together drive malignant transformation and uncontrolled tumour growth [8].

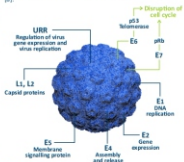


Figure 3. The HPV genome

More than 200 HPV genotypes have been fully characterized and classified into low- and high-risk types according to their carcinogenic potential [8].

HPV genotypes 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58 and 59 are carcinogenic and HPV68 is probably carcinogenic. These types are referred to as high-risk types [8].

HPV 16 and 18 together are responsible globally for 70% of cervical cancer. HPV 16 is detected in about 50% of HPV-related anal, vaginal, vulvar, penile and oropharyngeal cancers [9].

Low-risk group HPV types 6 and 11 cause 90% of external anogenital warts (as well as low-grade changes in cervical cells) [9].

The main route of infection is via vaginal, anal, or oral sexual contact encounters with someone who is infected with HPV; however, any skin-to-skin contact may transmit the virus and cause infection [10].

Indeed, HPV infection is very common but in the majority of cases, the host immune system will clear the infection. 80% of cases clear within 24 months and 90% of cases within 48 months.

VAX-ID®

New insights into the potential of prophylactic and therapeutic intradermal vaccination against Human Papilloma Virus (HPV)

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