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Qdenga (TAK-003) — India Approves Its First Dengue Vaccine

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WHY IN NEWS

India's Central Drugs Standard Control Organisation (CDSCO) approved Takeda's tetravalent dengue vaccine Qdenga (TAK-003) for individuals aged 4–60 years — marking a historic shift from reactive vector control to preventive immunisation against dengue.

UNDERSTANDING DENGUE: THE SCALE OF THE PROBLEM

Dengue fever, caused by the dengue virus (DENV), is transmitted by *Aedes aegypti* mosquitoes. India reports approximately 200,000–300,000 confirmed dengue cases annually, with actual infections estimated at over 30 million due to significant under-reporting.

Four Serotypes — Why Dengue is Uniquely Challenging

SEROTYPE	DISTRIBUTION
DENV-1	Widespread globally
DENV-2	Asia, Americas — most severe
DENV-3	Asia, Americas
DENV-4	Asia, Pacific

The key challenge: infection with one serotype provides lifelong immunity only to that serotype. Subsequent infection with a different serotype can trigger **Antibody-Dependent Enhancement (ADE)** — where existing antibodies paradoxically worsen the second infection, causing Dengue Haemorrhagic Fever or Dengue Shock Syndrome.

QDENGA (TAK-003) — WHAT MAKES IT DIFFERENT

Key Parameters

PARAMETER	QDENGA (TAKEDA)	DENGVAXIA (SANOFI)
Developer	Takeda, Japan	Sanofi Pasteur, France
Type	Live attenuated tetravalent	Live attenuated tetravalent
Prior infection needed	**No**	**Yes**
Age group	4–60 years	9–45 years
Doses	2 doses, 3 months apart	3 doses, 6 months apart
Risk in seronegative	Low	**High** (can worsen disease)

The Dengvaxia Controversy (Why “No Prior Screening” Matters)

Sanofi’s Dengvaxia, approved in several countries including the Philippines, was found to increase the risk of severe dengue in individuals who had **never been infected** (seronegative). The Philippines’ mass vaccination programme in schools led to deaths among seronegative children, resulting in a major public health crisis. This is why Qdenga’s design — effective without requiring prior infection — is a major advancement.

Limitations of Qdenga

- **Lower efficacy against DENV-3 and DENV-4** in seronegative individuals
- **Expected cost:** Rs 3,000–6,000 per dose in India's private sector — limiting broad access
- Not yet included in India's Universal Immunisation Programme (UIP)

INDIA'S DENGUE VACCINE PIPELINE

CANDIDATE	DEVELOPER	STAGE
Qdenga (TAK-003)	Takeda (Japan)	**Approved** ✅
DengiAll	Panacea Biotec + ICMR	Phase III (~2027)
TV003	NIH-derived candidates	Early research

DengiAll is India's homegrown candidate developed in partnership with the Indian Council of Medical Research (ICMR). If successful in Phase III, it could offer a more affordable domestically produced option.

VECTOR CONTROL: INDIA'S EXISTING APPROACH

India's current dengue control strategy relies on:

- **Source reduction:** Eliminating *Aedes* breeding sites (stagnant water)
- **Fogging:** Pyrethroid insecticides during outbreaks
- **Wolbachia mosquitoes:** A bacterium that reduces dengue virus replication in mosquitoes — experimental deployment in some cities
- **Case management:** Supportive care (no specific antiviral exists)

Vaccination is expected to complement, not replace, vector control.

UPSC RELEVANCE

Prelims: Qdenga developer (Takeda), serotypes (4), no prior screening needed, age group (4–60), Dengvaxia controversy, ADE mechanism.

📌 FACTS CORNER

DENGUE VIRUS:

Flaviviridae family; transmitted by *Aedes aegypti* (primary) and *Aedes albopictus*

4 serotypes (DENV-1 to DENV-4); all cause dengue fever

ADE (ANTIBODY-DEPENDENT ENHANCEMENT):

Pre-existing antibodies from first infection enhance uptake of second serotype into macrophages

Leads to higher viral replication → Dengue Haemorrhagic Fever / Dengue Shock Syndrome

QDENGA:

Tetravalent live attenuated vaccine; uses DENV-2 backbone

No pre-vaccination serology screening needed

Approved in EU, UK, Indonesia, Brazil, Argentina, Thailand before India

CDSCO: CENTRAL DRUGS STANDARD CONTROL ORGANISATION; INDIA'S NATIONAL DRUG REGULATORY AUTHORITY UNDER MOHFW

TAKEDA: JAPANESE MULTINATIONAL PHARMA; ACQUIRED THE DENGUE VACCINE CANDIDATE FROM UTMB (UNIVERSITY OF TEXAS MEDICAL BRANCH)

UNIVERSAL IMMUNISATION PROGRAMME (UIP): COVERS 12 VACCINES; QDENGA NOT YET INCLUDED; INCLUSION WOULD REQUIRE NTAGI RECOMMENDATION

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