

HEALTH

1. How is India addressing sickle cell anaemia?

➤ **CONTEXT:** Sickle cell anaemia (SCA), a genetic blood disorder, found mention in the Budget 2023-24. Finance Minister Nirmala Sitharaman said that the government will work in “mission mode” to eliminate the condition by 2047.

- India is the second-worst affected country in terms of predicted births with SCA — i.e. chances of being born with the condition.

➤ **What is sickle cell anaemia?**

- In 1910, a physician named James Herrick wrote of discovering unusual red blood cells in an anaemic student from Granada, Spain. Unusual, because unlike their usual globular structure with an indented center (like a doughnut with a hole) these blood cells were shaped like a sickle, similar to the letter C. This was the first description of sickle cell anaemia in western medical literature.

- Haemoglobin which is tasked with carrying oxygen to all parts of the body has four protein subunits — two alpha and two beta. In some people, mutations in the gene that creates the beta subunits impact the shape of the blood cell and distort it to look like a sickle. A round red blood cell can move easily through blood vessels because of its shape but sickle red blood cells end up slowing and even blocking, the blood flow.

- Moreover, sickle cells die early, resulting in a shortage of red blood cells that deprive the body of oxygen. These obstructions and shortages may cause chronic anaemia, pain, fatigue, acute chest syndrome, stroke, and a host of other serious health complications.

Without treatment, quality of life is compromised and severe cases can become fatal in the initial years of life.

➤ **Does SCA only affect some?**

- In India, first descriptions of SCD came around 1952, when researchers H. Lehmann and Marie Cutbush were studying tribal populations in the Nilgiri hills. The presence of the sickle haemoglobin was also reported around this time in tea garden workers of Upper Assam – labourers who had migrated from tribal groups in Bihar and Odisha. Research and screening programmes have found that the prevalence of haemoglobinopathies (disorders of the blood) is more common among tribal populations than non-tribal communities in India.

- Research has shown that SCA is prevalent in communities residing in areas where malaria is endemic. Around the middle 1940s, doctors found that those with sickle red blood cells were more likely to survive malaria. Those with the trait in some African countries were found to be potentially resistant to lethal forms of malaria and had a survival advantage.

- The sickle cell trait thus gave an evolutionary advantage, offering immunity to some people during malaria epidemics. In India, States and UTs with tribal populations contribute a significant malaria caseload. Additionally, the documented prevalence of SCA is higher in communities that practice endogamy, as the chances of having two parents with sickle cell trait is higher.

➤ **Can it be treated?**

- Sickle cell anaemia is a genetic disorder, making complete “elimination” a challenge that requires a major scientific breakthrough. The only cure comes in the form of gene therapy and stem cell transplants — both costly and still in developmental stages.

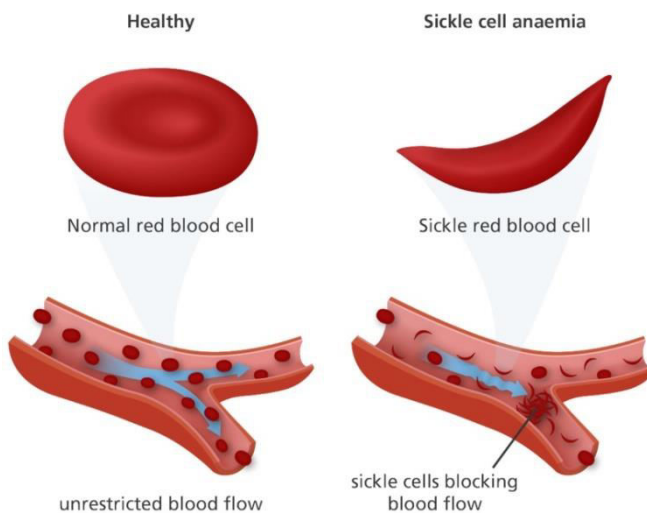
- In gene therapy, the DNA inside the haemoglobin gene is edited to stop the disease while in stem cell transplants, the bone marrow affected by sickle cell anaemia is replaced with healthy bone marrow from a donor. Both interventions are currently being tested in clinical trials globally.

- Blood transfusion, wherein red blood cells are removed from donated blood and given to a patient, is also a trusted treatment in the absence of permanent cures. But challenges include a scarcity of donors, fears around safe supply of blood, risk of infection etc.

➤ **What has India done so far?**

- The Indian Council of Medical Research and the National Rural Health Mission in different States are undertaking outreach programmes for better management and control of the disease.

- The Ministry of Tribal Affairs launched a portal wherein people can register themselves if they have the disease or the trait, in order to collate all information related to SCA among tribal groups.



- The National Health Mission guideline on Hemoglobinopathies also identifies “establishing services at the community level for pre-marital and pre-conception screening backed by genetic counselling services” as a strategy for addressing SCA.
- Genetic counselling involves creating awareness and advising two carriers about the risks of having biological children. In pre-marital counselling, partners are provided with the knowledge of how their sickle genes could affect the newborn baby. They are “free to choose the path which is most comfortable to them the genetic counsellor will not tell the patient what to do” (Chhattisgarh government’s manual on SCA states).
- In the Budget, the government plans to distribute “special cards” across tribal areas to people below the age of 40. “The cards will be divided into different categories based on the screening results.” The mission will receive funding under the National Health Mission.
- According to researchers “The card system will help to know the status of the patient, but at the same time, biggest worry is if it will stigmatise the individual.”
 - ✓ In one field research, a patient expressed concern that she was not getting a marriage alliance because she was a carrier, so her father tried to “hide it”. There is concern among activists that a card only works to brand the individual as a disease carrier, alienates them, and blames the community for the spread

2. Is there a need for an extra dose of polio vaccine?

➤ **CONTEXT: The West Bengal government announced that it was introducing an additional dose of injectable polio vaccine as part of the Universal Immunisation Programme (UIP) for children.**

- The State, considered among high risk areas for polio, announced that this dose will be given at nine months, in addition to the existing doses in the current UIP.
- Additionally, two Polio Immunisation days are observed in the country each year and in some States, there are sub-national immunisation days, involving children under five years of age. An additional dose of inactivated poliovirus (IPV) at nine months will protect against any polio thereafter.

➤ **What is polio?**

- Poliovirus can invade the central nervous system and as it multiplies, destroy the nerve cells that activate muscles, causing irreversible paralysis in hours.
- There are three types of polio virus serotypes: types 1, 2 and 3. According to the India Polio Learning Exchange (along with UNICEF), of those paralysed, 5-10% die when their breathing muscles become immobilised.
- There is no cure for polio, but there are safe, effective vaccines which, given multiple times, protect a child for life. Polio held the world in a bind of fear until Jonas Salk developed the first polio vaccine. Later, Albert Sabin made a ‘live’ polio vaccine that could be administered orally which became the tool of the trade, especially for nations carrying out mass immunisation campaigns, including India.

➤ **How did India achieve its polio-free status?**

- In 2012, the WHO removed India from the list of endemic countries. Seen as a massive achievement in public health, the campaign had begun years ago. While Rotary International launched its polio eradication campaign, Polio Plus, in 1985, it was in 1986 that it provided a \$2.6 million grant to Tamil Nadu for a pilot polio vaccination campaign.
- In 1995, the Union government announced the first National Polio Immunisation Day. As per the India Polio Learning Exchange portal, the last case of poliovirus type 2 case was recorded in India in October 1999 at Aligarh, Uttar Pradesh; the last case of poliovirus type 3 case was on October 22, 2010, at Pakur, Jharkhand; and the last case of poliovirus type 1 case was recorded on January 13, 2011, at Howrah, West Bengal.
- As of October 2022, the WHO said only two countries worldwide remain with indigenous transmission of wild poliovirus type 1 (WPV1) — Afghanistan and Pakistan. It also recorded that so far, 33 countries have outbreaks of variant polioviruses, such as in the U.K., the U.S., Israel and Malawi.
- Unprotected children are at risk of getting the disease. It is important to take the polio vaccine each time it is offered, in special polio campaigns and routine immunisation. In the latter, the oral polio vaccine is provided at birth, at six weeks, 10 weeks and at 14 weeks (a booster could be factored in at 16-24 months). The injectable vaccine is given at six weeks, and then, another dose at 14 weeks.
- In addition, West Bengal has now decided to administer a third injectable dose at nine months.

➤ **What was the recent global polio crisis?**

- According to a paper published in Vaccines, in 2022: “Genetic variants of vaccine poliovirus type 2, imported from an unknown source, were detected in waste waters in Jerusalem, London and New York in early 2022.
- The wild poliovirus type 2 was globally eradicated in 1999, but vaccine virus type 2 continued for 16 more years; routine use of the vaccine was discontinued in 2016 and reintroduced occasionally on purpose.
- As an unintended consequence, type 2 vaccine virus variants (circulating vaccine-derived polioviruses) that mimic wild viruses’ contagiousness and neurovirulence, have been emerging and spreading.” He also posits the theory of respiratory transmission of polio, ‘as was the classical teaching of polio epidemiology’. “People assume that virus transmission is via the faecal–oral route. But in London and New York, where there are high standards of hygiene and sanitation, definitely virus transmission cannot be attributed to faecal contamination.”

➤ **What is the future?**

- Expert, says recent events have shown how dramatically and rapidly global progress can unwind if the pressure is not maintained to vaccinate children. “India have seen some setbacks, particularly in the area of immunisation post the pandemic. In November 2022, at the meeting of the India Expert Advisory Group for polio eradication participants discussed how India continues to maintain high population immunity, risk mitigation from polio viruses including containment and transitioning of polio networks. Their suggestions will guide revised policy changes to ensure that India remains polio free.

PRELIMS

1. Pluto

- **CONTEXT: On February 19, according to the International Astronomical Union (IAU), our solar system officially has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. But between 1930 to 2006, it had nine.**
- On this day it has been relegated to the status of a dwarf planet, much to the chagrin of a small section of astronomers.
- **“Planet X”**
- In 1906, Percival Lowell, started an extensive project in search of a possible ninth planet, – “Planet X.” The existence of a ninth planet had been theorised by scientists in the late 19th century while observing perturbations in the orbit of Uranus. Astronomers had speculated that some planet, other than Neptune, was behind observed disturbances in Uranus’s orbit. By 1909, Lowell and his collaborator William H Pickering suggested several possible celestial coordinates for Planet X but were unable to prove its existence.
- The search for Pluto was paused for fourteen years post Lowell’s passing in 1915, resumed by Clyde W Tombaugh in 1929 at the Lowell Observatory. After a year of searching, on February 18, 1930, Tombaugh discovered a possible moving object on his photographic plates. After confirmatory photographs were obtained, the news of the discovery was telegraphed to the Harvard Observatory.
- Interestingly, this was not the first time the still-unnamed planet had been photographed. According to researchers, there are 16 known pre-discoveries of the planet, with the oldest dating as far back as 1909. However, none of the previous astronomers was able to realise just what they had seen.
- **To be or not to be (a planet)**
- Pluto’s status as a planet really fell into jeopardy from 1992 onwards, when the Kuiper Belt was discovered.
 - ✓ A circumstellar disc in the outer solar system, the Kuiper Belt contains over 100,000 discovered small objects (diameter over 100km), all revolving around the sun beyond the orbit of Neptune. As more KBOs were discovered, Pluto’s uniqueness as a celestial object quickly diminished.
- In 2005, astronomers at Caltech announced the discovery of a new trans-Neptunian object, Eris, which was substantially more massive than Pluto. While some clamoured for it to be called the tenth planet of the solar system, others saw it as the strongest argument for the reclassification of Pluto.
- Finally, in 2006, the IAU came up with a resolution that created an official definition of a “planet”. The resolution outlined three criteria that a planet must meet in order to be so classified:
 - ✓ The object must be in orbit around the sun
 - ✓ The object must be big enough to be rounded by its own gravity, and
 - ✓ The object must have cleared the neighbourhood around its orbit.
- Pluto failed to meet the third criterion. Pluto is not gravitationally dominant – its mass is substantially less than the combined mass of the other objects in its orbit (0.07 times, in contrast to Earth, which is 1.7 million times the remaining mass in its orbit, excluding the moon). For celestial objects that satisfy the first two criteria but not the third, the IAU came with the classification of “dwarf planet”.
- However, this was not uniformly well received in the scientific community. Many felt that this was an arbitrary classification while others were more emotionally involved. A Bill was passed in California which called IAU’s classification of Pluto to be “scientific heresy”. Many scientists have continued to refer to Pluto as a planet to date.
- **The New Horizons flyby**
- On July 14, 2015, NASA’s New Horizons spacecraft made its historic flight through the Pluto system – providing the first close-up images of Pluto and its moons and collecting other data that has transformed our understanding of these mysterious worlds on the solar system’s outer frontier.
- The flyby renewed the debate around Pluto’s planet status as well as gave some of the most stunning images of the planet ever seen. Regardless of the classification, Pluto remains an object of fascination among the masses.
- **About International Astronomical Union:**
- The IAU is a nongovernmental organisation.
- The International Astronomical Union is the foremost international association of professional astronomers.
- It has more than 13000 individual members and 82 national members, including India.
- Aims: Advancing astronomy in all aspects, including promoting astronomical research, outreach, education, and development through global cooperation. It was founded in 1919 and is based in Paris, France
- 2. Special Marriage Act**
- **CONTEXT: For several interfaith couples including actress Swara Bhasker and her partner Farhad Zirar Ahmad, the choice to marry under a secular personal law is through the Special Marriage Act, 1954.**
- **What is the Special Marriage Act?**

- The Special Marriage Act of 1954 (SMA) was passed by the Parliament on October 9, 1954.
- It governs a civil marriage where the state sanctions the marriage rather than the religion.
- The SMA enables marriage between inter-faith or inter-caste couples without them giving up their religious identity or resorting to conversion.
- ✓ Issues of personal law such as marriage, divorce, adoption are governed by religious laws that are codified.
- ✓ These laws, such as the Muslim Marriage Act, 1954, and the Hindu Marriage Act, 1955, require either spouse to convert to the religion of the other before marriage.
- Eligibility: The applicability of the Act extends to the people of all faiths, including Hindus, Muslims, Sikhs, Christians, Sikhs, Jains, and Buddhists, across India.
- Age: The minimum age to get married under the SMA is 21 years for males and 18 years for females.
- Effect on rights: Once married as per the SMA, any member of an undivided family who professes the Hindu, Buddhist, Sikh or Jain religion shall be deemed to effect their severance from the family.
- ✓ This would affect rights, including the right to inheritance, of the persons choosing to marry under the SMA.
- Procedure for a civil marriage: The parties to the marriage are required to give a notice to a “Marriage Officer” of the district in which at least one of the parties has resided for at least 30 days immediately preceding the notice.
- ✓ Before the marriage is solemnized, the parties and three witnesses are required to sign a declaration form before the Marriage Officer.
- ✓ Once the declaration is accepted, the parties will be given a “Certificate of marriage” which is essentially proof of the marriage.
- Objections: The clause of Objection to marriage allows any person before the expiration of thirty days from the date of the notice’s publication to object to the marriage.
- ✓ If an objection has been made, the Marriage Officer cannot solemnize the marriage until he has inquired into the matter of the objection and is satisfied that will not prevent the marriage from taking place, unless the person making such an objection withdraws it.
- Recent Court rulings: In January 2021, the Allahabad High Court ruled that couples seeking to solemnize their marriage under the Special Marriage Act, 1954 can choose not to publish the mandatory 30-day notice of their intention to marry.

3. **Symbol allotment by Election Commission**

➤ **CONTEXT: The Election Commission of India (ECI) ordered a political party to retain the official name and symbol of the party.**

➤ **What are Election symbols?**

- An electoral or election symbol is a standardized symbol allocated to a political party.
- They are used by the parties during their campaigning and are shown on Electronic Voting Machines (EVMs).
- They were introduced to facilitate voting by illiterate people.
- The allotment of symbols is supervised by the provisions of Election Symbols (Reservation and Allotment) Order, 1968.

➤ **The Election Symbols (Reservation and Allotment) Order, 1968**

- It provided for specification, reservation, choice and allotment of symbols at elections in Parliamentary and State Assemblies’ constituencies.
- It also had provisions regarding the registration and recognition of political parties as state and national parties.
- The Election Symbols Order also provided for resolution of disputes in cases involving splits in recognized parties or merger of two or more political parties.
- It distinguishes between a reserved and a free symbol.
- A reserved symbol is one that is allocated to a political party.
- A free symbol is available to be allocated to non-recognized parties and independent candidates.
- **Disputes in Election Symbols**
- The dispute regarding electoral symbols is resolved by the Election Commission of India.
- In Sadiq Ali and Another v. Election Commission of India 1972 SC held that symbol is not a property that can be simply divided between two owners.
- The EC’s power to adjudicate disputes regarding allotment of election symbols is drawn from Article 324 and the Conduct of Election rules, 1961.
- The EC has the exclusive authority to decide on issues over merger or split of a party.
- Where the party is vertically divided and it is not feasible to establish majority through these wings, then the Commission may freeze the party’s symbol and advise the factions to contest elections under different names and with temporary symbols.
- If they settle their differences and reunite, they may approach the Commission again and seek to be recognized as a political party.
- The Commission may even restore the name and symbol of the original party.

ANSWER WRITTING

Q. Developing infrastructure along the Line of actual control (LAC) is important to ensure border security and check China's incursion. Discuss the various measures taken by the government in this regard.

In order to counter the Chinese incursion, the government has decided to allocate a substantial sum of money to improve facilities in places along the Line of Actual Control (LAC). This will lead to projects on border infrastructure and connectivity along India's 3,488 km border with China including ramping up infrastructure on the Indian side in Ladakh, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh.

Measures by the government for border infrastructure development:

- Road construction: In the last five years the Border Roads Organisation (BRO) has constructed almost 6,000 km of roads pan-India out of which 2,100 km has been along the northern borders.
 - ✓ Arunachal Frontier Highway which is a 2,000-km-long road that follows the McMahon Line will be of strategic importance to the military.
 - ✓ Chushul-Dungti-Fukche-Demchok road in the Ladakh region.
 - ✓ Umlin La pass in eastern Ladakh built under project Himank is the world's highest motorable road.
- Tunnel construction: Two tunnels Sela and Nechipu tunnel are under construction in Arunachal Pradesh for providing all weather connectivity as the vehicular movement becomes difficult due to heavy snowfall during winter.
- Vibrant villages programme: The scheme will provide funds for the development of essential infrastructure and the creation of livelihood opportunities in the areas bordering China.
 - ✓ The plan is to upgrade 633 villages in Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh and the Union Territory of Ladakh.
- New battalions of ITBP: The government will raise seven new battalions of the Indo-Tibetan Border Police (ITBP). This means 9,000 personnel will be deployed along India's borders with China alongside the Army.
- Internet connectivity: Apart from road connectivity the government is working to strengthen mobile connectivity by installing mobile towers in Tawang and other bordering areas of Arunachal Pradesh.
- Infrastructure in friendly neighbouring countries: The government is also focusing on the development of infrastructure in the neighbourhood.
 - ✓ For example, railway links to Nepal and Bangladesh, the Mahakali motorable bridge and the Maitri Setu between Tripura and Bangladesh, and the Kaladan Multi-Modal Transit Transport Project (KMTTP) which includes a 158 km waterway.
 - ✓ The government is also developing "South Asia's first cross-border petroleum products pipeline" between Motihari in India and Amlekhgunj in Nepal.

For a very long time China through its salami-slicing tactics has been claiming parts of Indian territory which are devoid of human settlement. The infrastructure development along the LAC would help in integrating these areas with the hinterlands. This will also create a positive perception in the minds of people and will encourage them to settle in the border areas leading to safe and secure borders.

MCQs

1. With reference to Sickle Cell Disease, consider the following:
 1. The sickle-cell anaemia is due to mutation in β -globulin gene.
 2. The sickle cell anaemia is a genetic disease common in tropical and sub-tropical countries.
 Which of the statements given above is/are correct?
 - a) 1 only
 - b) 2 only
 - c) **Both 1 and 2**
 - d) Neither 1 nor 2
2. With reference to Polio, consider the following statements
 1. Polio is transmitted through the faecal-oral route.
 2. India is not yet declared polio-free.
 Which of the statements given above is/are correct?
 - a) **1 only**
 - b) 2 only
 - c) Both 1 and 2
 - d) Neither 1 nor 2
3. Pluto is known as dwarf planet because which of the following reason/s?
 - a) It has negligible mass
 - b) It has not nearly round shaped
 - c) **It does not have always same neighbouring planet**
 - d) All of the above
4. With reference to the International Astronomical Union (IAU), consider the following statements:
 1. It is the global authority for naming planetary features in the solar system.
 2. Its mission is to promote and safeguard the science of astronomy in all its aspects, including research, communication, education and development, through international cooperation.

Which of the statements given above is /are correct?

- a) 1 only
- b) 2 only
- c) **Both 1 and 2**
- d) Neither 1 nor 2

5. Special Marriage Act 1954 (SMA) often mentioned in news, with reference to SMA consider the following
1. Communal harmony
 2. Inter-faith marriage
 3. Strict endogamy
 4. Inter-caste marriage

Which of the above does the Special Marriage Act 1954 not support?

- a) 1 and 2 only
- b) 4 only
- c) 2 and 3 only
- d) **3 only**

6. With reference to election symbol, consider the following statements:

1. Two state parties can have the same election symbol.
2. After split in a political party, the Election Commission has the power to decide which faction of a political party gets to use the allotted symbol.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) **Both 1 and 2**
- d) Neither 1 nor 2

7. With reference to New Horizons mission consider the following

1. New Horizons is an interplanetary space probe that was launched by ROSCOSMOS as a part of it's New Frontiers program.
2. One of the Goal of the mission is to understand the the Kuiper belt.

Which of the above given statement/s is/are correct?

- a) 1 only
- b) **2 only**
- c) Both 1 and 2
- d) Neither 1 nor 2

8. Consider the following animals:

1. Hedgehog
2. Marmot
3. Pangolin

To reduce the chance of being captured by predators, which of the above organisms rolls up/roll up and protects/protect its/their vulnerable parts?

- a) 1 and 2
- b) 2 only
- c) 3 only
- d) **1 and 3**

9. With reference to Munich Security conference, Consider the following statements

1. It is an annual conference on global security issues
2. It was founded by European Union against the backdrop of the Russian-Ukraine war.

Which of the above statements is/are correct?

- a) **1 only**
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

10. Consider the following statements:

1. The National Social Assistance Programme is administered by the Ministry of Social Justice & Empowerment.
2. The scheme targets the elderly, widows and persons with disabilities from "BPL families.

Which of the above statements is/are correct?

- a) 1 only
- b) **2 only**
- c) Both 1 and 2
- d) Neither 1 nor 2