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Daily News Analysis

The Hindu Important News Articles & Editorial For UPSC CSE

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- India and the United States are moving towards finalising a limited trade agreement, possibly by Fall 2025 (September–November). This follows a series of high-level visits and negotiations on both sides, with several contentious issues still unresolved.

India, U.S. inch closer to limited trade agreement

Deal is likely to be signed by November; the earlier goal was to finalise an initial agreement by July 9, when U.S. tariffs kick in; sticky issues include high U.S. tariffs on steel, aluminium imports

T.C.A. Sharad Raghavan
NEW DELHI

An India-U.S. trade deal, including a potential initial "mini-deal" of limited concessions, will likely be firmed up by the original deadline of the fall season – between September and November in the U.S., according to sources aware of the progress of the negotiations.

Earlier, officials on both sides had expressed confidence of finalising an initial deal before July 9.

Delegation visits
An Indian team led by Commerce Minister Piyush Goyal visited the U.S. last month to further the negotiations, followed by a week-long trip to India by a U.S. team of negotiators, which ended on June 10.

Despite "productive" talks, however, certain sticky issues remained that are stymieing the finalisation of an initial deal.

"India and the U.S. are working towards negotiating the first tranche of a mutually beneficial, multi-sector Bilateral Trade Agreement (BTA) by fall 2025," a government official told *The Hindu*.

The fall deadline had first been mentioned following Prime Minister Narendra Modi's visit to the U.S. in February this year. In a joint statement following the visit, the two countries said that "the leaders announced plans to negotiate the first tranche of a mutually beneficial, multi-sector Bilateral Trade Agreement by fall of 2025".

The official added that the negotiations with the U.S. "were productive" and helped in making progress towards crafting a "mutually beneficial and balanced agreement", but added that some "sticky issues" remained.

"One of our major issues is the tariffs they have imposed on steel and aluminium," the official said. "We are trying to get a concession on this, but they are not yet agreeing to it."

On June 4, U.S. President Donald Trump signed an executive order doubling tariffs on steel and aluminium imports to 50%. This came after his March decision to hike the import duties on these metals to 25%.

Following the March tariff hike, the Indian government had protested and had in May informed the World Trade Organisation that it reserved the right to impose reciprocal tariffs on the U.S. Since then, the matter has been discussed bilaterally between the two countries.

"On [the U.S.] side, they want us to open up our agriculture market too much, much more than we can afford to do and also protect our own farmers," the official added.

Earlier this month, U.S. Secretary of Commerce Howard Lutnick had said a trade deal with India would materialise in the "not too distant future".

The July 9 notional deadline for the trade deal is significant because that is the day when Mr. Trump's 90-day pause on his 'Liberation Day' tariff hikes is set to end.

Trade troubles

Though India and the U.S. are keen to conclude a mutually beneficial Bilateral Trade Agreement at the earliest, hurdles remain

- U.S. wants greater agri-products **market access**, but India is resistant
- India wants **relaxations** on higher U.S. steel & aluminium tariffs, but the U.S. is reluctant
- U.S. President Donald Trump's 90-day pause on tariff hikes ends on **July 9**

Negotiations on: Union Minister Piyush Goyal meeting U.S. Secretary of Commerce Howard Lutnick in May.

Significance of the Deal:

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- The trade agreement aims to resolve longstanding trade frictions and build a foundation for a broader Bilateral Trade Agreement (BTA).
- It aligns with the broader India-U.S. strategic partnership encompassing defence, technology, and geopolitical interests.
- A successful deal could revive investor confidence and strengthen bilateral economic ties amid shifting global supply chains.

Key Issues in Negotiation:

- **1. Tariff Disputes:**
  - The U.S. has doubled tariffs on steel and aluminium to 50%, severely impacting Indian exports.
  - India considers this protectionist and has threatened reciprocal tariffs under WTO rules.
- **2. Agricultural Market Access:**
  - The U.S. wants greater access to India's agriculture sector, which India resists to protect its farmers and food security.
  - Liberalisation could expose vulnerable Indian farmers to unfair competition.
- **3. Market Liberalisation vs. Domestic Interests:**
  - The U.S. push for broader market reforms conflicts with India's policy of calibrated liberalisation.
  - India is cautious of commitments that could hurt domestic industries or compromise regulatory autonomy.

Geopolitical & Strategic Angle:

- The negotiation reflects U.S. Indo-Pacific strategic engagement, where economic partnerships are being leveraged to counterbalance China's regional influence.
- It strengthens India's position as a reliable democratic partner, especially in technology, defense, and supply chain resilience.

Challenges Ahead:

- Balancing reciprocity and protectionism remains a central challenge.
- India's concerns over domestic political sensitivities (e.g., farmers' welfare) may limit concessions.
- The U.S. faces internal lobbying from its agriculture and steel industries, delaying consensus.

Way Forward:

- A phased, mini-deal approach can help build trust and momentum.
- A robust dispute resolution mechanism is essential to handle trade irritants.

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- India must negotiate with strategic clarity, ensuring economic gains without compromising sovereign policy space.

Conclusion:

- The India-U.S. trade talks represent an important step in recalibrating bilateral trade relations in a multipolar world. While political will exists on both sides, resolving core disagreements — especially over tariffs and agriculture — will require pragmatism, patience, and diplomacy. For India, the deal must serve not just economic goals, but strategic autonomy and inclusive development.

UPSC Mains Practice Question

Ques : India-U.S. bilateral trade negotiations reflect a mix of convergence and contestation." In the light of this statement, discuss the major challenges in finalising a balanced trade agreement between the two nations. **(250 words)**

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Page 05: GS 2 : Polity& Governance

In a recent interview, Andhra Pradesh Chief Minister N. Chandrababu Naidu shared his views on governance priorities, Centre-State relations, language policy, economic recovery, regional development, and political vision. His responses offer insight into key themes relevant to federalism, cooperative governance, welfare-development balance, and national integration.

'Hindi can be taught along with English and mother tongue'

Andhra Pradesh Chief Minister says that in this age of technology and artificial intelligence, language is not an issue at all, and people are unnecessarily sticking to their old traditions; on Centre-State relations, he says there should be uniform policy to develop at a fast pace, but there should not be an over-centralisation of power, as it is harmful for the nation; says PM Modi has a long-term vision

INTERVIEW

N. Chandrababu Naidu

Varghese K. George

N. Chandrababu Naidu has completed one year in his current term as Chief Minister of Andhra Pradesh. He speaks on a wide range of issues in an exclusive interview. Edited excerpts:

How do you see your first year of this term as Chief Minister?

Power is not new to me. But I had not expected the kind of challenges that I inherited – the damage that was inflicted on Brand Andhra Pradesh, collapse of the economy. And today, I cannot run away from these difficulties because people have put their trust in me. It's a huge responsibility, and we need to recover slowly.

Is public finance the biggest challenge?

No, it is not just public finance. The State's credibility was destroyed (by the previous government). There is massive debt. And they started pledging government properties for more borrowing. They diverted the money granted for 98 Central schemes, which came to a halt. Schemes such as Jal Jeevan Mission were stopped. I have given six guarantees – Super Six – (schemes such as cooking gas refill, free bus ride for women, and so on) to the people. My agenda is welfare, development, empowerment of people.

In your first term, you were a darling of the market, and you had famously said, "There is no free lunch." How have your views changed over the years?

At one time, we thought economic reforms would create wealth, and people would get more facilities, but now with an experience of 34 years, we understand that market creates wealth but the government, through public policy, has to empower people. That is where expenditure in welfare comes in. Disparities between the 'haves' and 'have-nots' are increasing rapidly, which should be bridged quickly. Otherwise, there will be huge backlash. This is why I am creating the P4 model – public, private, people partnership.

You have revived the Amaravati city project. How is the progress after one year?

The previous regime had worked against the wishes and interest of the State and people. Amaravati was a self-financing project. It would have created wealth and additional revenues for the State. But my successor halted the project, playing destructive politics. Now, I have revived it and many other projects.

You mentioned the Central schemes. The State government funds

So all these big projects need a lot of money and you do not have it...

These are all futuristic projects. We can go for new revenue models. Thirty years back nobody could visualise the kind of roads we have today. People are paying toll, and it is a win-win situation for everyone. Power, telecommunication, etc., are the rising sectors, and we can have different revenue models.

In Andhra Pradesh, the hostility between the ruling party and the Opposition is now extreme – prosecutions and investigations. Why?

For 50 years, I have been in politics. I have seen several Congress Chief Ministers until Rajasekhara Reddy, and our fights have been only political. Things changed when a criminal floated a regional party. I don't believe in victimisation. At the same time, if we let economic terrorists scot-free that would lead to a disaster, which Andhra Pradesh is going through right now. This is a different type of politics. You see, his uncle Vivekananda Reddy was murdered, they killed him... this leads to a dangerous trend. There can be no leniency... nobody can commit crimes under political cover-up, everyone has to respect the laws of the land.

Regional parties are facing a crisis, aren't they? What future do you see for the Telugu Desam Party?

Post Independence, new parties have emerged and collapsed. It's a cycle, because ultimately, for any political party to survive, they have to maintain people's trust in them. And that's what TDP is doing. Through all the ups and downs we faced, including the separation of Telangana from Andhra Pradesh, and many other challenges, our foremost duty is to serve people efficiently.

You are confident that the TDP will be around for a long time?

Absolutely. You can go through history, and you will find that among all the regional parties, TDP is the only party that has played a positive and constructive role at the national level. Never have we disappointed the nation's trust or interest. Our fundamental principle has always been – first the nation, then the State, and then the party. We were once the main Opposition party in Lok Sabha. We were key constituents in the National Front and the United Front governments. We supported the NDA governments as a crucial partner, but we never created trouble or blackmailed them.

So you have been part of several political alliances in Delhi. Do you see any changes in the way coalition is run today?

No, it is a continuous process, and it mostly depends upon the leader. In West Bengal, Jyoti Basu ran a coalition government for 25 years with Left parties, without any hindrance. It is important to know how to lead as a leader – Vajpayee*ji* at one time, and UPA too have run coalition governments. Narendra Modi*ji* is running a coalition without any problems. It is because of the credibility that we have established as one entity.

What difference do you see between Vajpayee*ji* and Prime Minister Narendra Modi?

Different leaders, different approaches. Today, it's a fortunate and inspiring time, I believe India and Indians will have a bright future in the coming years. The PM has a long-term vision, a good grasp of the economy, and capability to take people along. I am confident that India will grow under his leadership. Vajpayee*ji* had brought good reforms during his tenure, in which I had a part too. That helped the nation to move forward, but today we are moving to the next level. PM is doing justice and promoting development. In protection of the nation, there is no compromise. After the Pahalgam attack, how he acted promptly... through Opera-

tion Sindoor, which satisfied the nation and demonstrated his capability in responding, handling such things.

Moving on, do you see any danger of communalism in our society?

Some parties with vested interest try to create instability... Within country, and outside the country, which is to derail our progress. We have to work on these issues consciously. It's the only way for the nation to prosper. Everybody's free to offer prayers... but they should not quarrel and must respect each other to move forward.

Your plans for the new phase of industrialisation in Andhra Pradesh, and also a proposal for a defence corridor. Can you explain?

In defence, we are trying to develop our own indigenous capacity. Aerospace is a booming sector. We are working on drones and space industry too. I believe the high-tech industry is the future for defence and commercial applications. Andhra Pradesh has a lot of land available for setting up these facilities. Defence corridor is part of these plans.

In the run-up to Telugu Desam's Mahanadu conference recently, there was lot of anticipation that your son, Lokesh, would be

assuming a role that makes him your successor. It did not happen. Will it happen, and when will it happen?

It will happen in its due time. Public interest is the main factor. It is a continuous journey, and our party is full of youngsters.

There is a lot of concern among non-Hindi States, including Maharashtra, about the three-language policy. Do you have any such fears?

No, in this age of technology and artificial intelligence, according to me, language is not an issue at all. People are unnecessarily sticking to their old traditions. Hindi can be taught along with English and mother tongue. For example, people from Hyderabad have a better advantage in Delhi as they speak Hindi and Urdu than people from Tamil Nadu or Karnataka. Learning more languages help individuals communicate and get things done more easily. If youngsters are willing to learn they should be allowed to learn, just like one learns English to communicate and become a citizen at international level, without needing any translators. In the same way, learning Hindi will give you an advantage at national level. I want to introduce many languages as an option in universities, so that those who are interested can learn.

Key Themes:

- **Centre-State Relations and Federalism:**
  - Naidu stresses the importance of a "uniform development policy" while cautioning against over-centralisation. His remarks underline the need for:

- A balanced federal structure where states are empowered to innovate and execute.
- Respect for state autonomy in implementation of central schemes.
- A spirit of cooperative federalism that is constructive, not coercive.
- **Economic Policy and Governance Approach:**
    - Naidu revisits his earlier pro-market stance, now advocating a blended model — where markets create wealth, and the state ensures equitable distribution through welfare schemes. His P4 model (public-private-people partnership) reflects evolving governance models in India.
- **Urban Development and Infrastructure Projects:**
    - He emphasizes futuristic planning (e.g., Amaravati), use of innovative revenue models (like toll roads), and investment in telecom, power, and aerospace. His plan for a defence corridor in Andhra highlights a push for indigenous capability and high-tech industry.
- **Three-Language Policy and Cultural Sensitivities:**
    - Naidu takes a pragmatic view, asserting that in the age of AI and globalisation, language should be a tool, not a barrier. He supports teaching Hindi alongside English and mother tongues, not through imposition, but choice — promoting linguistic flexibility and practical learning.
- **Political Stability and Role of Regional Parties:**
    - Naidu highlights TDP's constructive national role and defends coalition politics as a viable model of governance. He contrasts regional cooperation during Vajpayee and Modi's time, showing how leadership styles shape coalition dynamics.
- **Law and Order, Political Ethics:**
    - He sharply criticizes criminalisation of politics and insists on zero tolerance for economic and political crimes. His assertion of "economic terrorism" reflects growing concern about governance erosion through corrupt practices.
- **Social Harmony and Communalism:**
    - Naidu warns against attempts to disrupt social harmony and advocates mutual respect across religions. He views communal stability as central to economic progress and national unity.

Conclusion:

- The interview with N. Chandrababu Naidu reflects a mature political and administrative perspective rooted in federal balance, inclusive governance, practical language policy, and visionary economic planning.

UPSC Mains Practice Question

Ques: Over-centralisation of power in India weakens the spirit of cooperative federalism. Examine in the context of Centre-State relations. **(250 words)**

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On June 9–10, 2025, the Indian Navy and the Royal Navy of the United Kingdom conducted a joint passage exercise in the North Arabian Sea. This engagement included advanced maritime warfare drills, highlighting bilateral defence cooperation.

India and U.K. carry out joint naval exercise in Arabian sea

The Indian Navy's stealth frigate *INS Tabar*, a submarine, and P-8I maritime patrol aircraft participated in a passage exercise with the United Kingdom's Carrier Strike Group in the North Arabian Sea on June 9 and 10, the Ministry of Defence said on Tuesday. The U.K. formation comprised the aircraft carrier *HMS Prince of Wales* and frigate *HMS Richmond*. "The naval exercise demonstrates the deepening cooperation between the Indian Navy and the Royal Navy. The collaboration included unified control of integral helicopters, tactical manoeuvres and coordinated anti-submarine operations," the Ministry said in a statement.

Key Participants:

- India: INS Tabar (stealth frigate), a submarine, and P-8I maritime patrol aircraft.
- United Kingdom: HMS Prince of Wales (aircraft carrier) and HMS Richmond (frigate).
- **Nature of the Exercise:**
  o Type: Passage Exercise (PASSEX) – conducted when navies of two friendly countries cross paths at sea.
  o Activities: Unified helicopter operations, tactical manoeuvres, and anti-submarine warfare coordination.
- **Strategic Importance:**
  o Strengthens interoperability between Indian and UK naval forces.
  o Reflects growing India–UK defence partnership under India's Act East and Indo-Pacific strategies.
  o Enhances maritime domain awareness and preparedness in the Arabian Sea, a region of strategic interest.

Prelims Pointers:

- **PASSEX:** Not a scheduled exercise; happens during mutual ship passage.
- **INS Tabar:** Talwar-class stealth frigate of Indian Navy.
- **HMS Prince of Wales:** UK's Queen Elizabeth-class aircraft carrier.
- **P-8I:** Indian Navy's long-range maritime surveillance and anti-submarine aircraft.
- **Arabian Sea:** Key location for India's energy security and trade route protection.

UPSCPrelimsPractice Question

Ques:Recently, India conducted a PASSEX (Passage Exercise) with which country in the Arabian Sea in June 2025?

(a) France

(b) United Kingdom

(c) Australia

(d) United States

Ans : b)

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Daily News Analysis

Page 06: GS 2 : International Relations

At the ongoing United Nations Ocean Conference 2025 in Nice, France, India signalled that it is not likely to ratify the High Seas Treaty (also known as the BBNJ Agreement) during the current session. Though India signed the treaty in 2024, the ratification process remains pending due to required legal amendments and political considerations.

India unlikely to ratify 'High Seas Treaty' at U.N. Ocean Conference

Jacob Koshy
NEW DELHI

India is unlikely to ratify the Biodiversity Beyond National Jurisdiction (BBNJ) agreement – also known informally as the 'High Seas Treaty' – at the ongoing United Nations Ocean Conference in Nice, France, sources indicated to *The Hindu*.

Though India signed the agreement in September 2024, formal ratification is pending. Before proceeding, the government is required to amend certain laws, including the Biological Diversity Act, it is learnt. "This will probably be taken up after the Monsoon Session (July 12-August 12) and needs to be passed in Parliament. There are other issues that also need to be sorted out," a person familiar with the negotiations said.

India had signed the agreement in 2024, pending ratification. (Seen here) Minister Jitendra Singh at the Ocean Conference 2025. AFP

As of June 10, 49 countries have ratified the treaty. Once 60 countries complete the process, the treaty will enter into legal force.

Union Minister for Science and Technology Jitendra Singh, who is representing India at the conference, which continues until June 13, stated in France that India was in the "process of ratifying the treaty".

One of the most contentious aspects of the BBNJ is the sharing of resources. The high seas, lying beyond the exclusive economic zones (EEZ) of nations, are not under the jurisdiction of any single country, and are known to harbour unique and exotic marine life. While commercial extraction remains technically challenging, a clear mechanism for equitable sharing of potential economic benefits is yet to be finalised.

In his address on June 10, Dr. Singh highlighted India's progress on Samudrayaan, the country's manned submersible mission, which is expected to reach ocean depths of up to 6,000 metres and is slated for a trial dive in 2026. He also referred to India's nationwide ban on single-use plastics and highlighted more than $80 billion in Blue Economy investments.

India reiterated its call for a legally binding Global Plastics Treaty and launched the 'SAHAV' digital ocean data portal at the conference, underscoring its growing leadership in global marine conservation efforts.

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What is the High Seas Treaty (BBNJ)?

- The Biodiversity Beyond National Jurisdiction (BBNJ) Treaty, commonly referred to as the High Seas Treaty, is a multilateral agreement aimed at conserving marine biodiversity in international waters — areas that lie beyond a country's Exclusive Economic Zone (EEZ).

Key aims include:

- Conservation of marine genetic resources (MGRs)
- Environmental impact assessments (EIAs) for activities on the high seas
- Area-based management tools (including marine protected areas)
- Capacity building and technology transfer
- Equitable sharing of marine benefits
- Once ratified by 60 countries, it will come into legal force. As of June 10, 49 countries have ratified it.

Why is India delaying ratification?

- Legislative constraints: India must amend key domestic laws such as the Biological Diversity Act to align with BBNJ commitments.
- Equity concerns: India has historically emphasised equitable access to marine resources. The lack of a clear mechanism for benefit-sharing from marine genetic resources has been a sticking point.
- Strategic interest: The Indian government is cautious about binding itself to international obligations that could impact its blue economy potential, including future exploration and commercial extraction in high seas.
- Institutional readiness: Implementation of provisions related to marine EIA, monitoring, and enforcement would require significant institutional strengthening and inter-agency coordination.

India's Position at the Conference:

- Despite not ratifying the treaty yet, India presented itself as a proactive maritime stakeholder:
- Samudrayaan Mission: India's first manned deep-sea submersible, expected to reach 6,000 metres, is under development with trial dives planned in 2026. This marks a major step in deep ocean exploration and capacity building.
- Plastic Ban Leadership: India reiterated its nationwide ban on single-use plastics and advocated for a legally binding Global Plastics Treaty.
- Digital Ocean Portal – SAHAV: India launched a real-time marine data sharing platform, enhancing transparency, ocean governance, and scientific cooperation.
- Blue Economy Focus: India highlighted $80+ billion in blue economy investments, demonstrating its long-term commitment to sustainable ocean use.

Conclusion:

- India's cautious approach to ratifying the High Seas Treaty reflects a balancing act between sovereignty, strategic interests, environmental commitments, and equity concerns in global marine governance. While India is yet to ratify the treaty, its proactive engagement in ocean science and sustainable marine practices signals its emerging leadership in the Indo-Pacific maritime landscape.

UPSC MainsPractice Question

Ques: India's cautious approach towards ratifying the High Seas Treaty reflects its strategic priorities and developmental concerns. Discuss in the context of India's evolving maritime diplomacy.**(250 words)**

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Daily News Analysis

Page 07 : GS 2 : Social Justice

Artificial Intelligence (AI) is rapidly transforming the Indian healthcare landscape — from predictive tools for foetal age, high-risk pregnancy management, and virtual autopsies to clinical chatbots. These developments promise enhanced accuracy and efficiency, but they also raise serious ethical, legal, and systemic concerns. This analysis explores the double-edged nature of AI in healthcare, with a focus on the importance of human oversight.

Human oversight key to safe use of AI in healthcare, say experts

From foetal dating and high-risk-pregnancy guidance to virtual autopsies and clinical chatbots, AI tools are matching expert accuracy; yet their promise comes entwined with the systemic challenges of automation bias and weak regulation, exacerbated by sensitivities of the sector itself

Sayantan Datta
SRI CITY

Researchers at IIT-Madras and the Translational Health Science and Technology Institute in Faridabad are developing an artificially intelligent (AI) model to use ultrasonography pictures to predict the age of a growing foetus. Called Garbhini-GA2, the model was trained on scans from about 3,500 pregnant women who had visited the Gurugram Civil Hospital in Haryana. Each scan labelled different parts of the foetus, its size, and its weight – measures that can be used to predict a foetus's age.

After the training, team members tested it with (unlabelled) scans from 1,500 pregnant women who had visited the same hospital and around 1,000 pregnant women who had visited the Christian Medical College Vellore. They found Garbhini-GA2 erred on the age of the foetus by only half a day. This is a significant improvement over the most common method today: using Hadlock's formula. Because the formula is based on data from Caucasian populations, it has been known to miss the age of the foetus in India by up to seven days, according to the IIT-Madras team.

The team now plans to test its model in datasets from around India.

Promise with pitfalls
This is just a glimpse of how AI tools are quietly reshaping Indian healthcare. From foetal ultrasound dating and high-risk-pregnancy guidance to virtual autopsies and clinical chatbots, they are matching expert accuracy while accelerating workflows. Yet their promise comes entwined with the systemic challenges of data and automation bias, privacy, and weak regulation, often exacerbated by the sensitivities of the healthcare sector itself.

Almost half of all pregnancies in Indian women are high-risk pregnancies (HRPs), according to a 2023 study in the *Journal of Global Health*. In HRPs, there is a high chance of the mother and the newborn taking ill or dying. The conditions that cause these outcomes include severe anaemia, high blood pressure, pre-eclampsia, and hypothyroidism. The risks are higher for women with no formal education, those from rural areas, and those belonging to marginalised social groups.

Experts say routine monitoring is the best way to reduce maternal and perinatal mortality in HRPs. In rural areas, this task is often carried out by auxiliary nurse midwives (ANMs), female health workers who are the first point of contact between a pregnant woman and the medical system. ANMs are trained by medical professionals to recognise HRPs and advise women on their options.

Mumbai-based NGO ARMMAN started such a training programme in 2021 in partnership with UNICEF and the Governments of Telangana and Andhra Pradesh. It has been training healthcare professionals, including ANMs, in "end-to-end management of HRPs," ARMMAN's director of innovation Amrita Mahale said.
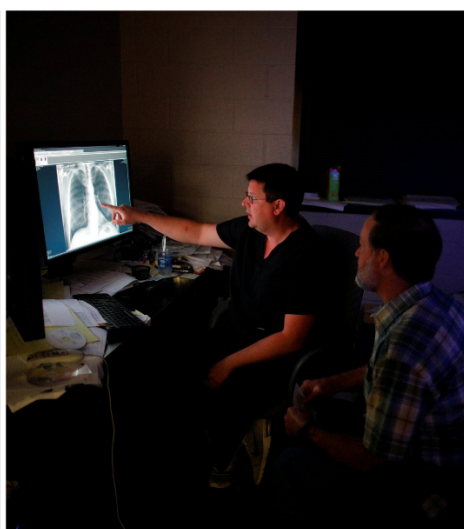
The NGO trains ANMs to track and manage HRPs through "classroom training and digital learning," Ms. Mahale said, adding that ANMs are also supported through a WhatsApp helpline "for doubt solving and hand-holding as they go through the learning content and apply it to real life high risk pregnancy cases."

When in doubt, ANMs are encouraged to reach out to their trainers with queries. However, "the trainers themselves are overworked and do not always prioritise responding to ANM queries," Ms. Mahale said. So ARMMAN adopted an AI chatbot earlier this year. It recognises both text and voice-based queries from ANMs and responds in the same medium with clinically validated answers.

Medical professionals now "act as humans-in-the-loop who step in when the chatbot cannot answer a question, or if the ANM is not satisfied with the chatbot's response," Ms. Mahale said. Currently being tested with 100 ANMs, the chatbot has received "94% positive feedback" from its users, Mahale added. "A domain expert has rated 58% of the answers to date as accurate and satisfactory."

But she also flagged a problem: "The current lot of speech (recognition) models struggle with Indian languages, especially regional variations and accents."

This means that the chatbot might fail to understand about 5% of the queries that are shared as voice notes rather than as text.

Amar Jyoti Patowary heads the Department of Forensic Medicine at the North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences. He is one of India's few "virtual autopsy" experts.

Autopsies don't have a good public reputation. When Dr. Patowary and his team asked the relatives of 179 deceased people who had undergone an autopsy at the department, about 63% expressed fears of the body being mutilated and delays in conducting funeral rites. Similar issues have been reported from rural Haryana, too.

In a virtual autopsy, or virtopsy, a body is scanned with CT and MRI machines to generate detailed images of its internal structures. Then a computer creates a 3D image of the body. Physicians feed this image into convolutional neural networks (CNNs) – deep-learning models adept at extracting features from one set of images and using them to classify images in others.

In 2023, researchers from Tohoku University in Japan built a CNN that could distinguish individuals who had died of drowning from those who had died of other causes using chest CT scans. The model was 88% accurate "for cases in which resuscitation was performed and 92% for cases in which resuscitation was not attempted," the authors wrote in their paper. In 2024, Swiss scientists developed a CNN that could say whether a person had died of a cerebral haemorrhage based on postmortem CT images.

While conventional autopsies take about 2.5 hours to complete, a virtopsy can be finished in about half an hour, Mr. Patowary said.

In conventional autopsies, once the body has been dissected, a second dissection may be required if the first one has been inconclusive. This is harder. But virtopsies allow as many dissections as required since the scans can be used to reconstruct the body multiple times.

What virtopsies might miss, however, are "small injuries in the soft tissue" and changes in the colour of tissues and organs and how the body and its fluids smell, which might indicate how a person died, Mr. Patowary cautioned. Yet he also expressed confidence that by combining a virtopsy with a "verbal autopsy" – checking with an accompanying relative or police officer for clinically relevant

In 2019 a digital healthcare company experimented with an AI bot that could chat with a patient and present them to a doctor. Nine of the 15 doctors who tested this said it was helpful

details – and a visual examination of the body and its cavities, these challenges can be overcome.

Privacy concerns
These cases indicate that the best use of AI might be as a healthcare professional's assistant. In 2019, Meditiuddy, a digital healthcare company that provides online doctor consultations and other services, experimented with an AI bot that could chat with a patient, extract clinically relevant details from the conversation, and compile and present them to a doctor along with suggested diagnoses. Nine of the 15 doctors who tested this app said it was helpful while the rest remained "sceptical", said Krishna Chaitanya Chavati, MediBuddy's head of data science.

He flagged data privacy as a key concern. In India, digital personal information, including an individual's health information, is governed by the Information Technology Act 2000 and the Digital Personal Data Protection Act 2023. Neither Act specifically mentions AI technologies although lawyers suggest the latter could apply to AI tools. Even then, the "DPDP Act lacks clarity on AI-driven decision-making and accountability," lawyers wrote in a May 2025 review.

To allay these concerns, Mr. Chavati said strong data security protocols are necessary. At MediBuddy, the team has deployed a few, two of which are a personal identifiable information masking engine and role-based access. A masking engine is a programme that identifies and hides all personal information from specific algorithms, preventing unauthorised users from tracing the data to a single individual. Role-based access ensures no one individual within the company is able to access all of an individual's data, only the parts relevant to their work.

Shivangi Rai, a lawyer who helped draft the National Public Health Bill and the

Digital Information Security in Healthcare Bill, said "automation bias" is also another cause for concern. Ms. Rai is currently the deputy coordinator of the Centre for Health Equity, Law & Policy in Pune.

Automation bias is "the tendency to overly trust and follow the suggestions made by an automated system, even if the suggestions are incorrect," Ms. Rai said.

This happens when the "human in the loop", such as a doctor, banks too much on the judgment of an AI-powered app "rather than their own clinical judgement".

In 2023, researchers from Germany and Netherlands asked radiologists with different degrees of experience to evaluate mammograms (X-ray scan of breasts) and assign them a BI-RADS score. BI-RADS is a standardised metric radiologists use to report the malignancy of cancerous tissue observed in mammograms.

The radiologists were told that an AI model would also parse the mammogram and assign a BI-RADS score. In truth the researchers had no such model; they arbitrarily and secretly assigned a score to some mammograms.

The researchers found that when the 'AI model' reported an incorrect score, the radiologists' own accuracy fell drastically. Even those with more than a decade of experience reported the correct BI-RADS scores in only 45.5% of such cases.

The researchers reported being surprised that "even highly experienced radiologists were adversely impacted by the AI system's judgments," the study's lead author said in 2023.

For Ms. Rai, this study is evidence of a pressing need to train "doctors on the limits of AI" and to constantly test and reassess "AI tools being developed for and used in healthcare".

India's rapid adoption of medical AI has illuminated a path to cheaper, faster, more equitable care. But algorithms inherit human fallibility while also further obfuscating it. If technology is to augment and not supplant ethical medicine, medical AI will need robust data governance, clinician training, and enforceable accountability.

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Tech breakthrough: A doctor reviews chest X-rays with a coal miner diagnosed with black lung disease in Kentucky, U.S. FILE PHOTO

Key Developments:

- AI for Foetal Dating – Garbhini-GA2 Model (IIT-Madras):
  - Trained on Indian population data to overcome flaws in Western-derived formulas like Hadlock's.
  - Demonstrates high accuracy with an error margin of only half a day.
  - Represents India-specific AI solutions with potential national scalability.
- AI in High-Risk Pregnancy Management (ARMMAN & UNICEF):
  - Trains ANMs through hybrid digital-classroom models.
  - Recently deployed AI chatbots for real-time doubt resolution.
  - Human-in-loop ensures safety, but linguistic limitations and resource constraints persist.
- Virtual Autopsies (Virtopsies):
  - Faster, less invasive, and socially acceptable alternative to traditional autopsies.
  - Powered by deep learning tools (CNNs) to detect causes of death from postmortem CT scans.
  - Yet cannot fully replace human forensic insights, especially for soft tissue or olfactory cues.
- Private Sector and AI Chatbots (e.g., MediBuddy):
  - Automate patient-doctor interactions and triaging.
  - Raises questions on data privacy, informed consent, and diagnostic bias.

Challenges & Concerns:

- **Automation Bias:**Overreliance on AI outputs can lead even experienced professionals to misdiagnose, as seen in BI-RADS mammogram studies. Without active questioning, clinical judgement is compromised.
- **Data Privacy & Security:**India's Digital Personal Data Protection (DPDP) Act, 2023 is ambiguous on AI accountability. Lack of clarity on algorithmic transparency and liability remains a challenge.
- **Linguistic & Cultural Gaps in AI Design:**Indian diversity in language and dialect presents a barrier to widespread AI adoption. Current speech recognition models often fail to understand regional accents.
- **Regulatory Oversight Deficiency:**There is no dedicated legal framework to evaluate, certify, or monitor AI tools in healthcare. Ethical audits and real-world validation are inconsistent or absent.

Way Forward:

- Strengthen Human-in-the-Loop Mechanisms:
  - AI must augment, not replace, clinical expertise. Healthcare workers should be trained to critically interpret AI outputs.
- Create Sector-Specific AI Governance Framework:
  - India needs clear regulatory norms to govern health-AI tools, including audit trails, ethical testing, and grievance redressal.

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- Promote India-Centric Datasets:
  - AI models trained on Indian population data will offer better outcomes than imported algorithms based on Western populations.
- Local Language Integration in AI Tools:
  - Multilingual and accent-sensitive models are essential for successful rural deployment.
- Strengthen Data Privacy Protocols:
  - Enforce robust masking, encryption, and role-based access to safeguard health data under the DPDP Act.

Conclusion:

- The integration of AI in healthcare holds transformative potential in India — especially in bridging rural gaps, speeding up diagnosis, and improving care affordability. However, without robust human oversight, regulatory mechanisms, and clinician training, AI risks deepening existing inequities and errors under the guise of automation. Ethical healthcare in the AI age must be rooted in transparency, trust, and human agency.

UPSC Mains Practice Question

Ques: Discuss the role of Artificial Intelligence in strengthening India's healthcare system. In light of recent initiatives, evaluate the importance of human oversight in ensuring ethical and effective AI deployment. (**250 words**)

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Recounting Velpur's story in ending child labour

Every year, June 12 is observed as World Day Against Child Labor (WDACL) under the auspices of the International Labour Organization (ILO). In an attempt to draw the attention of the world on the issue of child labour, the day brings together governments, employers and workers' organisations as well as civil society to work towards ending child labour. Though Sustainable Development Goal Target 8.7 calls on the global community to take effective measures to end child labour in all its forms by 2025, we are far from achieving this.

Child labour is prevalent all over the world, robbing many children of their basic right to live with dignity, enjoy their childhood and attain their full development potential. Across the world, 160 million children are estimated to be involved in child labour – which is almost one among 10 children. The Africa, Asia and the Pacific regions together account for almost nine out of every 10 children being in child labour. The COVID-19 pandemic exacerbated the situation for many underprivileged children, when their schools closed, and their parents lost their jobs/wages. Many children who dropped out of school, and who were forced to work to supplement their family income, have not returned to school.

The extent of child labour in India
India has a significant incidence of child labour. Census 2011 estimated that 43.53 lakh children in the age group of five to 14 were involved in child labour due to factors such as poverty, non-accessibility and illiteracy. Child labour is preferred in beedi, carpet-weaving and firework factories.

India enacted the Child Labour (Prohibition and Regulation) Act (CLPRA) in 1986, while the National Policy on Child Labour, 1987 sought to adopt a gradual and sequential approach with a focus on rehabilitation. Its action plan included strict enforcement of the CLPRA and implementation of the National Child Labour Project (NCLP) in areas where there is a high incidence of child labour. The CLPRA was replaced with the Child Labour (Prohibition and Regulation) Amendment Act, 2016, which prohibited the employment of children below 14 and had provisions for the prohibition on employment of adolescents (14-18 years) in scheduled hazardous occupations. The Right to Education now mandates that the state shall provide free and compulsory education to all children in the age group six to 14 years.

Most drives against child labour have been

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effective but only for a short time. There are several instances of children who were engaged earlier in labour and who dropped out of school returning to their workplace. But there is a success story.

The Velpur model
Velpur Mandal (tehsil) of Nizamabad district in erstwhile Andhra Pradesh (now Telangana), was once notorious for child labour. But in a dramatic way it became a rare exception of shunning child labour due to the total control, the commitment and the involvement of the local community. In June 2001, a drive involving the community was started in Velpur to ensure that all children in the age group of five to 15 years went to school and that no child would be engaged as labour in any form. After a sustained campaign for about 100 days, Velpur was declared to be a "child labour free mandal", on October 2, 2001. Twenty-four years later, there is 100% retention in schools and no child labour in a mandal once notorious for it.

The campaign to identify and track every out-of-school child and enrol them in schools was initially led by a committed set of officials. But the fact is that there was large-scale resistance in the beginning. Canards were spread that the teams moving in villages were part of a nationwide racket to kidnap children and sell their organs such as kidneys and eyes. Hotels refused to serve even tea, with those in hotels making sarcastic remarks that all their servers had joined school.

But after persistent efforts and discussions with the people, the tide began to turn. People began to cooperate and even transformed it as their movement. Children who were seen in work places were sent to bridge schools under the NCLP. Public meetings emphasised the necessity of education and the need for children to go to school. In these meetings, children recognised their (former) employers who let them stop work and go to school.

Under peer pressure, former employers also made a public announcement of writing off the balance amount (principal, the interest and penal interest) owed to them by the parents who took hand loans from them (the children were used as mortgage and as child labour till the amount was repaid). They even distributed school stationery to the children.

A study found that a total amount of about ₹35 lakh was written off – the price for a good cause. All sarpanchs signed a memorandum of understanding (as in the provisions of the Andhra Pradesh Compulsory Primary Education Rules, 1982), with the government (district education officer in the presence of the District Collector) to

ensure that all children in the five to 14 age group in their village were sent to school. The government in turn undertook to provide access, infrastructure and teachers. This was the first time that such an agreement had been signed between sarpanchs and the government. There is no child labour – an achievement that is very zealously guarded by the community. To cherish this proud achievement of being the first mandal in the State to be declared child labour free and to remind them of their commitment to sustain it, villagers erected boards in every village with the words, 'There is no child labour in our village'.

On October 8, 2021, as a part of the 'Azadi ka Amruth Mahotsav', the V.V. Giri National Labour Institute, (VVGNLI) Noida, Uttar Pradesh (under the Ministry of Labor and Employment, Government of India) organised a programme in Nizamabad. The event was to celebrate 20 years of successful intervention "to eliminate child labour and the declaration of Veilpur Mandal, as Child labour free". All sarpanchs, caste elders, zilla parishad members and people involved in the campaign were honoured for their role in sustaining it. The challenge made to the local media to identify at least one child who was not in school had no takers. A leading news magazine had an exclusive report on this event.

The Velpur story is well documented and has been appreciated by the ILO and the media. Velpur has been visited by many experts in the fields of education and child labour. The former President of India, A.P.J. Abdul Kalam, and members of the National Human Rights Commission India sent letters of appreciation.

The Velpur model, where there was the complete participation of the community in sustaining the fight against child labour, is an integral part of all training programmes that are organised by the VVGNLI. Made aware of its sustained success, the Parliamentary Standing Committee on Labour, Textiles and Skill Development asked the then District Collector, who led this campaign, to make a presentation before it on November 24, 2022. The Parliamentary Standing Committee appreciated and acknowledged its success.

What is vital
This is a community-led success story that is testimony of the axiom that social issues can be successfully and sustainably addressed only if they metamorphose into a people's movement. It is a proud moment for this writer to have been associated with it. He was the Collector of Nizamabad district, when this drive against child labour was taken up in Velpur in 2001.

Twenty-four years later, there is 100% retention in schools and no child labour in this mandal in Telangana

Tirumal Classes Quality education

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Context :

- On World Day Against Child Labour (June 12), the Velpur Mandal (in present-day Telangana) stands out as a rare example of a sustained, community-driven success in eliminating child labour. It is not just a success story but a replicable grassroots model of how public participation, official commitment, and social change can converge for lasting impact.

Child Labour in India – A Continuing Concern:

- As per Census 2011, over 43.5 lakh children (ages 5–14) were engaged in child labour.
- Industries such as beedi-making, carpet weaving, and fireworks remain major sectors where children are employed.
- Despite constitutional guarantees and progressive laws, poverty, illiteracy, and lack of access to education continue to drive children into labour.

Legal and Policy Framework:

- **Child Labour (Prohibition and Regulation) Act, 1986 (amended in 2016):** Prohibits employment of children below 14 and regulates working conditions of adolescents (14–18) in hazardous sectors.
- **Right to Education Act, 2009:** Mandates free and compulsory education for all children aged 6–14.
- **National Child Labour Project (NCLP):** Focuses on rehabilitation through special schools, bridge courses, and skill development.
  - Yet, legal efforts alone have shown limited impact, as enforcement is often weak and community resistance persists.

Velpur Model – A Case Study in Community Mobilization: In 2001, Velpur Mandal was known for widespread child labour.

- Within 100 days, through a campaign led by district officials and community leaders, it became the first mandal in Andhra Pradesh to be declared child-labour free.

Key Elements of Success:

1. Community Ownership: Initial resistance gave way to active participation through public meetings, peer pressure, and local leadership.

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2. Public Declarations: Former employers forgave debts and pledged support; villagers erected signs declaring child-labour-free status.
3. Institutional Integration: MoUs between government and village heads ensured commitment from both ends — infrastructure by the state, enrolment by the community.
4. Recognition and Sustenance: ILO, NHRC, and even former President Dr. A.P.J. Abdul Kalam appreciated the initiative.
5. Training modules at VVGNLI now include the Velpur model as a reference.

Key Takeaways:

- Legal enforcement must be backed by community engagement for durable social reform.
- Elimination of child labour is possible if interventions focus on education, awareness, social support, and remove economic compulsions.
- The Velpur model offers a blueprint for replication in other high-incidence regions.

Conclusion:

- The Velpur story proves that child labour is not inevitable. With leadership, empathy, and mass mobilisation, even deeply embedded social issues can be reversed. It reaffirms the belief that sustainable development is possible only when the community becomes a stakeholder in change.

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