AI in Healthcare

For Prelims: Garbhini-GA2, Telemedicine, World Health Organization, SARAH, eSanjeevani, Digital Personal Data Protection Act, 2023, National Health Policy (2017), Ayushman Bharat Digital Mission (ABDM), National Data and Analytics Platform (NDAP), BharatNet, National Health Authority, CDSCO (Central Drugs Standard Control Organization),

For Mains: Use of AI in healthcare, Major challenges of AI in healthcare in India and suggested measures to deal with them.

Source: TH

Why in News?

Indian researchers have developed **Garbhini-GA2**, an **Artificial Intelligence (AI) model** that **predicts fetal age from ultrasound images** with an error margin of just half a day, outperforming current methods with an error of up to 7 days. This development highlights the **vast potential of AI** to drive advancements **in healthcare** in India.

What are the Applications of AI in Healthcare?

- **Early Disease Detection and Diagnosis: AI tools** assist doctors in analyzing **medical images** like **X-rays**, **CT scans**, and **ultrasounds** quickly and accurately—vital for countries with **limited specialists**.
    - **AIIMS Delhi** has launched an AI platform - **iOncology.ai.** - designed for the early **detection of breast and ovarian cancer**.
    - **Also,** Mumbai-based **Qure.ai** detects **TB**, **pneumonia**, and **lung cancer** from chest X-rays, while Bengaluru startup **NIRAMAI** uses **AI-powered thermal imaging** to identify **early-stage breast cancer** without radiation.
- **AI in Telemedicine and Remote Consultations: AI-driven telemedicine** is bridging gaps in **rural healthcare** by improving access and efficiency.
    - Tools like **Practo's AI chatbot** and **Apollo's "Ask Apollo" assistant** offer **symptom-based guidance**, **instant medical advice**, and **appointment scheduling**, reducing **unnecessary hospital visits.**
- **AI for Drug Discovery: Indian startups and research labs** are using **AI** to create **affordable, patient-specific treatments**.
    - E.g., **Bengaluru-based InnAccel** developed **SAANS**, an **intelligent, infrastructure-free, multi-therapy system** that delivers **non-invasive breathing support** for **neonatal and pediatric patients**, helping **reduce infant mortality** in **rural clinics.**
- **AI in Wearables: AI-powered wearables and apps** are enabling Indians to manage **chronic diseases** like **diabetes** and **hypertension** more effectively.
    - **E.g., Delhi-based BeatO** offers an **AI-enabled glucometer** that tracks **blood sugar levels** and gives **real-time diet and medication recommendations.**

- **AI for Hospital Efficiency: Hospitals** are using **AI** to **reduce administrative workload** and **improve operational efficiency**.
    - **E.g., Microsoft's AI Network for Healthcare** has partnered with **eye hospitals** in India to **predict the progression of diabetic retinopathy**, helping prevent **blindness in high-risk patients.**
- **Enhancing Medical Education and Training: AI** is transforming **medical education and training** through **personalized learning** and **simulation of complex clinical scenarios**.
    - Platforms like **FundamentalVR** use **AI-powered VR and haptic systems** for realistic surgical practice, while **adaptive learning tools** customize curricula, enhancing **training efficiency** and **competency.**

What are the Key Initiatives Enabling the Adoption of AI in India's Healthcare System?

- **Ayushman Bharat Digital Mission (ABDM)**: **ABDM** provides a **unique digital health ID** for each citizen.
- **HealthLocker/Personal Health Records (PHR)**: It is a **digital national health database** backed by a **cloud-based storage system**, serving as a **single source of health data** for the nation.
- **National Health Stack (NHS)**: It includes platforms like the **National Health Analytics Platform**, supporting **data-driven healthcare solutions.**

Note: The **World Health Organization** has launched **S.A.R.A.H.** (*Smart AI Resource Assistant for Health*), a **generative AI prototype** that uses **advanced language models** to deliver reliable information on **key health topics** like **mental health**, **healthy habits**, and **non-communicable diseases** (e.g., **cancer**, **heart disease**, **lung disease**, **diabetes**).

What are the Major Challenges of AI in Healthcare in India?

- **Lack of High-Quality, Standardized Medical Data: AI models** require **large, diverse, well-labeled datasets**, but face limitations in India due to **fragmented data**—as **most hospitals still rely on handwritten prescriptions and non-digital records**.
    - Additionally, **AI trained on Western data** often performs poorly in India because of differences in **lifestyle** and **disease patterns.**
- **Limited AI Infrastructure in Rural Areas: Advanced AI tools** need **high-speed internet**, **cloud computing**, and **digital healthcare systems**, which are often lacking in **rural India**.
    - Platforms like **eSanjeevani** and tools like **Qure.ai's TB detection** face challenges in **remote areas** and **PHCs** due to **poor connectivity** and **lack of digital infrastructure** (e.g., **digital X-ray machines**).
- **Regulatory and Ethical Concerns:** India lacks a **clear AI governance framework**, leading to concerns over **patient privacy**, **bias**, and **accountability**.
    - While the **Digital Personal Data Protection Act, 2023** sets strict rules on **health data use**, weak enforcement and cases of **AI bias** hinder safe AI deployment.
    - Also, the **Digital Information Security in Healthcare Act (DISHA)**, proposed by the **Ministry of Health & Family Welfare in 2017** to regulate digital health data, **remains unenacted**.
- **Language and Localization Issue:** India's **linguistic diversity**, with **22 official languages** and numerous dialects, poses a major challenge for **AI implementation in healthcare**.
    - This **language barrier** can cause **misdiagnosis**, **miscommunication**, and reduce the **effectiveness of AI tools**.
- **Resistance from Healthcare Professionals: Doctors and nurses** often show **distrust towards AI**, fearing **job loss** or potential **misdiagnosis**.
    - Many remain **reluctant to use AI** for **critical decisions**, favoring **traditional clinical methods** instead.

ICMR Guidelines for AI Use in the Health Sector

In **March 2023**, the **Indian Council of Medical Research (ICMR)** released the **"Ethical Guidelines for Application of AI in Biomedical Research and Healthcare,"** outlining **10 key patient-centric ethical principles** for the use of **AI in healthcare**.

- **10 Guiding Principles:**
- **Accountability and Liability**: Regular **audits** to ensure **optimal AI performance**, with findings **made public**.
- **Autonomy**: Mandatory **human oversight** and **informed patient consent**, including **risk disclosure**.
- **Data Privacy**: Protection of **privacy** and **personal data** at **every stage** of AI use.
- **Collaboration**: Encourages **interdisciplinary** and **international partnerships** for responsible AI development.
- **Safety and Risk Minimization**: Focus on **misuse prevention**, **data security**, and **ethical review** by committees.
- **Accessibility, Equity, and Inclusiveness**: Ensure **AI infrastructure** is accessible to all, bridging the **digital divide**.
- **Data Optimization**: Minimize **biases and errors** from **poor data quality** or lack of representation.
- **Non-Discrimination and Fairness**: Promote **universal access** to **bias-free AI technologies**.
- **Trustworthiness**: Ensure AI is **valid**, **reliable**, **ethical**, and **lawful** to build **user confidence**.
- **Transparency**: Provide **clinicians** with clear methods to test AI's **validity** and **reliability.**

Frameworks: India's frameworks supporting AI in healthcare include the Digital Health Authority under the **National Health Policy (2017)**, DISHA 2018, and **Medical Device Rules, 2017**.

How Can India Effectively Integrate AI into Healthcare?

- **Build High-Quality, Localized Healthcare Datasets:** India should **expand the Ayushman Bharat Digital Mission (ABDM)** to **standardize electronic health records (EHRs)** across hospitals and leverage platforms like the **National Data and Analytics Platform (NDAP)** for **anonymized AI training data**.
    - Leading hospitals like **AIIMS, Apollo, and Tata Memorial** can share **de-identified data** with **AI startups** (e.g., **Qure.ai**, **SigTuple**), ensuring datasets represent **rural populations**, **women**, and **ethnic minorities** to **reduce bias**.
- **Strengthen AI Infrastructure in Rural Healthcare: eSanjeevani** can integrate **offline-capable AI symptom checkers** for use in **low-connectivity areas**.
    - **ASHA workers** can be equipped with **AI tools** (e.g., **portable ultrasound devices** like **Butterfly Network's**) while **BharatNet** and **Jio's 5G** can support **cloud-based AI radiology** in **district hospitals**.
- **Establish Clear AI Regulations & Ethical Guidelines: CDSCO (Central Drugs Standard Control Organization)** should establish clear **approval pathways** for **AI-based diagnostics**, similar to the **US's AI/ML Action Plan**, while **NITI Aayog's Responsible AI guidelines** must be enforced in healthcare.
    - Mandatory **algorithm audits** (for **caste/gender bias**) and a strengthened **Digital Personal Data Protection Act, 2023** are essential to protect **patient data** and ensure **ethical AI use**.
- **Train Doctors & Build AI Awareness:** Include **AI and Digital Health modules** in **MBBS and nursing curricula**, and let the **National Health Authority** train doctors in using **AI tools** like **predictive analytics**.
    - **AI developers** must offer **clear explanations** for algorithmic decisions to ensure **clinical trust** and **transparency.**
- **Launch Public Awareness Campaigns:** To build **patient trust and acceptance**, India should launch **public awareness campaigns** explaining the **benefits and limitations of AI in**

healthcare in **simple, relatable terms**.
    - Using **media channels** like **social media**, **TV**, and **community outreach**, and following models like the **Pulse Polio campaign**, can boost **AI awareness and adoption**.

Conclusion

AI in Indian healthcare offers **transformative potential**—enhancing **diagnostics**, **telemedicine**, and **drug discovery**—but faces challenges like **data bias**, **infrastructure gaps**, and **regulatory hurdles**. Effective integration requires **robust datasets**, **rural AI adoption**, **clear regulations**, and **clinician training**. **Ethical frameworks** like **ICMR's guidelines** ensure **responsible AI use**, balancing **innovation** with **patient safety** and **equity**.

Drishti Mains Question:

Q. Discuss the role of Artificial Intelligence in transforming India's healthcare system. What challenges hinder its effective implementation?

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. With the present state of development, Artificial Intelligence can effectively do which of the following? (2020)

1. Bring down electricity consumption in industrial units
2. Create meaningful short stories and songs
3. Disease diagnosis
4. Text-to-Speech Conversion
5. Wireless transmission of electrical energy

Select the correct answer using the code given below:

(a) 1, 2, 3 and 5 only

(b) 1, 3 and 4 only

(c) 2, 4 and 5 only

(d) 1, 2, 3, 4 and 5

Ans: (b)

Mains:

Q.1 What are the areas of prohibitive labour that can be sustainably managed by robots? Discuss the initiatives that can propel the research in premier research institutes for substantive and gainful innovation. **(2015)**