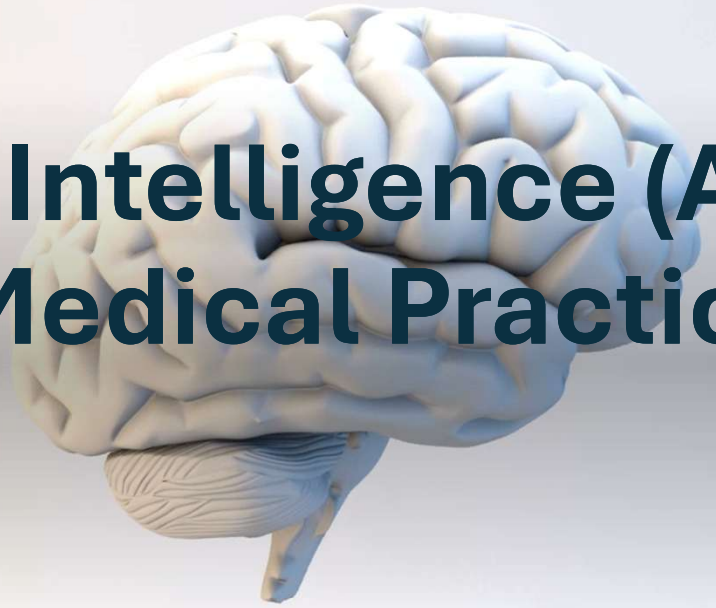
Artificial Intelligence (AI) in Daily Medical Practice



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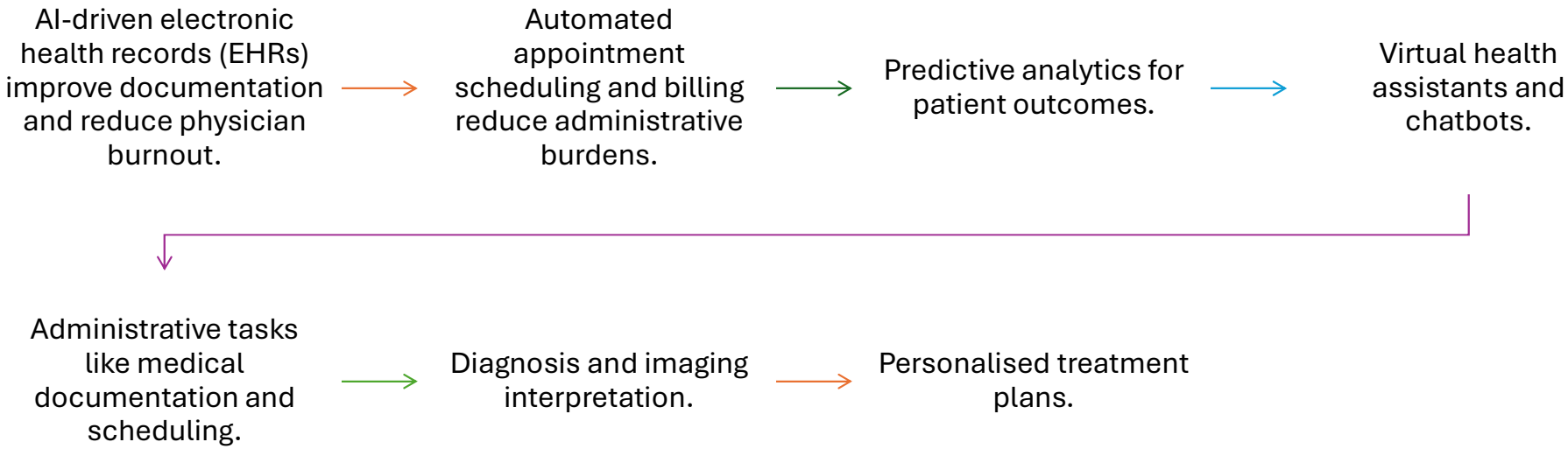
The Role of AI in Medical Practice



Benefits and Challenges of AI in Healthcare

Enhanced Accuracy: AI reduces diagnostic errors and supports clinical decision-making.

Increased Efficiency: Automating repetitive tasks allows physicians to focus on patient care.

Personalised Treatment: AI tailors treatment strategies based on patient-specific data.

Improved Access to Care: AI-powered telemedicine and chatbots provide medical advice remotely.

Challenges

Data Privacy and Security: Patient data must be protected to comply with regulations like GDPR and HIPAA.

Bias in AI Algorithms: Training data must be diverse to avoid biases that lead to health disparities.

Physician Acceptance: Some clinicians are sceptical about AI's reliability and integration into clinical practice.

Legal and Ethical Concerns: Issues like liability in AI-driven decisions need to be addressed.

Current Applications of AI in Different Medical Fields

Radiology and Imaging

AI-powered tools can detect abnormalities in X-rays, CT scans, and MRIs with accuracy comparable to experienced radiologists.

Algorithms assist in detecting cancer, fractures, and neurological disorders earlier than traditional methods.

Pathology and Laboratory Medicine

AI-driven analysis helps identify malignant cells in histopathological slides.

Automated systems enhance workflow efficiency in laboratories.

Cardiology

AI analyses ECGs to detect arrhythmias and predict cardiovascular risk.

Echocardiogram interpretation benefits from machine learning models that improve diagnostic accuracy.

Current Applications of AI in Different Medical Fields

Oncology

AI assists in precision medicine by identifying genetic markers for targeted therapy.

Tumour detection and response assessment are enhanced by AI in imaging.

Surgical Assistance

AI-enabled robotic surgery improves precision and reduces complications.

Preoperative planning is enhanced using AI-based 3D modelling.

Administrative Efficiency

AI-driven electronic health records (EHRs) improve documentation and reduce physician burnout.

Automated appointment scheduling and billing reduce administrative burdens.

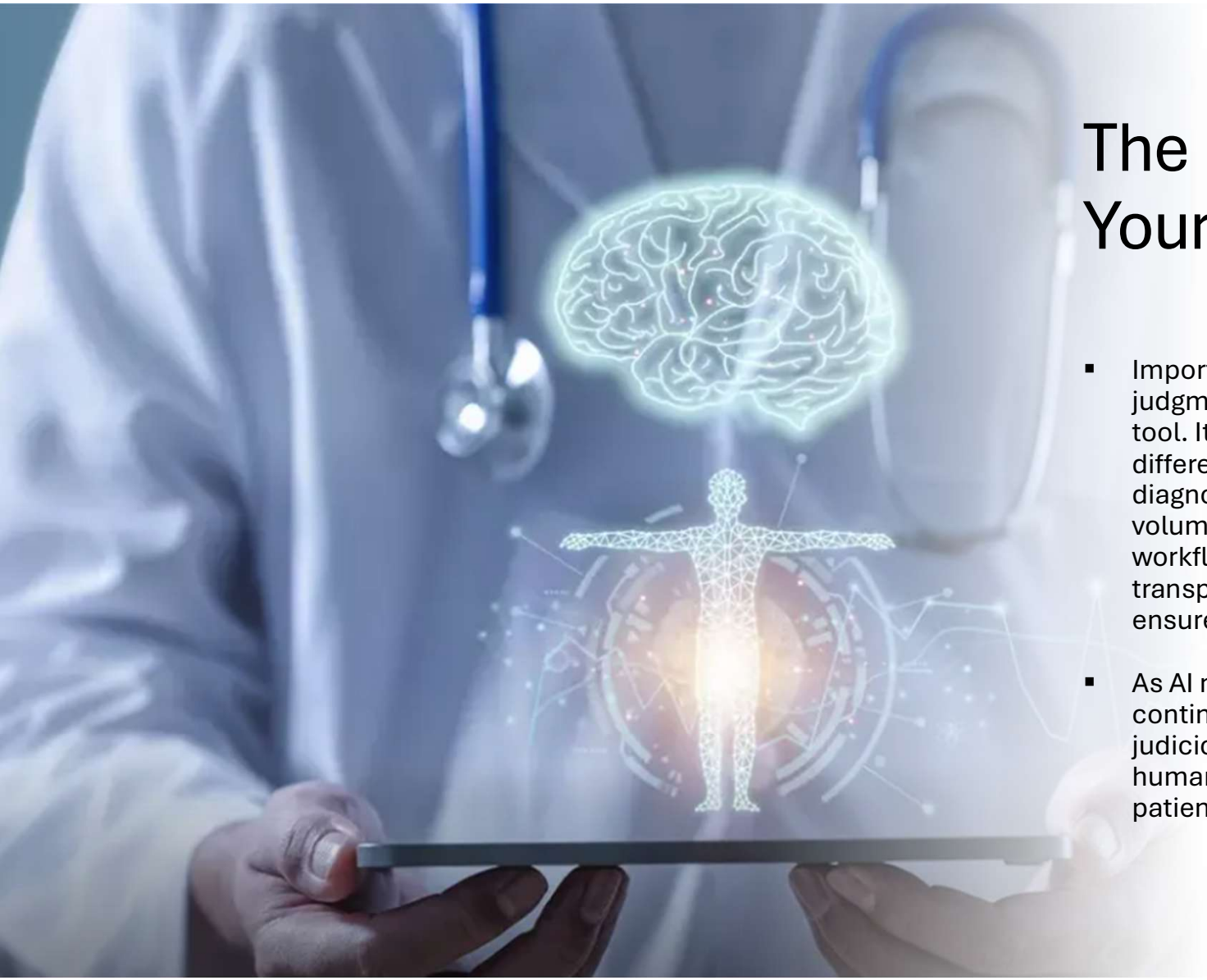
The Importance of Data in Healthcare

Data forms the foundation of AI in medical practice. High-quality, structured, and comprehensive datasets are critical for training reliable AI models. In clinical contexts, data includes:

- Electronic health records (EHRs)
- Imaging data (radiology, pathology, etc.)
- Genomic and proteomic information
- Laboratory results and clinical notes
- Patient-reported outcomes and wearable device data
- The quality, diversity, and integrity of data directly affect the accuracy and generalisability of AI systems. Proper data governance, including privacy protection, standardised data formats, and interoperability across platforms, is essential to ensure ethical and effective AI integration in clinical workflows.

Diagnosis

- Artificial Intelligence is increasingly being used to augment clinical decision-making, particularly in diagnostics. AI algorithms—especially those based on machine learning and deep learning—can analyse large volumes of clinical, imaging, and laboratory data to identify patterns not easily discernible by humans.
- In radiology, AI systems can detect pulmonary nodules, intracranial haemorrhages, and fractures with sensitivity and specificity comparable to expert radiologists. In pathology, AI supports digital slide analysis for early cancer detection. In cardiology, machine learning algorithms interpret ECGs to predict arrhythmias and heart failure risk.



The Power is in Your Hands

- Importantly, AI does **not** replace clinical judgment but serves as a decision-support tool. It can highlight abnormalities, suggest differential diagnoses, and reduce diagnostic delays, particularly in high-volume settings. Integration into clinical workflows requires validation, transparency, and clinician oversight to ensure safety and reliability.
- As AI matures, its role in diagnostics will continue to grow—provided it is used judiciously, with high-quality data and human oversight remaining central to patient care.

AI Hallucinations

- AI hallucinations refer to instances where artificial intelligence systems generate incorrect or fabricated information that appears plausible but is not based on actual data. This phenomenon poses significant risks in healthcare, as reliance on such misinformation can lead to misdiagnoses, inappropriate treatments, and compromised patient safety.

- For example, AI-powered transcription tools have been reported to produce inaccurate medical records, sometimes inventing details not present in the original consultations. These errors can mislead healthcare providers and affect clinical decisions.

- To mitigate these risks, it is essential to implement robust detection and correction mechanisms, ensure continuous human oversight, and establish clear ethical and regulatory guidelines. By doing so, the healthcare industry can harness the benefits of AI while safeguarding against potential harms associated with AI hallucinations.

The Smart Choice: Owning Your Integration Future

To remain agile in an evolving healthcare landscape, organisations must consider the long-term impact of their integration choices. A well-designed interoperability strategy should allow for:

- **Customisation without complexity** – Organisations should be able to tailor their integration capabilities without having to build from the ground up. This ensures they can adapt to new regulatory requirements and technological advancements.
- **Scalability without skyrocketing costs** – A robust data platform should enable growth without the exponential cost increases often associated with rented solutions.
- **Security and compliance by design** – Healthcare providers cannot afford to compromise on data privacy and security. A trusted interoperability partner should offer built-in compliance with international standards.

Ref: Quick News March 2025 *Henry Adams, Country Manager South Africa, InterSystems*

AI should be seen as a **complement** rather than a **replacement** for human expertise.

The ultimate goal is to create a synergy between technology and clinical judgment to provide optimal patient care.