Many **barriers** exist that **prevent** the successful development and **adoption** of **well-performing, context specific AI** tools in **low-resource healthcare** settings

# Artificial intelligence for strengthening healthcare systems in low- and middle-income countries: a systematic scoping review


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## Introduction

- **Artificial Intelligence (AI)** applications in medicine have **rapidly developed** in recent years
- AI has potential to **strengthen health systems** by improving **capacity** and **capabilities** in low-resource settings
- There is **limited research** exploring the implementation of **AI in healthcare in LMICs**

## Methods

- Followed the **PRISMA-ScR guidance** (Preferred Reporting Items for System Reviews and Meta-Analyses Extension for Scoping Reviews)
- **Databases searched** included Scopus, EMBASE, MEDLINE, Global Health and APA PsycInfo Databases, and Google Scholar for grey literature
- Variety of **search terms** consisting of **concepts related to AI, healthcare, and LMICs** to identify a broad range of peer-reviewed, original records
- **Screening** performed using the Covidence Systematic Review Software according to the criteria in Table 1

## Results

- From **1126 articles** found in our search, **10 articles** were included in our analysis
- **Geographically,** 4 studies were conducted in China, while 6 represented LMICs across Latin America, South Asia and Sub-Saharan Africa - mostly representing upper-middle income countries
- The **clinical applications** of the AI tools included diagnosis, screening, patient triage, and care planning and provision
- Regarding **AI tool training**, only 50% of studies described the **algorithms** and 50% described **training data** used
- 70% of studies used **black box** AI tools **without interpretable outputs**
- **Discordance** between clinicians and AI tools was attributed to using **training data from outside their applied contexts**
- **Higher workloads** were reported in clinical settings with low capacity for adopting new AI tools, while **shortened time to diagnosis/care** was seen in some settings
- **Poor user friendliness** was a barrier to effective implementation
- **Distrust** of AI tools was expressed by some clinicians and patients in Chinese contexts
- **Little evidence** exists to link AI tools with **cost-effective improvements in health outcomes**
- **Poor accounting for local contexts** was a common theme in our included studies

| PICOS | Inclusion | Exclusion | |
|---|---|---|---|
| Population | • Health care workers and/or patients, given AI implemented in a country defined as a low- and middle-income country | • Non-health-related sample<br>• Health care workers, given AI implementation in high-income or unspecified country | Identification |
| Intervention | • AI Implemented in a global health context | • AI not implemented, only theoretically described<br>• Focus on model testing, no real-world application | Screening |
| Comparison | • Comparison of AI intervention to standard methods<br>• Qualitative evaluation of sample population to AI intervention | • No form of comparison conducted | |
| Outcome | • Evaluation of AI in a global health context | • AI used as a secondary tool to analyse another outcome | Eligibility |
| Study Design | • Any primary research, qualitative or quantitative<br>• Full text available<br>• Peer-reviewed | • Secondary/synthesis research<br>• Only abstract available<br>• Commentaries<br>• Letters, letters to editor<br>• Policy briefs<br>• Study protocols | |
| Language | • English | • Non-English full-text | Included |
| Timeframe | • Published after 1st Jan 2009 | • Published until 31st Dec 2008 | |

**Table 1:** PICOS framework used for inclusion and exclusion criteria

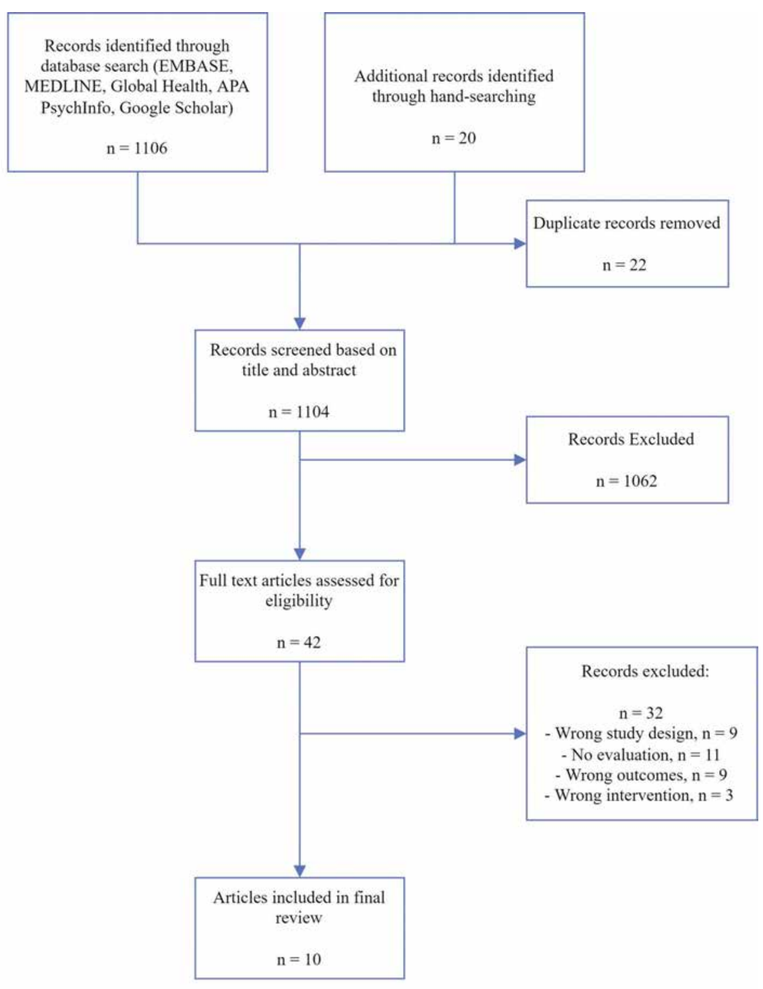


**Figure 1:** Flowchart of Study Identification

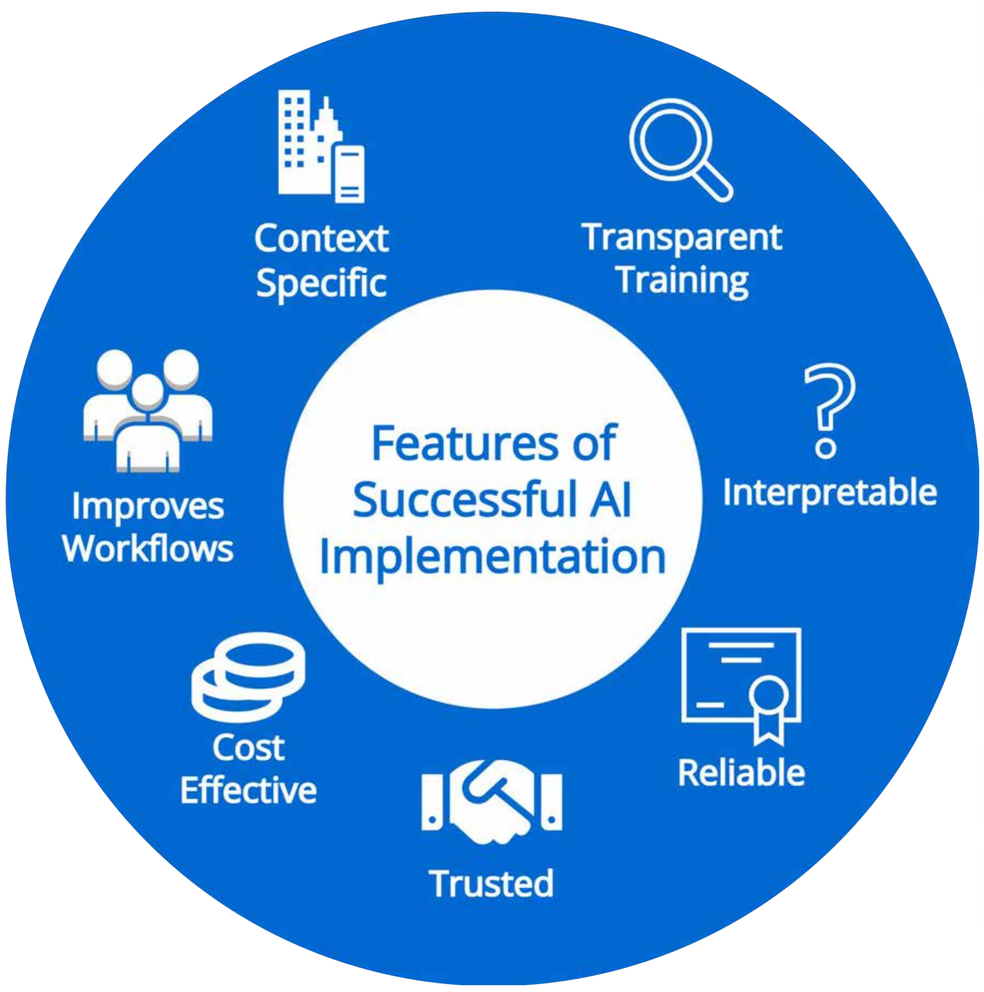


**Figure 2:** Features of Successful AI Implementations as reported in our included studies

**Figure 3:** Number of Studies Reporting Positive, Mixed or Negative Outcomes for Each Dimension

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