RAISING AWARENESS: THE TEDDY KIDS' WAY

Technology and Health: AI's Growing Role in Paediatric Care

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19-09-2026, Bari, Italy

„It’s not that I don’t believe it should be stopped. I don’t believe it could be stopped”

Geoffrey Hinton – 2024 Nobelist Prize in Physics



Technology and Health
AI's Growing Role in Paediatric Care

How can accelerating AI development translate into better care for children?

Our example: a child with cyanotic heart problem undergoing surgical procedure.

Clinical perspective:

- Before surgery: is the child's condition stable?
- During surgery: what is the immediate result of the procedure?
- After surgery: how is the child recovering?

How its done

The future?

Conceptual example — proposed AI functions require validation.

From Data to Decisions

Connect information throughout the child's care

Information	Clinical purpose
Echocardiography and cardiac anatomy	Characterise the defect and assess the repair.
Oxygen saturation, ECG and haemodynamic measurements	Assess physiological status and identify changes.
Postoperative trends and clinical observations	Evaluate recovery and investigate deterioration.

How AI can be used?

- Assess signal quality and flag unreliable measurements.
- Combine imaging and physiological data.
- Highlight changes that require clinical intervention.
- Evaluate, during surgery goal set up by clinical team

From Algorithms to Bedside

Goal of using the AI - One integrated system across three stages of care.

Stage	Equipment and purpose
Before surgery	A paediatric pulse oximetry sensor, with ECG monitoring when indicated, supports baseline assessment.
During surgery	A central workstation combines intraoperative echocardiography with physiological monitoring to support assessment of the surgical procedure.
After surgery	Bedside monitoring supports recovery assessment. Selected patients may receive home monitoring under a defined protocol.

Collaboration is the KEY

Clinical teams define the need. Engineers develop the system. Research evaluates measurement reliability, AI performance and patient benefit.

What is missing now?

DATA

AI and Smart Medical Devices in Paediatric Care

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Following procedure, the team reviews:

- Echocardiographic findings, including residual defects and cardiac function.
- Haemodynamic measurements.
- Oxygenation and other physiological signals.

This example show possible assist in measurements, align data in time and highlight findings for reassessment.

Improved oxygen saturation alone does not establish a successful procedure. The surgical team interprets the combined evidence and decides whether further action is necessary.

Can integrated AI support help identify clinically significant problems earlier and more accurately, without excessive false alarms?

YES but we need…

DATA

Children Are Not Small Adults — Neither Should Their AI Be

AI must allign with child's anatomy and changing physiology.

- Device design: appropriate sensor size, gentle skin contact, secure attachment and comfort.
- Signal quality: reliable measurements despite movement and practical limitations.
- AI interpretation: age, cardiac anatomy and the physiological changes associated with surgery.
- Clinical validation: evidence in the intended paediatric population and at each stage of care.

The same child will have a different physiological context before and after procedure. The AI must account for that change.

Who Should Decide what a **CHILD** needs from AI?

„One device”

Different perspectives.

Perspective	Essential question
Clinician	Are the measurements reliable and clinically useful?
Engineer	Does the system work consistently in its intended setting?
Parent or caregiver	Do I understand the information and know what to do when an alert appears?
Child	Can I sleep, move and play comfortably while wearing it?

Building paediatric care with Young Patients Advisory Groups

Children and families can help shape the AI equipment.

- Sensors: comfort, appearance and ease of wearing.
- Interfaces and alerts: understandable information and clear instructions.
- Daily use: effects on sleep, play and family routines.
- Evaluation: acceptability, practical burden and confidence in using the device.

A role for Young Persons' Advisory Groups

- They offer a model for involving young people in identifying needs, reviewing prototypes and selecting outcomes that matter to patients.
- Caregiver experience and observation of the child's comfort are essential.

Success means reliable clinical support, demonstrated patient benefit and technology that fits the child's life.

Where is the AI in paediatric ?

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- *Wolf, R.M., Channa, R., Liu, T.Y.A. et al. Autonomous artificial intelligence increases screening and follow-up for diabetic retinopathy in youth: the ACCESS randomized control trial. Nat Commun 15, 421 (2024). https://doi.org/10.1038/s41467-023-44676-z*

Any last words?

„We have a technology whose development is accelerating. In a few months, we will laugh at what impresses us today.”

Prof. Andrzej Dragan, Physicist, „RzeczpospolitAI”

Thank you for attendence

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