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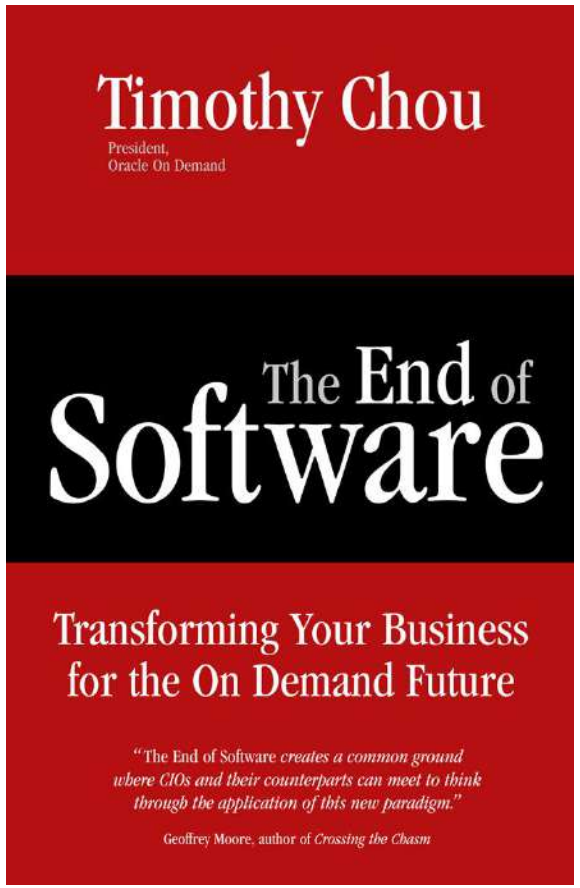
EUROPEAN PAEDIATRIC TRANSLATIONAL RESEARCH INFRASTRUCTURE

Paediatric Moonshot – Accelerating Global Paediatric Translational AI Research

Dr. Timothy Chou, BevelCloud

EPTRI– BOLOGNA – 15/MAR/2025



Stanford

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Cloud Computing

CS309A

STANFORD SCHOOL OF ENGINEERING

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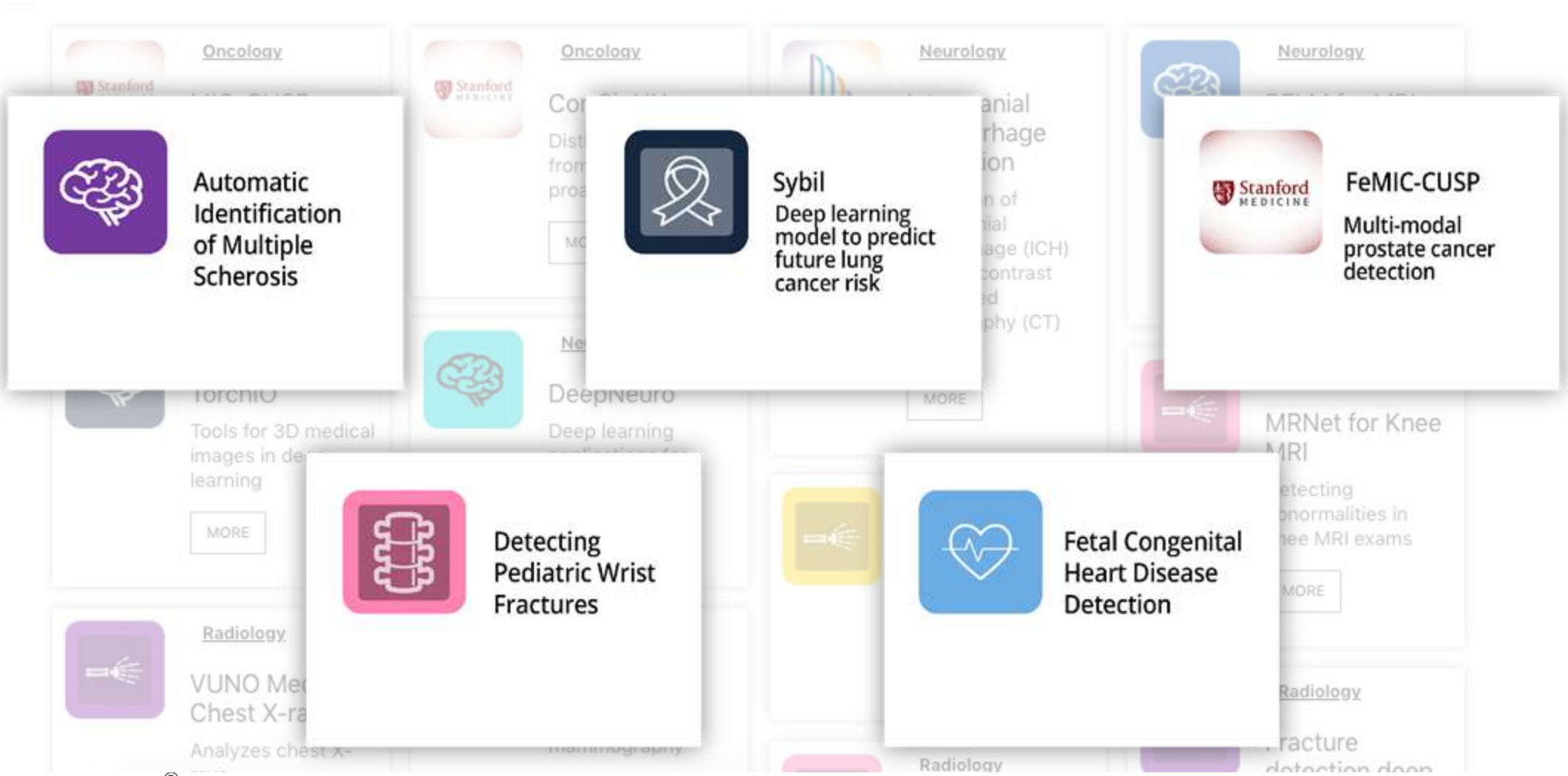
AI in medical imaging on the research bench

(appcommons.bevelcloud.ai)



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Even FDA approved AI Applications are trained on small data sets — and are not performing….

..studies have shown that the performance of many radiologic AI models ***worsens when they are applied to patients who differ from those used for model development…***

The Current and Future State of AI Interpretation of Medical Images
Pranav Rajpurkar, Ph.D., and Matthew P. Lungren, M.D., M.P.
June 2023

The NEW ENGLAND JOURNAL of MEDICINE

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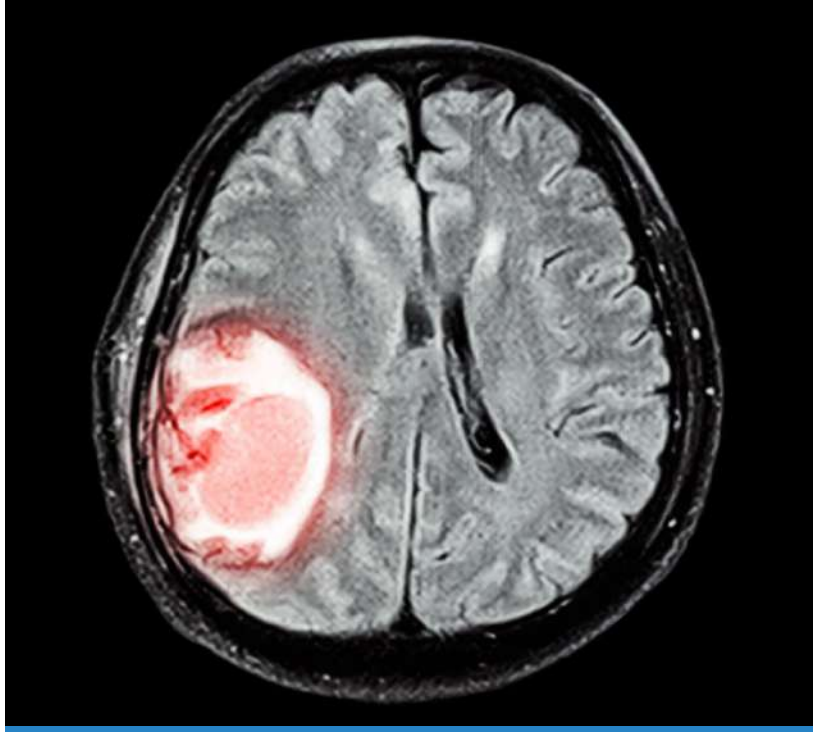
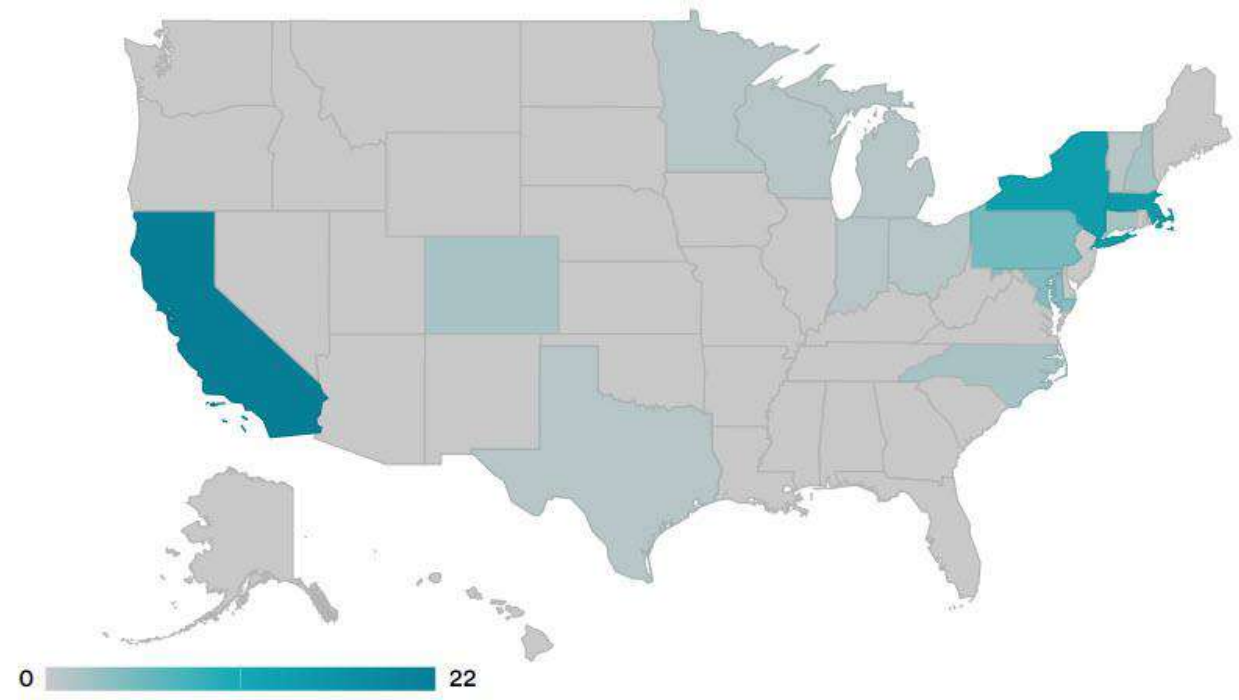


Why? Data for AI training is NOT diverse nationally



REBECCA ROBBINS/STAT
SOURCE: "GEOGRAPHIC DISTRIBUTION OF US COHORTS USED TO TRAIN DEEP LEARNING ALGORITHMS," JAMA 2020.

STAT

3 states provide almost **70%** of the data in adult medicine

only **13** of the remaining **47** provide any data

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Courtesy of Curt Langlotz

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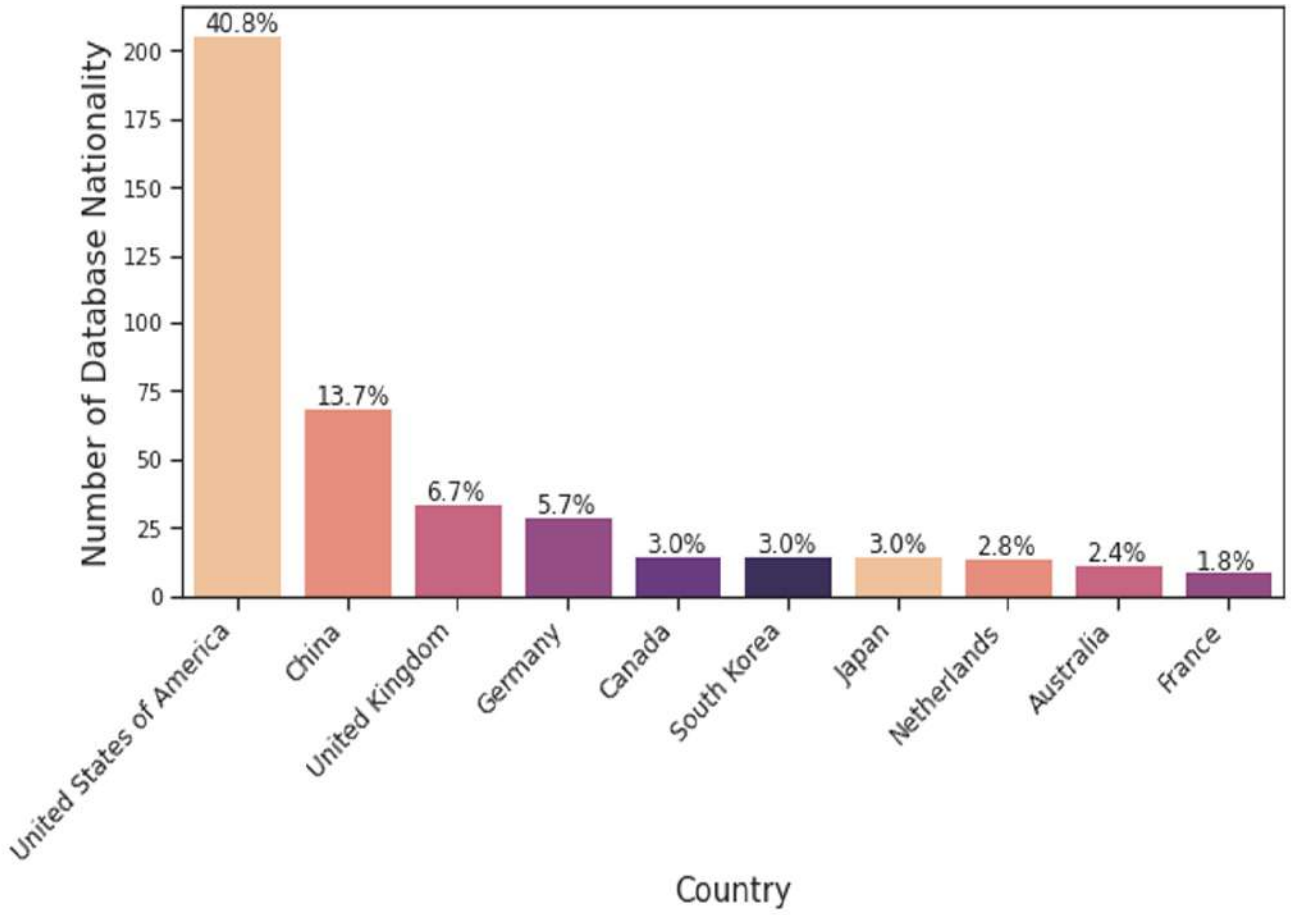
Data for AI training is NOT diverse globally



2 countries provide almost **50+%**

8 countries of the **193** remaining countries supply the rest

Celi LA, Cellini J, Charpignon M-L, Dee EC, Dernoncourt F, Eber R, et al. Sources of bias in artificial intelligence that perpetuate healthcare disparities—A global review. PLOS Digital Health. 2022. https://doi.org/10.1371/journal.pdig.0000022

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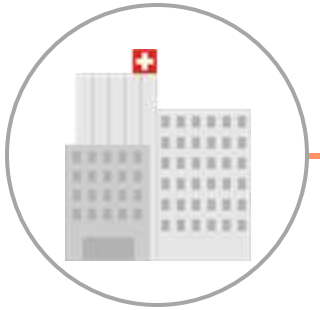
But there is big data
in the clinics, research labs, ambulances and hospitals



Real-time Data in Clinical Machines	Real-time Data in Research Machines	Offline PACS	Offline EMR
• Ultrasound • CT • MRI • Xray • PET • Microscope • Blood Analyzer • ECG/EKG • EEG • Bedside Monitor	• Next-gen sequencers (NGS) • RNA sequencers • Sanger sequencers • Nuclear magnetic resonance (NMR) spectrometers • Mass spectrometers • Multiplexed ion beam imaging (MIBI) machines • Spatial proteomics imaging systems • Spatial genomic machines	• Syngo • AGFA • Muse • Carestream • Centricity • ….	• Epic • Cerner • …

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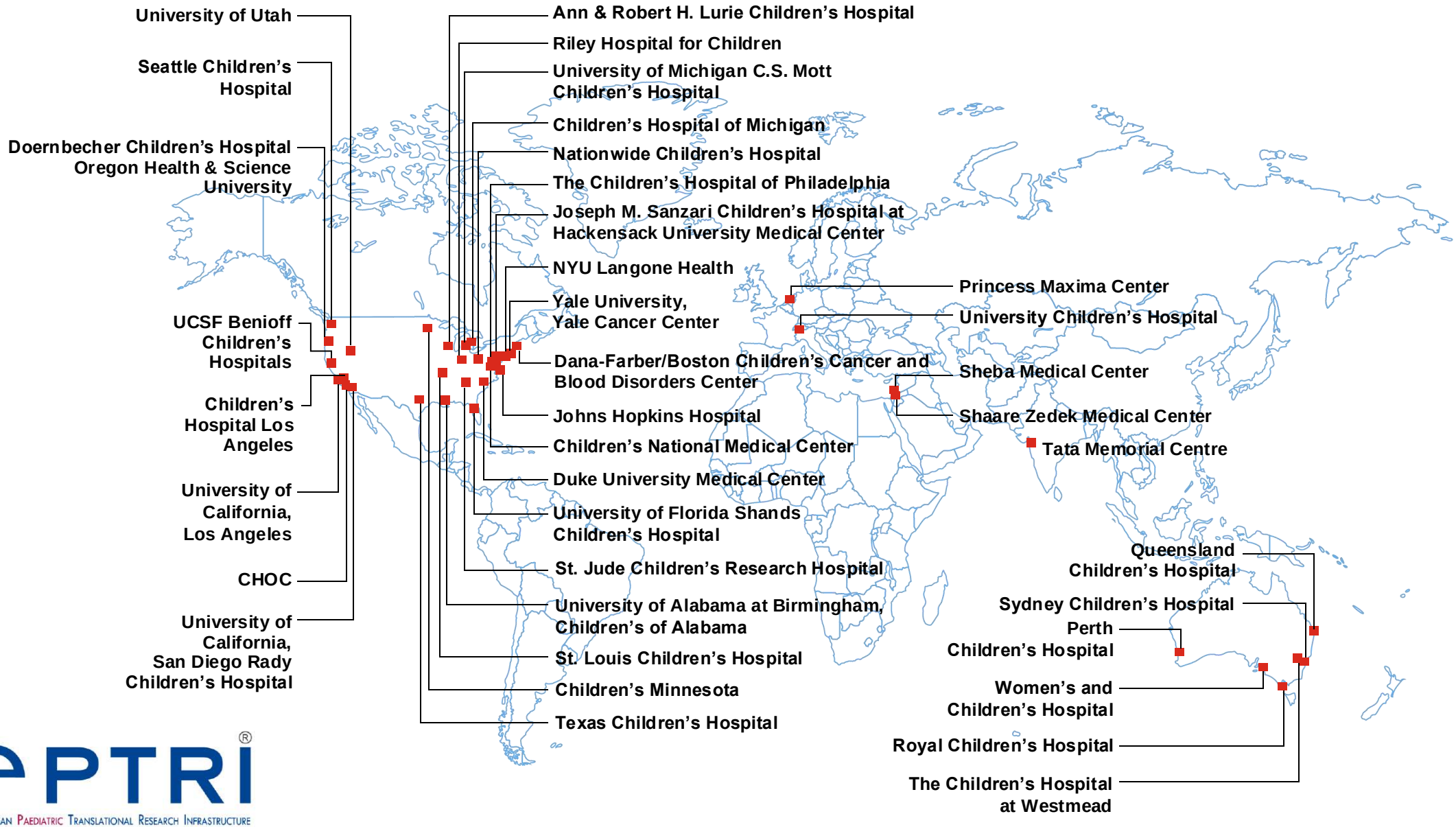
And diverse data all around the world



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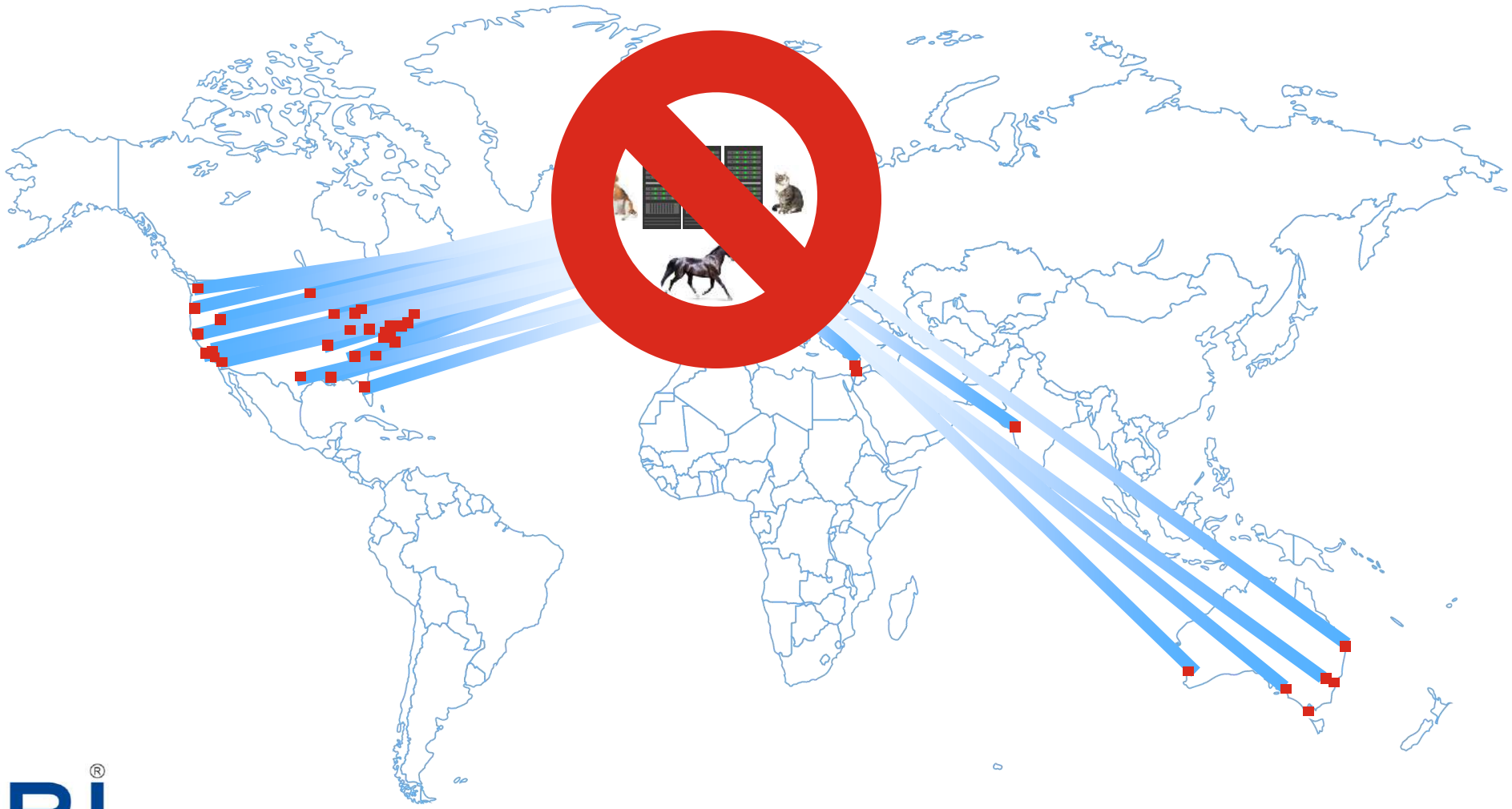
Centralized AI will never work in medicine



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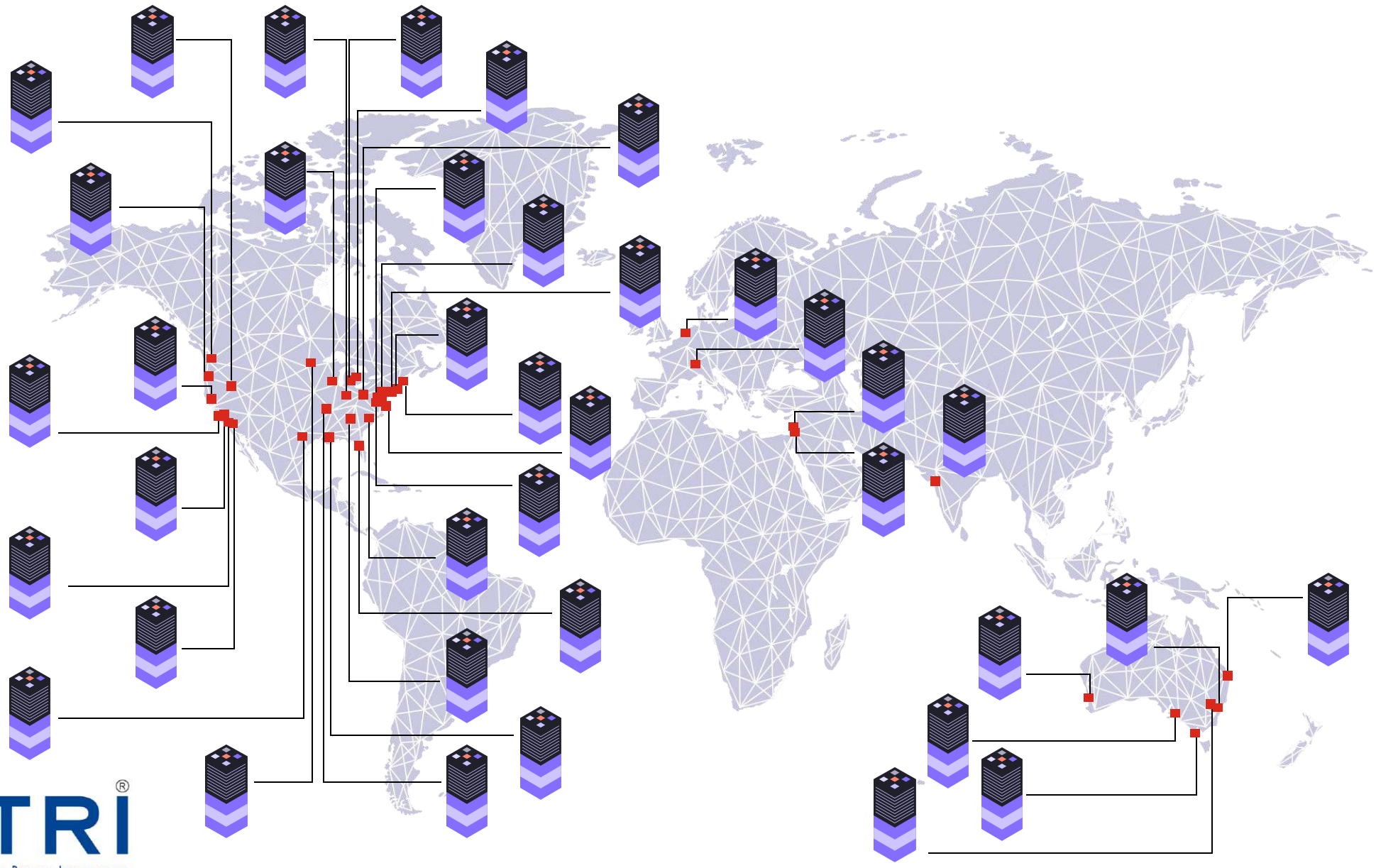
Instead, we've engineered a Distributed AI Infrastructure



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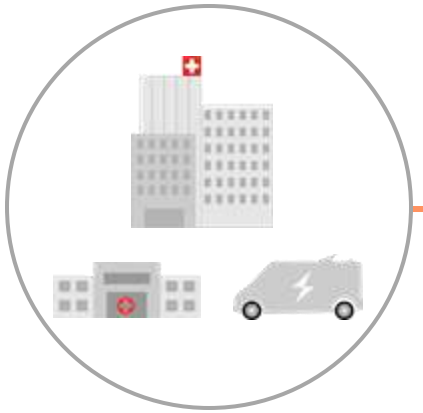
BevelCloud Distributed AI Cloud Infrastructure
Secure, privacy-preserving, real-time infrastructure



Real-time Data in Clinical Machines	**Real-time Data in Research Machines**	**Trial Protocol**	**EMR**
• Ultrasound • CT • MRI • Xray • PET • Microscope • Blood Analyzer • ECG/EKG • EEG • Bedside Monitor	• Next-gen sequencers (NGS) • RNA sequencers • Sanger sequencers • Nuclear magnetic resonance (NMR) spectrometers • Mass spectrometers • Multiplexed ion beam imaging (MIBI) machines • Spatial proteomics imaging systems • Spatial genomic machines	• Phase 1 • Phase 2 • Phase 3	• Epic • Cerner • …

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12 Features
Distributed AI Cloud infrastructure in Healthcare and Life Sciences

1. Secure Distributed Compute & Storage Services

2. Secure Network Services

3. Distributed Real-time Data Services

4. Distributed Offline Data Services

5. Distributed AI Application Control

6. Real-time Inference Service

7. Privacy Preserving Fine-Grained Data Sharing

8. Privacy Preserving Image Sanitization

9. Privacy Preserving Distributed Learning Services

10. Clinical Partners

11. Governance Framework

12. Scalable Business Model

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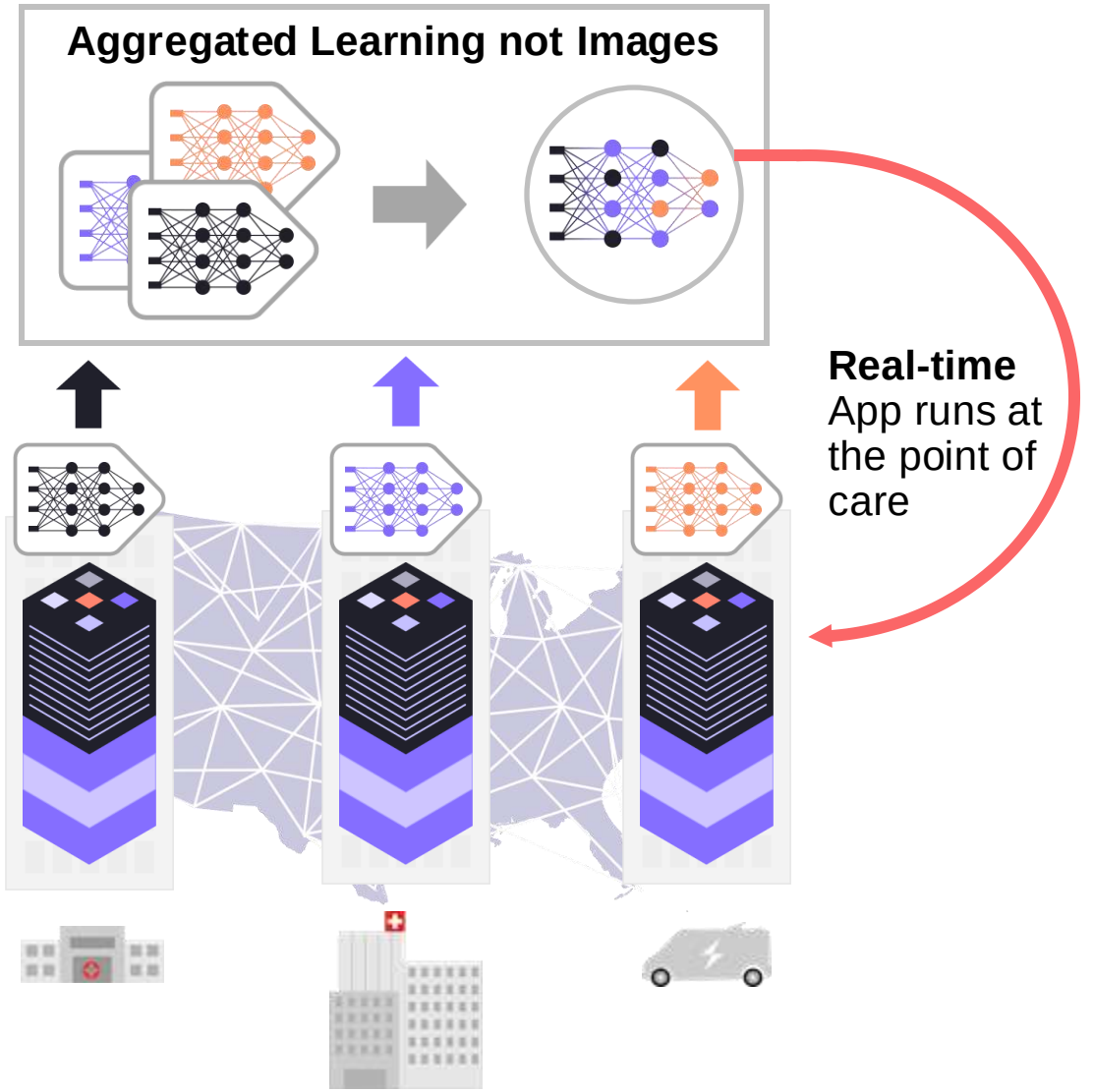
For imaging —
Translate AI Research from the bench to the bedside
Distributed AI Lab for Healthcare and Life Sciences

Privacy Preserving
Aggregate only learning from the image

Network Preserving
Transfer learning
NOT large images



Real-time
App runs at the point of care

32
Sites/Zones

ALL
imaging

3000+
Distributed servers

2,000+ TB
Training Data

Complete the Distributed AI Lab

$40M

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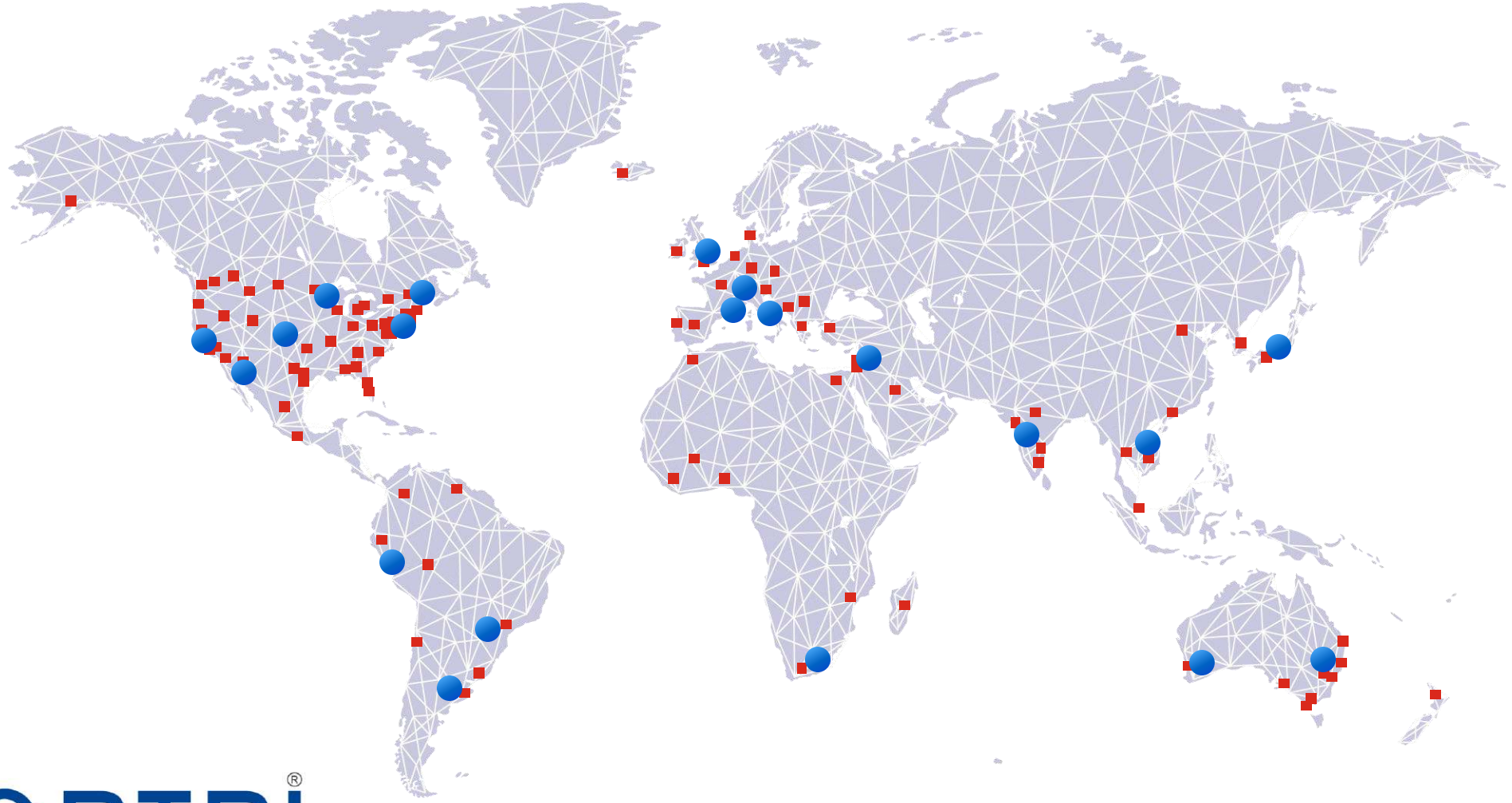
For text — Scalable, global, fast, efficient recruitment
Scale both patients and drug trials



"What drug trials is she qualified for?"

= PATIENT AGENT

@Hospital
@Clinic

= PROTOCOL AGENT

@ AstraZeneca, Bristol Myers Squibb, Roche, janssen

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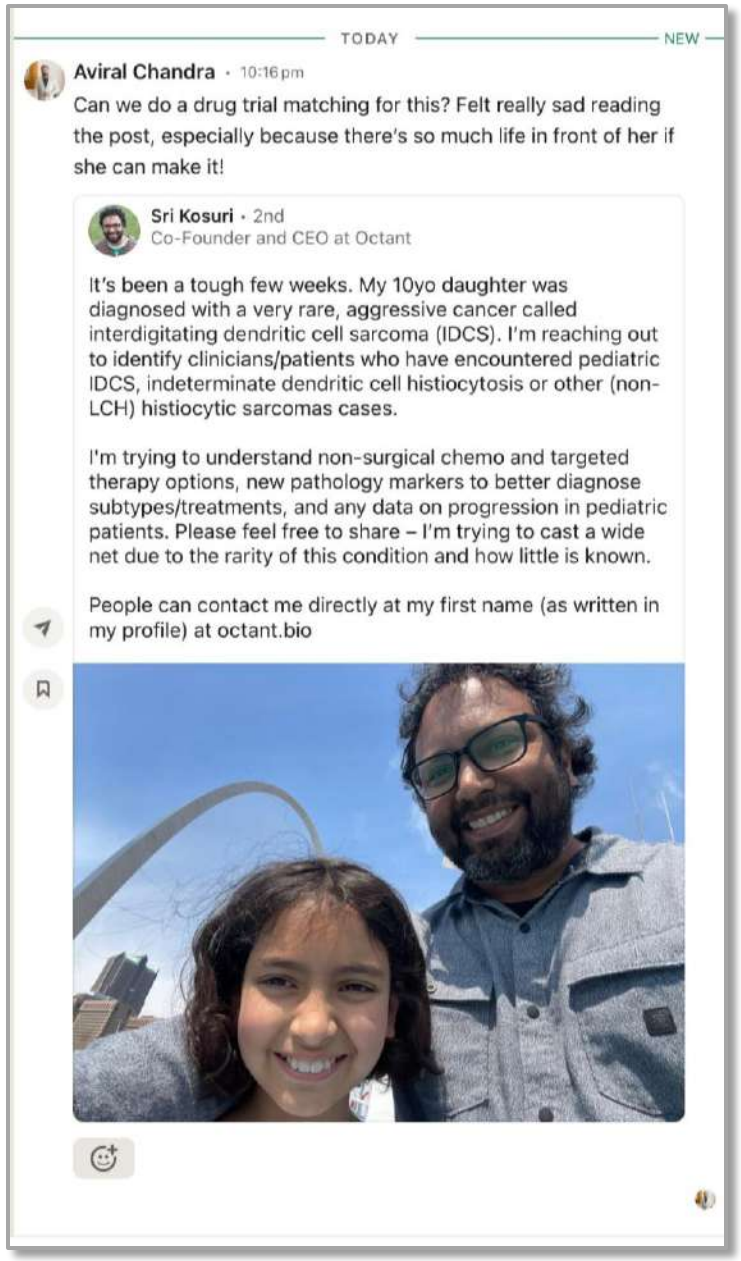
Today's "technology" — LinkedIn

"My 10yo daughter was diagnosed with a very rare aggressive cancer called interdigitating dendritic cell sarcoma (IDS)…

I'm trying to understand non-surgical chemo and targeted therapy options

…People can contact me directly at …."



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- Subscribe to the podcast https://pediatricmoonshot.buzzsprout.com

Podcast guests:

Dr. Anthony Chang, who inspired the mission and is Chief Innovation Officer at CHOC
Dr. Marc LaLande, VP of Research at Shriners.
Dr. Laura Jana, who with her books and TED talks advocates for children's healthcare worldwide.
Dr. Diana Ferro, who has returned to Italy to be a leading Research & Data Scientist @OPBG
Dr. Charitha Reddy, Clinical Assistant Professor, Pediatrics - Cardiology at Stanford Children's
Dr. Rubin Pillay, Professor of Medicine and Assistant Dean, School of Medicine University of Alabama
Dr. Hanmin Lee, Chief, Division of Pediatric Surgery, UCSF
Dr. Wyman Lai, Co-Medical Director, CHOC Heart Institute at CHOC Children's, author of the seminal text on echocardiography


PEDIATRIC MOONSHOT
Reduce healthcare inequity, lower cost and improve outcomes for children rurally, nationally and globally
by creating privacy-preserving, real-time AI applications
based on access to data from 1,000,000 healthcare machines in all 500 children's hospitals in the world