# Remote Operation of CT/MRI: Future or Fantasy?

## An Overview of Concepts, Benefits, and Challenges

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# Disclosures

- Advisory Board, Stock options, Contextflow
- Advisory Board, contractor, stock options, Roclub
- Stockholder, Astra Zenica
- Stockholder, Nvidia

# Case Study: Building a National Pediatric Oncology Health Care System in Uzbekistan

- *High prevalence and incidence of childhood cancer*
- *High mortality and dismal survival rates*
- *No healthcare infrastructure*
- *No modern medical imaging devices*
- *Lack of qualified doctors & trained technologists*

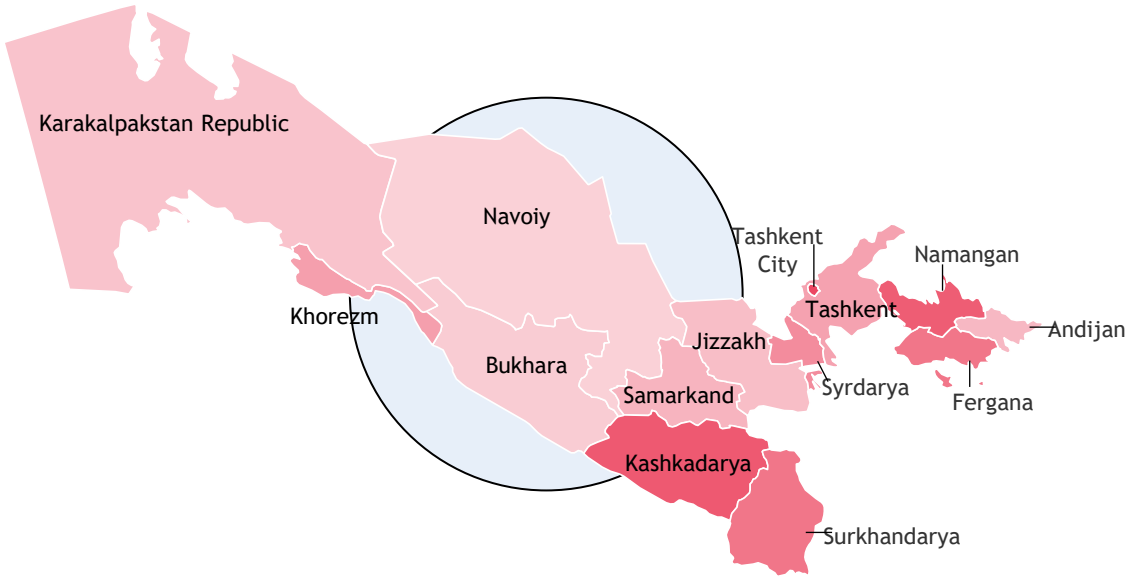
MEDICAL UNIVERSITY OF VIENNA INTERNATIONAL

# The Plan

- *Building a national structure for pediatric oncology*
- *14 regional cancer centers*
- *1 tertiary reference center*
- *Medical Academy to train pediatric oncologist, related specialists and medical technologists*
- *Installation of advanced imaging equipment countrywide*

# The Solution

- *Installation of a remote operation system*
- *Operated from a central hub (Tashkent / Vienna)*
- *Team of well-trained technologists in CT and MR*
- *One trained nurse / tec at each site*
- *Standardized protocols*
- *Remote reporting (pediatric oncologic specialist)*
- *Continuous training of local medical staff*
- *Standardized processes, guidelines & SOPs*




***Patients diagnosed with cancer per 100,000 Inhabitants 0-21 yrs (excl. Day-Clinic)*

# Background

## Staff and expertise shortage

**1-5%** of HCIs in LMICs have qualified techs

**840** vacancies for techs in German hospitals

**6-8** weeks Average wait time in the UK for an MRI or CT scan

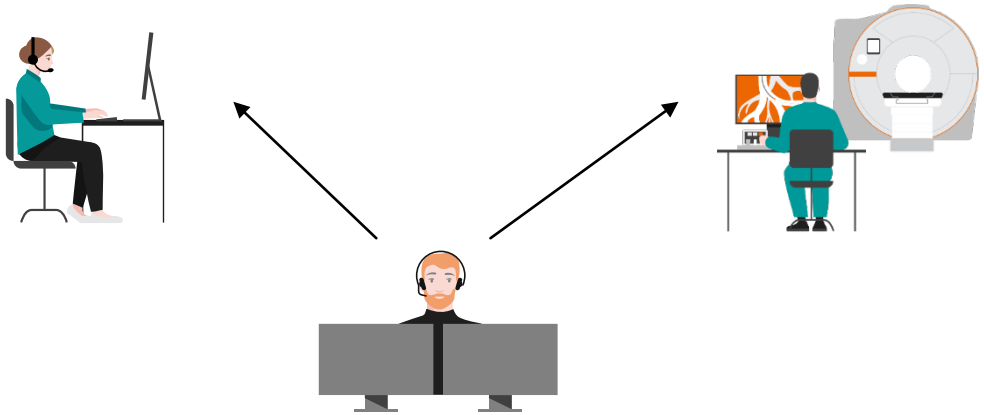
## Staff well-being and satisfaction

**51%** of hospitals have difficulties staffing techs

**37%** burnout of techs in US hospitals report burnout sy

# The Solution: Remote Operation

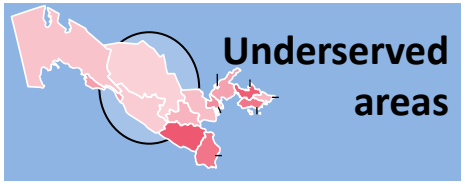
- Innovation - technology powered tool
- Remote scanning allows technologists to operate scanners from a distance
- Imaging control room at a different site from the scanner and the patient
- Secure connection with the scanner, life video, audio, and chat functions
- Covers protocol selection, positioning guidance, and real-time monitoring
- Communication with all professionals (on site case manager, physician)



# Indications & Benefits

## *Optimized patient care*

- Allows for services in remote/underserved areas
- Guarantees standardized scanning protocols across sites
- Supports to establish consistent quality
- Helps smaller institutions with specialized exams
- Adresses workforce crisis, gaps in experience / skills, productivity issues




**Standardization of high quality exams**

**Complex and specialized examinations**

**Staffing shortage**

# Indications & Benefits (2)

## *Job flexibility and Satisfaction*

- Permits flexible work models including home office solutions
- Increases job flexibility and satisfaction
- Focus on scanner operation / focus on patient handling and care
- Reduces travel and environmental impact
- Promotes training for junior staff via remote mentoring
- Increases operational efficiency and reduces scanner downtime

**Home Office**

**Job Flexibility and Satisfaction**

**Focus**

**Full staffing model**

**Expert model**

**Training model**

# Challenges and Disadvantages

- **Technical** equipment (secure high-speed internet, servers, monitors, audiovisual connection to on-site staff and patient, KVM switch)
- **Training** and integration into the daily workflow
- Requires optimal **cooperation** between remote and local operator 
- Need for **local support** and contingency planning
- **Fewer personnel on site** (emergencies, patient positioning, immobile pts)

- Not suited for ER (workflow, coordination of patient care and scanning)

*Remote operation of cross-sectional imaging devices….: Deisung A et al. Rofo 2024*

# Challenges

- **Regulatory** and data governance issues (HIPAA, GDPR)
- Compliance with **licensing, insurance and practice requirements** across multiple jurisdictions
- **„Safety breaks“** due to potentially heavy workload (air traffic controller)
- **Safety issues** (attention, equipment, emergency procedures, data)
- **Acceptance issues** (unions, political will)
- Justification: **Costs of implementation** vs budgetary effect / offset

*Canadian Agency for Drugs and Technologies in Health: Virtual Remote Imaging Services: CT and MR Scanning. Health Technology Review 2025*

# Guidelines & Endorsements

- **Endorsement** by ACR, AHRA, Intersocietal Accreditation Commission (IAC)
- Some **accreditation standards** now include remote scanning requirements
- **IAC** – MRI Standards added a remote-scanning section
- **RadSite** - Remote Scanning Accreditation Program CT & MRI

- **Requirements & expectations (Focus: patient safety, workflow integrity)**
  - Policies for contingencies (connectivity, power failure)
  - Defined division of responsibilities between on-site and distant staff
  - Registered tech remaining with the patient during remote scanning
  - Communication standards
  - State-law compliance

# Products and Vendors

- Vendor-specific / proprietary (OEM-specific) tools:
  typically offer the deepest console control but only on the vendor`s devices

- Vendor-independent / multi-vendor platforms:
  typically span multiple scanner brands/ sites supporting cross-fleet staffing models and centralized command centers

- Almost all products **FDA and CE** cleared
- Different **technologies** with full control or read-only modes
- **Security features** include VPN, plug-and-play with secure encryptions and multi-factor authentication
- **Communication tools** (real time screen sharing, video-conferencing, chat, multi-camera support)

# Products and Vendors

## Vendor-specific

- **GE HealthCare** – Digital Expert Access: remote scanning on MR systems
- **Canon Medical** – Remote Assist (CT, MR): Remote access to Canon CT, MR
- **Siemens Healthineers** – WeScan: On demand technologist support for MR

## Vendor-independent / Multi-vendor

- **Philips** – Radiology Operations Command Center: Vendor agnostic, multimodality command center, remote scannnig & protocol management
- **Siemens Healthineers** – syngo Virtual Cockpit: multi-vendor remote scanning, audiovisual connection with patient
- **IONIC Health** – nCommand Lite– (GE): Multi-vendor remote real-time
- **DeepHealth (RadNet)** – TechLive: Remote scanning (CT, MR, PET-CT, US)
- **GE – HealthCare** Imaging 360 Remote
- **Roclub** – CT and MRI remote operation platform, built-in technologist marketplace for booking external experts

# Remote Operations: Fantasy or Future?

- Thousands of scans are operated remotely every day
- Opens access to advanced imaging in remote / rural areas / LMICs
- Increase in performance, quality and technologist satisfaction
- Staffing / marketplace, expert and training models
- Challenges: Workflow, regulatory issues, acceptance

- Remote operations are already changing / modifying care delivery
- Value for healthcare and providers needs to be precisely defined
- Next: AI integration for scanning and interpretation

*Predictions are difficult to make, especially when they are about the future (Yogi Berra)*