

CONFERENZA GARR 2025
FRONTIERE DIGITALI

Verso una infrastruttura italiana di ricerca in fisica medica per lo sviluppo di Virtual Imaging Trials in diagnostica e terapia

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Istituto Superiore di Sanità



Mission

Promotion and protection of national and international public health through research, surveillance, regulation, control, prevention, communication, counselling and training.



Vision

The ISS produces knowledge through research and trials and disseminates scientific knowledge and evidence to decision makers, professional workers and citizens in order to protect and promote public health.

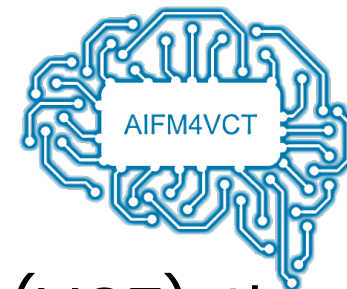


Establish a National Framework for Virtual Imaging (and clinical) Trials

Creation, through close collaboration among the leading research institutions in the field, of an «archive» that includes computational, hardware, and software resources, as well as databases (both generated data and data collected from various centers), accessible at the national level



The AIFM Italian National Working Group on Virtual Clinical Trials



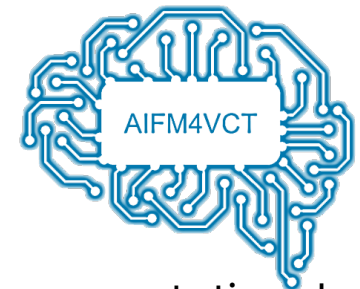
To facilitate the advancement of Virtual Clinical Trials (VCT), the Italian Association of Medical Physics (AIFM) has established a national working group (WG), called AIFM4VCT.

This initiative aims to promote, develop, and standardize methods and tools for multicentric VCT using virtual twins.

Free available tools and methodologies will be listed and tested.



The AIFM Italian National Working Group on Virtual Clinical Trials



The initial outcome of this Working Group (WG) entails a repository encompassing computational resources, including both hardware and software, accessible nationwide.

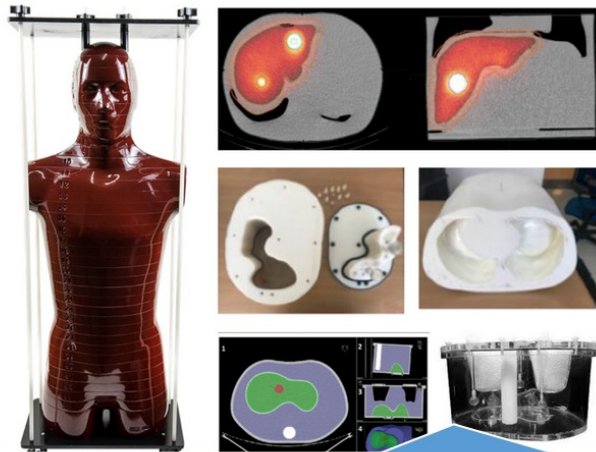


Image-based synthetic data generation using anthropomorphic phantoms corresponding to anatomical regions of particular significance



- Selection of use cases
- Data acquisition of antropomorphic phantoms
- Generation of synthetic images and data
- Setup of prospective trials

Virtual Imaging **Tri**Als in Medicine

a frontier project of interdisciplinary & technological research of INFN CSN5



VTA

Virtual Imaging TriAls in Medicine

Responsabile Nazionale
Giovanni Mettivier

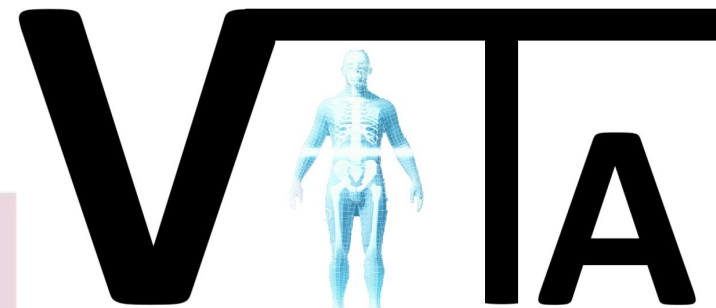
Sezioni Coinvolte
Napoli, Roma1, Padova, Torino,
Catania, CNAF, TIFPA



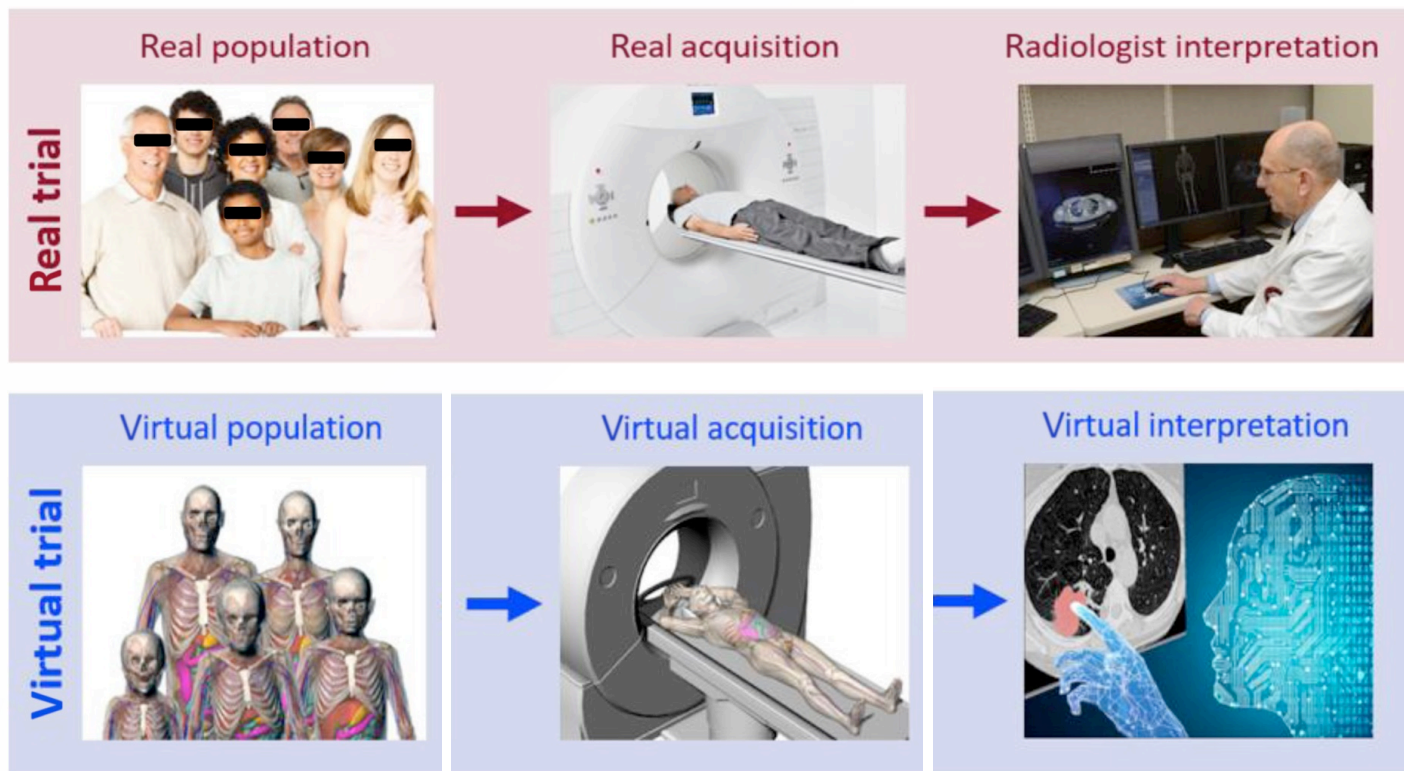
7 research centres involving 40 researchers

Barbara Caccia - ISS

Virtual Imaging Trials in Medicine



Goal: to accelerate and improve the evaluation and optimization of imaging technologies, promoting precise design and effective use of imaging in patient-centered care



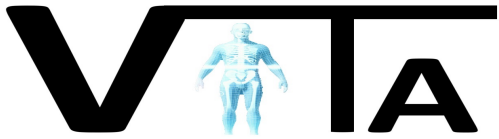
Ehsan Abadi, William P. Segars, Benjamin M. W. Tsui, Paul E. Kinahan, Nick Bottenus, Alejandro F. Frangi, Andrew Maidment, Joseph Lo, Ehsan Samei, "Virtual clinical trials in medical imaging: a review," J. Med. Imag. 7(4), 042805 (2020), doi: 10.1117/1.JMI.7.4.042805

Virtual Imaging TriAls in Medicine

Identification of the essential software skills for:

- Generating synthetic data and anthropomorphic phantoms
- Implementing the computational platform for equipment simulation
- Assessing the necessary computing resources and implementation complexity (National High-Performance Computing Center)
- Classifying the generated phantoms
- Developing an interface for accessing the resources





Lettere Supporto

The initiative of the Italian researchers in the VITA project of INFN, ..., is in line with similar initiatives in the USA which led to the creation of the National Center for Virtual Imaging Trials (CVIT) at Duke University, ... I wholeheartedly applaud this initiative and affirm its significance and relevance to enhance medical imaging and its utility. I also applaud the addition of a significant participation of clinical medical physicists of Italian Hospitals in the VITA project offers and additional asset to enhance its translational quality to clinical care. I further express my string interest to establish a scientific collaboration between the CVIT and VITA's communities in the VITs sector,...

Lettera del Prof. Samei, responsabile scientifico del Center for Virtual Imaging Trials, Department of Radiology, Duke University, Durham, NC, USA.



National Center for Virtual Imaging Trials (CVIT) at Duke University (USA)

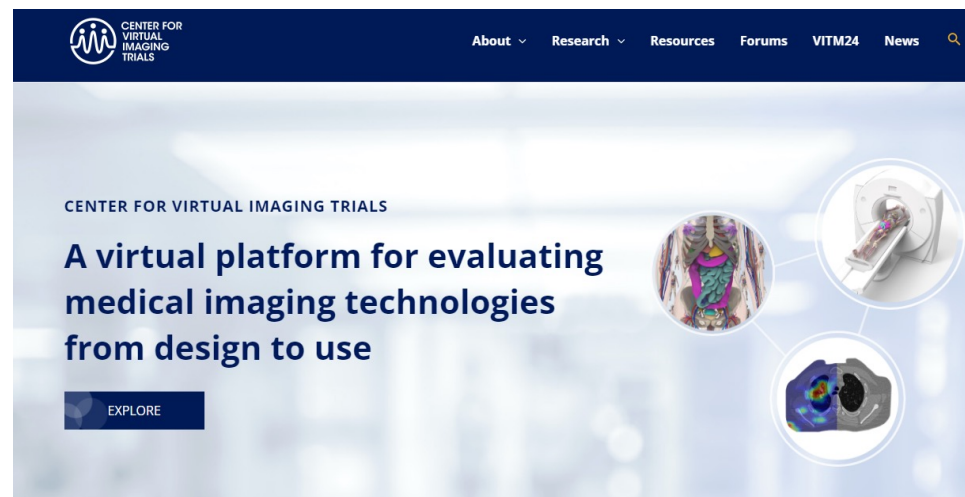
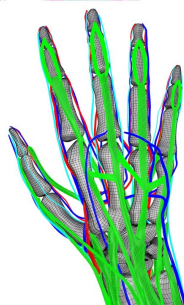
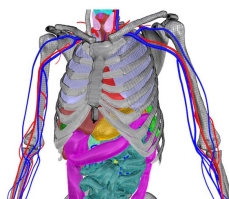


RESOURCES

Putting resources into the hands of scientists, developers, and clinicians

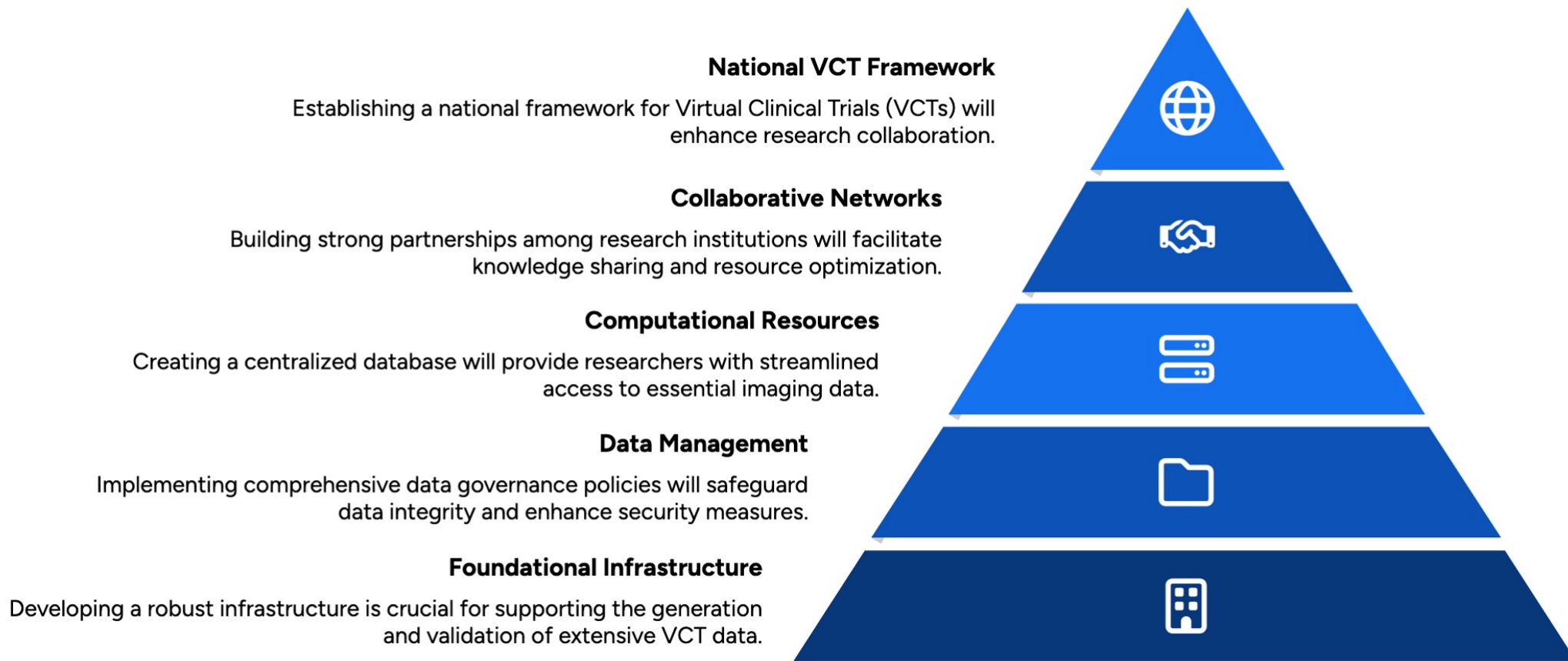
FORUMS

Educating and training scientists on how the Center's resources can aid their research



CVIT is a National Center for Biomedical Imaging and Bioengineering supported by the National Institute of Biomedical Imaging and Bioengineering (NIBIB) and operated at Duke University (<https://cvit.duke.edu/>)

Key Components of a National VCT Framework



Data Security, Access Policies and Governance in VIT framework

- Access to sensitive data: multi-institutional access → risk of unauthorized use
- Cloud and responsibility: clarity on data controllers/processors under GDPR
- Data security and encryption: protection during transfer and storage

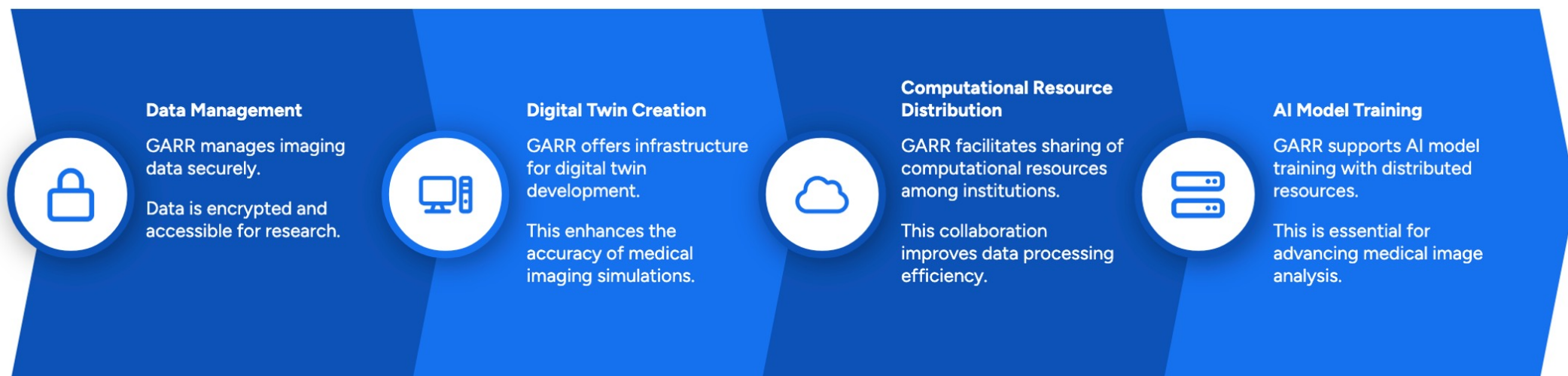
Possible Governance Model

Federated and interoperable architecture

Central coordination (ISS, INFN, AIFM)

Use of GARR resources for: archive, AI training, secure storage

Possible roles of Consortium GARR in VIT Framework development



Prossimi appuntamenti

CONFERENZA GARR 2025
FRONTIERE DIGITALI



Virtual Imaging Trials in Medicine
Alliance Manchester Business School
Manchester, United Kingdom
2 - 4 June 2025



Contatti: barbara.caccia@iss.it



Virtual Clinical Trial: stato dell'arte in Italia e prospettive

data da definire

organizzato da

ISTITUTO SUPERIORE DI SANITÀ

Centro nazionale per la protezione dalle radiazioni e fisica computazionale

In collaborazione con

ISTITUTO NAZIONALE DI FISICA NUCLEARE

e

ASSOCIAZIONE ITALIANA di FISICA MEDICA e SANITARIA