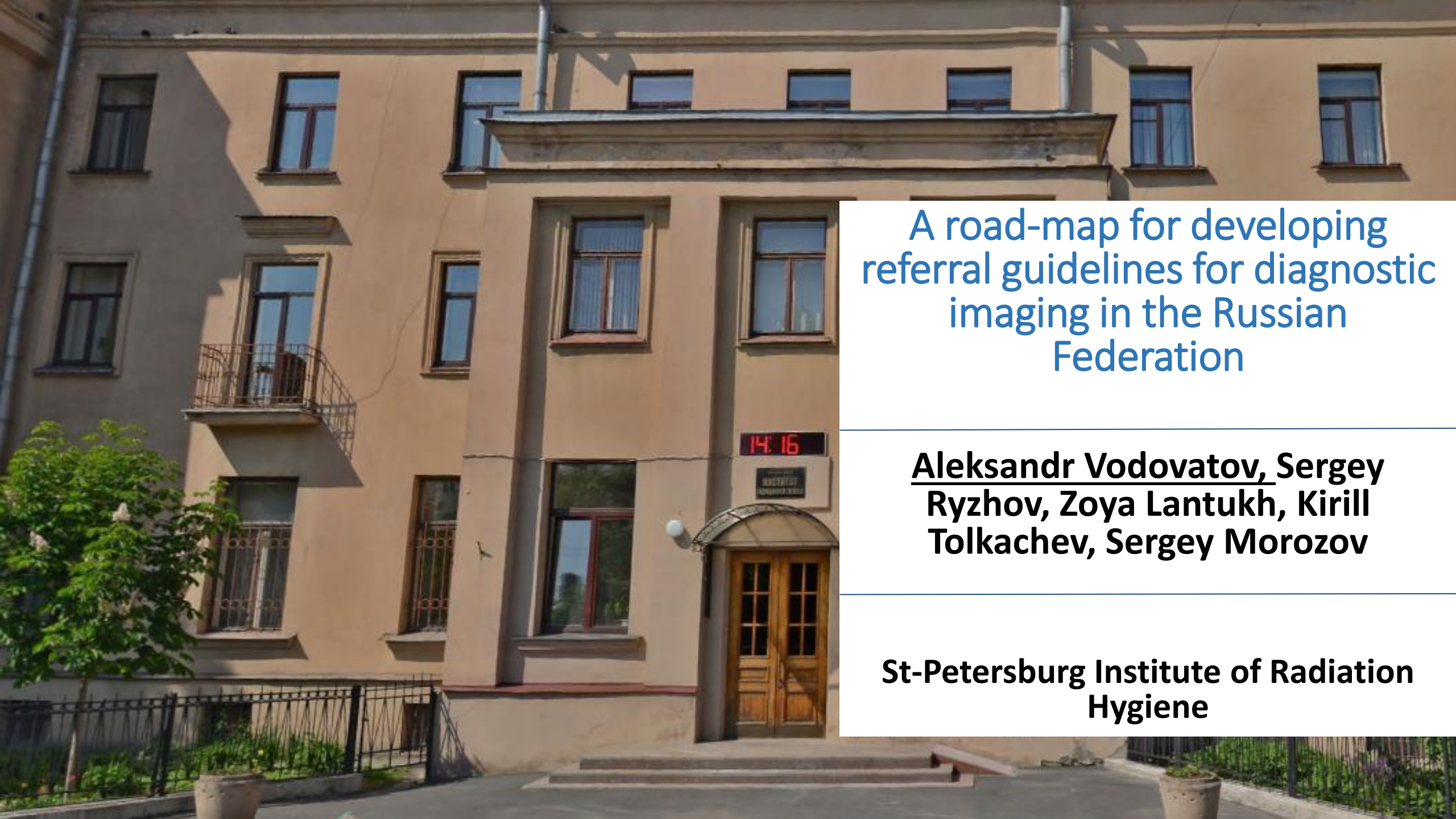


A road-map for developing referral guidelines for diagnostic imaging in the Russian Federation

Aleksandr Vodovatov, Sergey Ryzhov, Zoya Lantukh, Kirill Tolkachev, Sergey Morozov

St-Petersburg Institute of Radiation Hygiene

Justification in Russian radiation protection regulations

- One of the main principles of radiation protection in medicine
- Federal state law FZ-3 “On the radiation safety of the public”
- Norms of the radiation safety NRB-99/2009
- Basic sanitary rules of the provision of the radiation safety OSPORB 99/2010
- Medical exposure should be justified considering:
  - Clinical indications;
  - The use of the imaging modalities with the lowest doses
  - The use of alternative (non-radiation) diagnostic methods

Major issues with justification

Justification is the responsibility of the medical staff

Considered to be inspected by RP authorities

RP authority ≠Ministry of Healthcare

- Medical point of view:
  - Availability of the equipment (considering the patient flow)
  - Costs/coverage by insurance
  - Diagnostic efficiency
- Radiation protection point of view:
  - Lowest dose (non-ionizing radiation)
  - Exclusion of repeated examinations
  - Exclusion of self-referrals

Identified existing problems

- About 30% of examinations in surveyed hospitals in St-Petersburg were performed without proper referral (2009-2013)
- Significant number of self-referred PET/CT and CT examinations (2011-2017)
  - Cancer screening
- Fluoroscopic examinations of stomach and intestines (barium meal, enema) – performed by surgeons without any referral (2015-2019)
- Prevalent use of traditional imaging modalities (radiography, fluoroscopy) instead of CT (2011-2019)
  - Lack of equipment
  - Preferences of radiologists and referral physicians

Case report: St-Petersburg, 2016

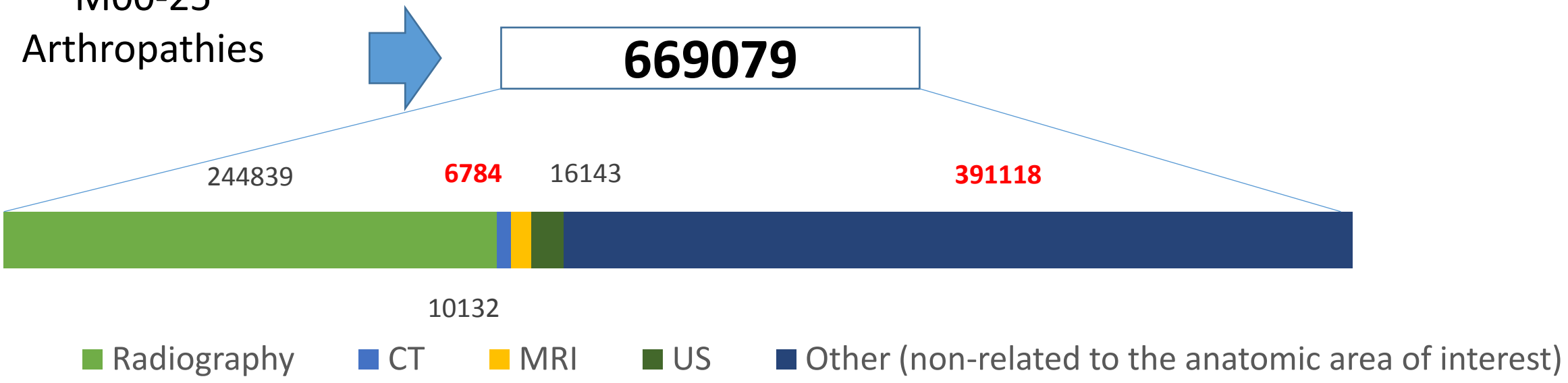
Evaluation of the mandatory chest X-ray screening, St-Petersburg, 2016

8600 patients

Result	Number of patients	%
No pathology	7339	85,79
Other (age-related changes)	699	8,17
Infiltrate	256	2,99
Consolidation	65	0,76
Single pulmonary nodule	39	0,46
Posttuberculosis calcificate	102	1,19
Disseminated processes	17	0,20
Tuberculosis	16	0,19
Malignant lesion (lung cancer/metastases)	21	0,24

Case report: Moscow, 2017

M00-25
Arthropathies



60% of incorrect admissions:

- Modalities with low diagnostic information (CT)
- Imaging non-related to the relevant anatomic area

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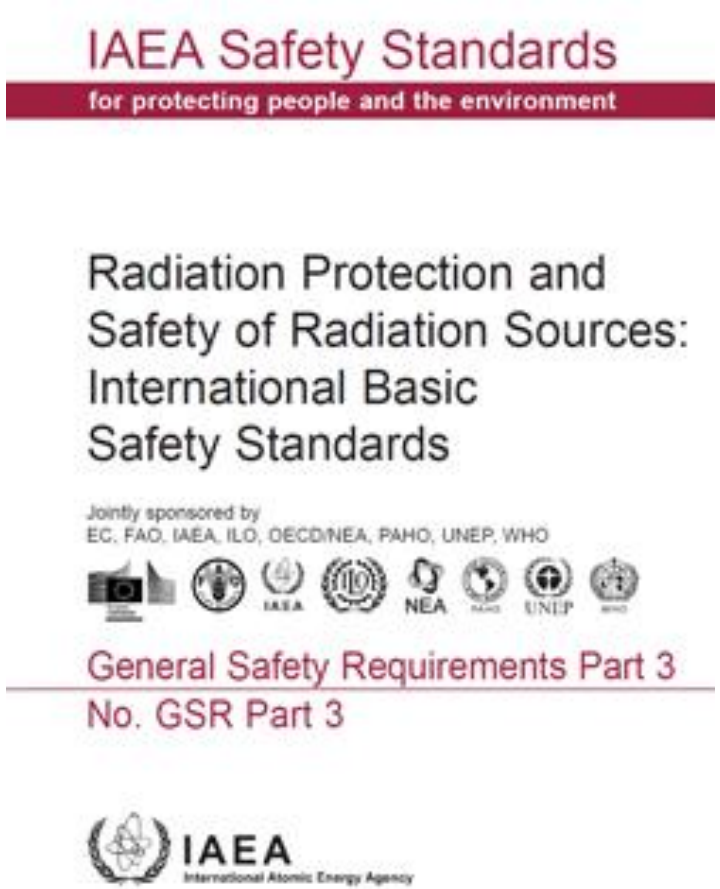
Justification of medical exposure

The diagnostic or therapeutic benefits of exposure should be weighed against the radiation detriment they might cause, with account taken of the benefits and risks of available alternative techniques that do not involve medical exposure.



Methodical guidelines “Assessment of radiation risks for the patients undergoing diagnostic examinations with the use of ionizing radiation”

Category of radiation risk, rel. units.	Effective dose, mSv		
	Children (under 18 years)	Adults (18-64 years)	Older persons (65 years and over)
Negligible ($<10^{-6}$)	<0.01	<0.02	<0.2
Minimum (10^{-6} - 10^{-5})	0.01 - 0.1	0.02 - 0.2	0.2 - 2
Very low (10^{-5} - 10^{-4})	0.1 - 1	0.2 - 2	2 - 20
Low (10^{-4} - 10^{-3})	1 - 10	2 - 20	20 - 200
Moderate (10^{-3} - 3.10^{-3})	10 - 30	20 - 60	200 - 500
Significant (3×10^{-3} - 10^{-2})	30 - 100	60 - 200	-

Category of radiation risk, rel. units.	CT examination		
	Children (Under 18 years)	Adults (18-64 years)	Older persons (65 years and over)
Very low (10^{-5} - 10^{-4})	—	—	Skull; Thorax; Abdomen; Pelvis and hip
Low (10^{-4} - 10^{-3})	Skull; Thorax; Abdomen	Skull; Thorax; Abdomen; Pelvis and hip	—

Category of radiation risk, rel. units.	Interventional procedures		
	Children (Under 18 years)	Adults (18-64 years)	Older persons (65 years and over)
Very low (10^{-5} - 10^{-4})	All procedures (depending on the complexity)	—	—
Low (10^{-4} - 10^{-3})		All procedures (Depending on the complexity)	All procedures (Depending on the complexity)
Moderate (10^{-3} - 3.10^{-3})	—		—

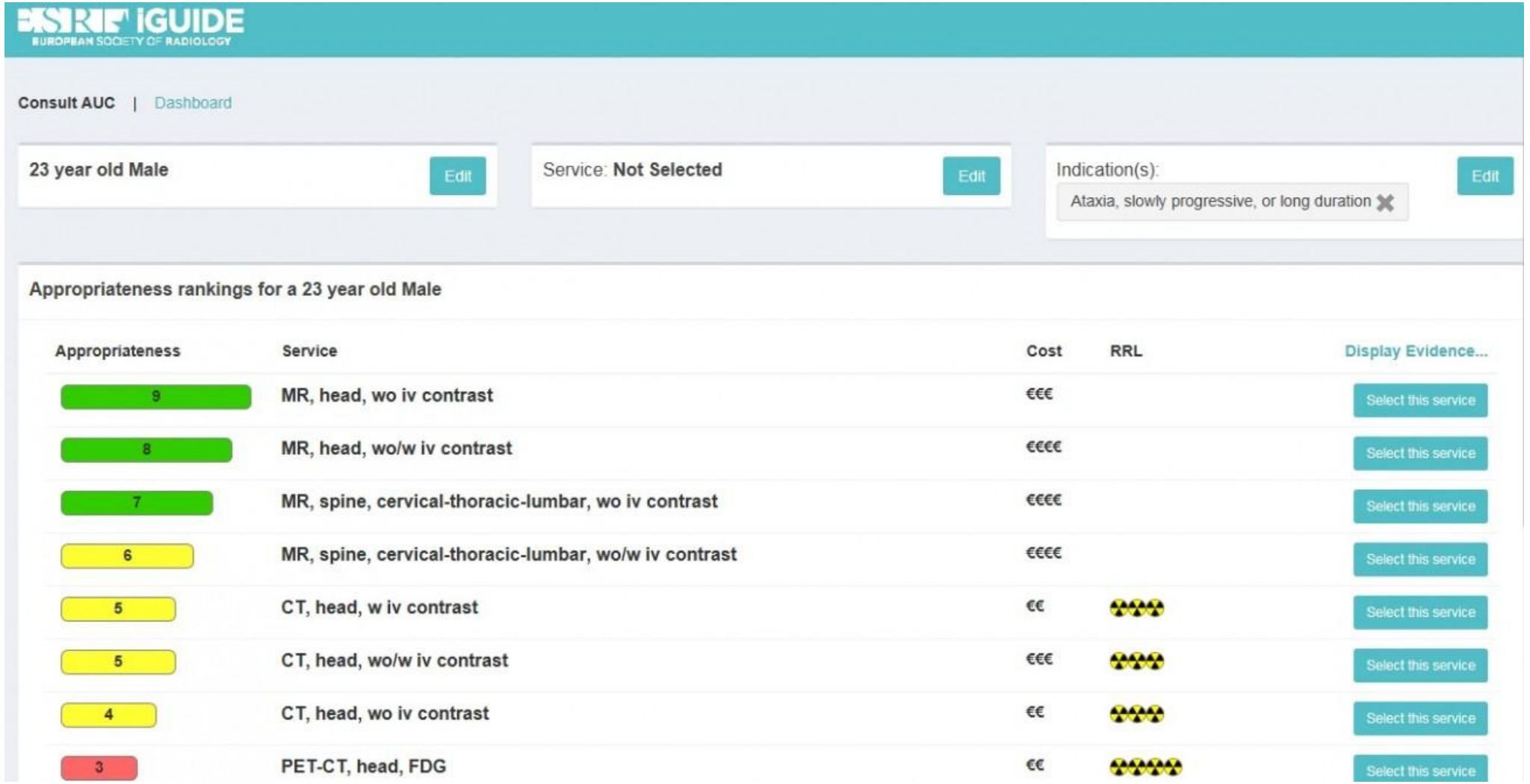
НИИРГ

Issues with justification based on radiation risk

- How to interpret risk categories properly?
  - Negligible = minimum = low (for any reasonable person)
- How to compare the risks properly?
  - Risk from incorrect diagnostics >>>>> radiation risk
- Complicated to perform on-site

“Even a housewife can estimate radiation risks”
© Vladislav Golikov

International referral guidelines



Document	Developer	Objective	Actuality	Evidence-based medicine	Radiation protection data	Status
Clinical standards	Ministry of healthcare	Basic standards of diagnostics and treatment	Outdated			Mandatory
Medical-economical standards	Regional healthcare authorities	Regional standards dia				Mandatory
Recommendations of the professional bodies	Prof			+	-	Voluntary
Clinical recommendatio of the Ministry o Healthcare	ations	ndards + decision-making support	Actual	+	-	Mandatory

Developed by the clinicians, without considering the radiologists/RP authorities

A set of guidelines “Best practices of X-ray and instrumental diagnostics”

- Developed by the radiologists
- Designed for the referring physicians
- Adopted from iRefer referral guidelines

- Diagnostics of the pathologies and diseases of:
  - Urinary tract
  - Gastro-intestinal tract
  - Chest
  - Muscular-skeletal system
  - Central nervous system

- For adult and pediatric patients
- In use in Moscow since 2018

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From recommendations to referral guidelines

Existing part

Syndrome or pathology	ICD-10 code	Imaging modality	Priority	Description
Acute abdominal pain	R10 R19-3	Ultrasound	Primary method	
		Computed tomography	Additional method	
		Radiography	Additional method	
		MRI	Additional method	

To add

Anatomic area	Cathegory of radiation risk		Typical dose range, mSv
	Adults	Older persons	
Abdomen	-	-	-
Abdomen	Low ☢☢☢☢	Very low ☢☢☢	2-20
Abdomen	Very low ☢☢☢	Neglible ☢☢	0,2-2
Abdomen	-	-	-

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Current activities

- Upgrade of the existing clinical recommendations for adult patients – in progress, deadline – end of 2019
- Review of the final referral guidelines on a regional level:
  - Moscow – Department of healthcare of Moscow; 2020
  - St-Petersburg – St-Petersburg Society of radiologists + Department of Healthcare; 2020
- Pilot integration in selected hospitals - 2021
- Final approval by the Ministry of Healthcare – 2022+

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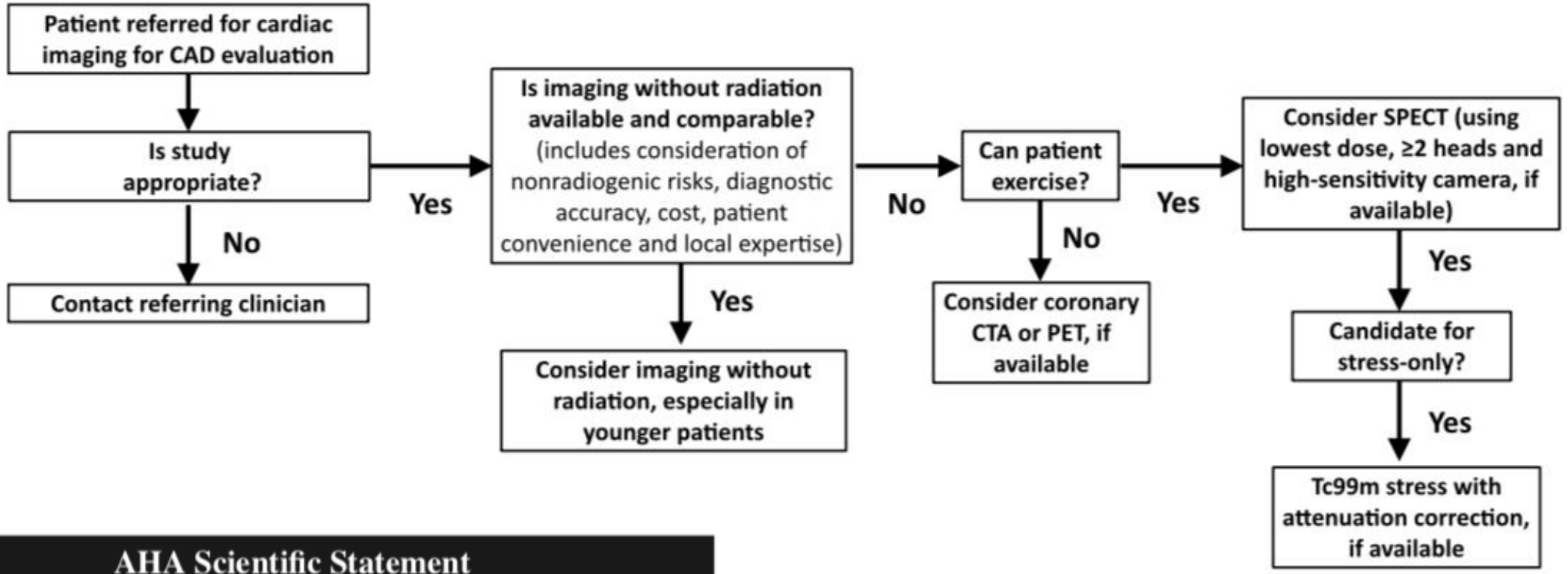
Main questions

- What regional specifics should be considered:
  - Differences in equipment
  - Differences in training
- Integration into hospital information systems
  - From textbook to decision support systems
- Feedback/benchmarking? Clinical audits?
  - Existing standards are built-in the State Health Insurance systems
- Integration into intern/resident training

From guidelines to workflow charts

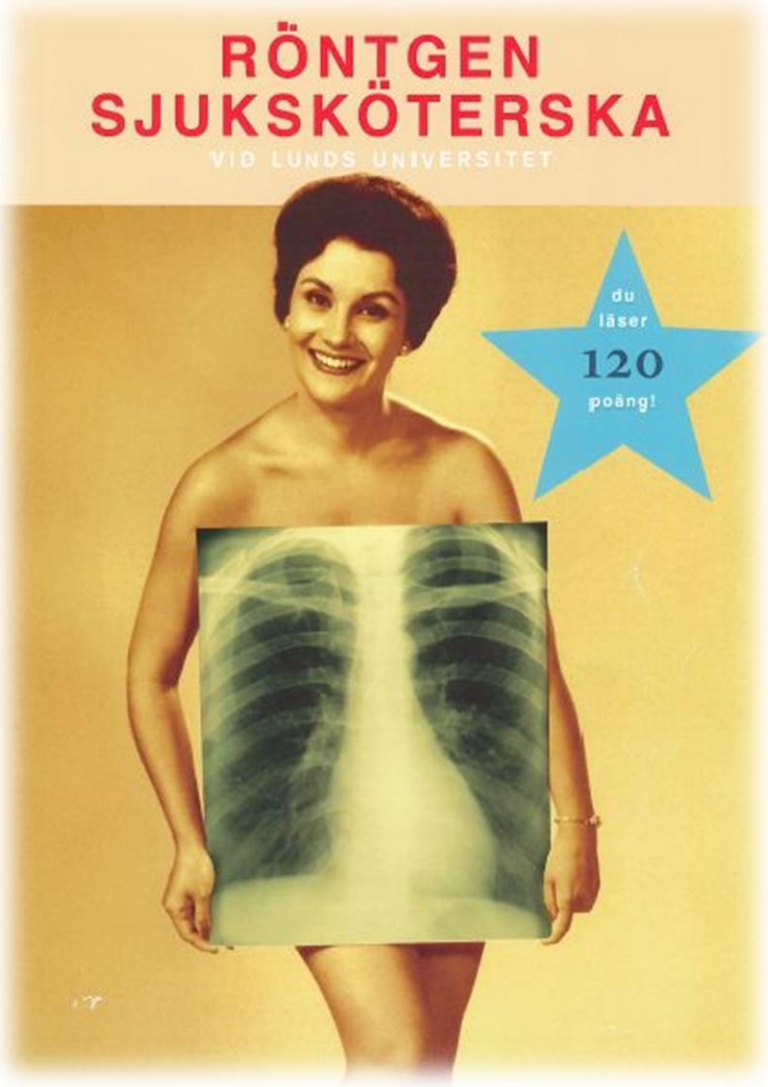


AHA Scientific Statement

Approaches to Enhancing Radiation Safety in Cardiovascular Imaging

A Scientific Statement From the American Heart Association

Thank you for the attention!



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