



JESSA
ZIEKENHUIS

JUSTIFICATION AND OPTIMISATION IN PRACTICE

DR. G. SOUVERIJNS

Jessa Hospital



Campus Virga Jesse
Hasselt



Campus Salvator
Hasselt



Campus St-Ursula
Herk-de-Stad

981 beds, 220 day hosp, > 400 doctors, > 3.000 employees
3 radiology departments, 24 radiologists, 1 consultant, 2 residents



Justification and optimisation

- › Increased use of ionizing radiation in medicine
 - › US: 600% increase in one generation
 - › Enormous benefits: 1. accuracy diagnosis
 - › Risk: linear dose relation radiation induced cancers
 - › Reasons: 1. better en more techniques
 - 2. increase in knowledge
 - 3. more frequent follow-up needed
 - > expensive cancer therapies
 - > longer survival
 - 4. Legal
 - ...

Boone JM, et al. Radiation exposure from CT scans, Radiology 2012; 265:544-554

Mettler FA, et al. Radiologic and nuclear medicine studies in the US and worldwide; Radiology 2009; 253:520-531



Justification and optimisation

› Increased use of ionizing radiation in medicine

› But...

The radiation protection of Patients Unit of the International Atomic Energy Agency (IAEA):

1. 'significant level of inappropriate usage'
2. 'poor level of awareness of dose and risk among some key groups involved'

The British journal of Radiology, 85 (2012), 523-538

Justification of Medical Exposure in Diagnostic Imaging, IAEA 2-4 Sept 2009



Justification and optimisation

> Increased use of ionizing radiation in medicine

> But...

1. 'significant level of inappropriate usage'
2. 'poor level of awareness of dose and risk among some key groups involved'

And...

3. Budget needed for reimbursement of new techniques (full body MRI, interventional oncology), better reimbursement for existing techniques (cardiac-CT and -MRI,...)
4. Budget constraints



Justification and optimisation

A dark blue square with a black border containing the text "DO WHAT IS RIGHT, NOT WHAT IS EASY" in white, bold, sans-serif capital letters.

**DO WHAT
IS RIGHT,
NOT WHAT
IS EASY**



Justification and optimisation

› ICRP: International Commission for Radiation Protection

› The ICRP system of radiation protection:

3 fundamental principles:

1. justification
2. optimisation
3. dose limitation

› http://ec.europa.eu/health/scientific_committees/opinions_layman/security-scanners/en/l-3/2-radiation-protection.htm

› icrp.org/docs



Justification?

> Appropriateness in imaging: 'best test first'

1. risk/benefit balance



2. Even if benefits outweigh risk, the test is unnecessary when US/MRI could provide an accurate diagnosis



3. Cost, local expertise, available resources, accessibility and patient values have to be considered in addition to efficacy.



Optimisation meets Justification

> Appropriateness in imaging: 'best test first'

1. risk/benefit balance



Benefit outweighs risk when:

- appropriately prescribed (Evidence based guidelines)
will improve diagnosis
Provide management information
- properly performed = Optimisation (ALARA)

Do the right procedure
Do the procedure right

PubMed
 US National Library of Medicine
 National Institutes of Health

Search: **Justification of radiological examinations**
 Create Alert | Settings | My NCBI

Article types: Clinical Trial, Review, Customize...
 Text availability: Abstract, Free full text, Full text
 Publication dates: 5 years, 10 years, Custom range...
 Species: Humans, Other Animals
 Clear all
 Show additional filters

Format: Summary - Sort by: Most Recent - Per page: 20 - Send to -

Best matches for Justification of radiological examinations:
[Justification of radiographic examinations: What are the key issues?](#)
 Vom J et al. J Med Radiat Sci. (2017)
[Radiological Examinations in Pediatric Age](#)
 Siciliano R et al. Ann Ig. (2017)
[Russian practical guidance on radiological support for justification of X-ray and nuclear medicine examinations](#)
 Balonov M et al. Radiat Prot Dosimetry. (2015)
 Switch to our new best match sort order

Search results
 Items: 1 to 20 of 48
 Page 1 of 3

- [Cost-risk-benefit analysis in diagnostic radiology with special reference to the application of referral guidelines.](#)
 Moores BM
 Radiat Prot Dosimetry. 2019 Apr 23; pii: ncz054. doi: 10.1093/rpd/nz054 [Epub ahead of print]
 PMID: 31329956
[Similar articles](#)
- [Overdiagnosis and overimaging: an ethical issue for radiological protection.](#)
 Salemi S, Laghi A, Cantone MC, Sartori P, Pinto A, Frija G.
 Radiol Med. 2019 Mar 21. doi: 10.1007/s11547-019-01029-5 [Epub ahead of print]
 PMID: 30900132
[Similar articles](#)
- [Is the diagnostic radiological image an underutilised resource? Exploring the literature.](#)
 Cox WAS, Cavenagh P, Bello F.
 Insights Imaging. 2019 Feb 6;10(1):13. doi: 10.1186/s13244-019-0707-9. Review
 PMID: 30725207 Free PMC Article
[Similar articles](#)
- [The risk of cancer attributable to diagnostic medical radiation: Estimation for France in 2015.](#)
 Marant-Micallef C, Shield KD, Vignat J, Ckro E, Kesminiene A, Hill C, Rogel A, Vacquier B, Bray F, Laurier D, Soerjomataram I.
 Int J Cancer. 2019 Jun 15;144(12):2954-2963. doi: 10.1002/ijc.32048. Epub 2019 Jan 15.
 PMID: 30537957
[Similar articles](#)
- [The present state of radiation exposure from pediatric CT examinations in Japan: what do we have to do?](#)
 Ideguchi R, Yoshida K, Ohtsuru A, Takamura N, Tsuchida T, Kimura H, Uetani M, Kudo T.
 J Radiat Res. 2018 Apr 1;59(suppl_2):i130-i138. doi: 10.1003/jrnm095.
 PMID: 29420748 Free PMC Article



- In past: attention for optimisation / dose reduction tech.
- Actual: worldwide attention for justification



[Ann ICRP](#). 2016 Jun;45(1 Suppl):113-21. doi: 10.1177/0146645316637783. Epub 2016 Mar 29.

Current status of medical radiation exposure in Korea - recent efforts to develop a radiation exposure control system focussed on justification and optimisation.

[Do KH¹](#), [Jung SE²](#).

[Author information](#)

1

Department of Radiology and Research Institute of Radiology, Asan Medical Centre, University of Ulsan College of Medicine, 88, Olympic-ro 43-gil, Songpa-gu, Seoul 138-736, Korea dokh@amc.seoul.kr.

2

Department of Radiology, College of Medicine, The Catholic University of Korea, Korea.

Abstract

Radiation exposure from diagnostic medical imaging has increased in Korea. Radiological societies play a key role in radiation safety issues in Korea, including guidelines, accreditation, advocacy, scientific activity, and education. Any medical radiation exposure must be justified, and examinations using ionising radiation must be optimised. Education of referring physicians and radiologists is also important for justification. Medical physicists and radiographers have an important role to play in quality management and optimisation. Regulations are essential to control medical radiation exposure. Therefore, national organisations have made a significant effort to regulate and monitor medical radiation exposure using guidelines, accreditation, and even the law. Medical radiation exposure must be controlled, and this could be achieved by continuous interest from health professionals and organisations.

[Radiat Prot Dosimetry](#). 2012 Apr;149(2):124-37. doi: 10.1093/rpd/ncr211. Epub 2011 May 16.

Justification in clinical radiological practice: a survey among staff of five London hospitals.

[Koutalonis M¹](#), [Horrocks J.](#)

[Author information](#)

[Radiat Environ Biophys](#). 2015 Jul;165(1-4):39-42. doi: 10.1093/rpd/ncv127. Epub 2015 Apr 9.

Russian practical guidance on radiological support for justification of X-ray and nuclear medicine examinations.

[Balonov M¹](#), [Sankov V²](#), [Kalnitsky S²](#), [Zvonova I²](#), [Chipiga L²](#), [Sarycheva S²](#), [Shatskiy I²](#), [Vodovatov A²](#).

[Author information](#)

1

[AJR Am J Roentgenol](#). 2015 Jan;204(1):124-7. doi: 10.2214/AJR.14.12834.

Radiation risks: what is to be done?

[Huda W¹](#).

[Author information](#)

1

1 Department of Radiology and Radiological Science, Medical University of South Carolina, 96 Johnathan Lucas St, MSC 323, Charleston, SC 29425-3230.

Abstract

OBJECTIVE:

What is currently known about radiologic risks is reviewed, policies that should be adopted based on our current knowledge are proposed, and how these policies can be applied to adequately protect patients in everyday clinical practice is described.

CONCLUSION:

All activities in life (e.g., driving automobiles) are associated with risks, and medical imaging is no different, so the most important message to convey to patients is whether a proposed examination is worthwhile. Our collective goal should be ensuring that all radiologic examinations are justified and are as low as reasonably achievable (ALARA), which maximizes the benefits of medical imaging for our patients.



[Med Oral Patol Oral Cir Bucal](#). 2007 May 1;12(3):E244-51.

Clinical justification of dental radiology in adult patients: a review of the literature.

[Martínez Beneyto Y](#)¹, [Alcaráz Banos M](#), [Pérez Lajarin L](#), [Rushton VE](#).

Author information

1

Universidad de Murcia, Murcia, Spain. yobandam@um.es

[Eur J Radiol](#). 2005 Feb;53(2):306-11.

Analysis of radiological examination request forms in conjunction with justification of X-ray exposures.

[Triantopoulou Ch](#)¹, [Tsalafoutas I](#), [Maniatis P](#), [Papavdis D](#), [Raios G](#), [Siafas I](#), [Velonakis S](#), [Koulentianos E](#).

Author information

1

Computed Tomography Department, Konstantopoulou-Agia Olga Hospital, 3-5 Agias Olgas, Nea Ionia, 14233 Athens, Greece chatri@mycosmos.gr

[Radiol Med](#). 2011 Feb;116(1):152-62. doi: 10.1007/s11547-010-0587-z. Epub 2010 Sep 17.

Critical issues in radiology requests and reports.

[Article in English, Italian]

[De Filippo M](#)¹, [Corsi A](#), [Evaristi L](#), [Bertoldi C](#), [Sverzellati N](#), [Averna R](#), [Crotti P](#), [Bini G](#), [Tamburrini O](#), [Zompatori M](#), [Rossi C](#).

Author information

1

Sezione di Scienze Radiologiche, Dipartimento di Scienze Cliniche, Università degli Studi di Parma, Ospedale Maggiore di Parma, Via Gramsci 14, 43100, Parma, Italy. massimo.defilippo@unipr.it



- Why worldwide attention for justification ?

- 3-7 dec 2012 IAEA, WHO, Government of Germany
Intl Conference on RP in medicine



80 countries
16 organizations



-> reviewed advances, challenges and opportunities:

Result: Call for Action => enhancing implementation
of justification



IAEA Call for Action 2012 => enhancing implementation of justification:

1. Introduce and apply the **3A's** (awareness, appropriateness and audit),
2. Develop **evidence-based** criteria
3. Implement imaging **referral guidelines** globally, keeping local and regional variations
4. Strengthen the application of **clinical audit** in relation to justification
5. Introduce information technology solutions, such as **decision support tools** in clinical imaging, and ensure that these are available and freely accessible at the point-of-care;
6. Further develop criteria for justification of health **screening programmes** for asymptomatic populations (e.g. mammography screening) and for medical imaging of asymptomatic individuals who are not participating in approved health screening programmes.



Justification: How?

Why representative of
Jessa Hospital Hasselt?

We started and improved our justification process in 2012-2016 through internal and external (Quaadriil - Niaz – Fanc – DGEC) audit; we tested BQUAADRIL.



Justification: How?

1. How did we start and improve our justification process?
2. Practical steps in justification

Justification

1. How did we start and improve our justification?

“Accreditation”

2008 - 2012- 2016:

Jessa received NIAZ – Qmentum accreditation

Qmentum:

2012->2016 more demanding standards !

2020 - ...

Qmentum Global:

even more demanding, patient involvement



Justification

NIAZ-Qmentum transition 2012->2016: gap-analysis

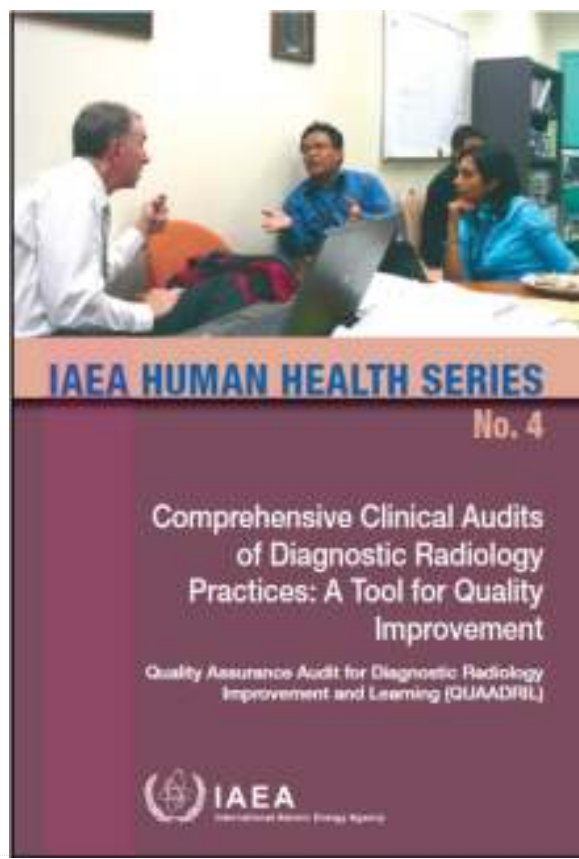
NIAZ-Qmentum // JCI for radiology

=~ Quaadril



QUAADRIL

Quality Assurance Audit For Diagnostic Radiology Improvement and Learning



- Comprehensive Clinical Audits of Diagnostic Radiology Practices: A tool for quality improvement



Chapter 5 QUAADRIL: Patient Related procedures

5.	Patient related procedures	
5.1	Referral of patient for examination	
5.1.1.	Appropriateness of examination/justification	
5.1.2.	Quality of referral	
5.1.3.	Referral education	
5.1.4.	Patient education/consent	
5.1.5.	Pre-procedure screening and preparation	
5.1.6.	Scheduling	
5.2	Identification of the patient	
5.3	Examinations	
5.3.1.	Patient confidentiality and physical privacy	
5.3.2.	Imaging techniques	
5.3.3.	Clinical care, patient sedation/anaesthesia and contrast agents	37
5.3.4.	Image quality	39
5.4	Imaging Report	41
5.5	Report communication	43
5.6	Continuity of clinical care	45
5.7	Accident and incident reporting	46
5.8	Record and film/image retention	48

NIVEAU A

3. Voorbereiding en nazorg

Nr.	Element	Overeenkomstige wetgeving of verwijzing
3.1.	Systematische controle van de identiteit van de patiënt	
3.2.	Vooraleer een onderzoek aan te vatten worden volgende condities systematisch opgespoord: <ul style="list-style-type: none"> condities waarbij het radiologisch onderzoek voor de patiënt potentieel gevaarlijk kan zijn, zoals contrastmiddelen overgevoeligheid, allergieën, nierinsufficiëntie, MRI-incompatibele materialen, anticoagulantie-gebruik, zwangerschapstatus, ... condities waarbij het radiologisch onderzoek potentieel niet veilig kan uitgevoerd worden, zoals leeftijd, infecties (bvb. multiresistente kiemen), mobiliteitsbeperking, sedatie en anaesthesie, ... 	Nomenclat. gen. verstr.: <ul style="list-style-type: none"> 17.5.12 ARBIS: <ul style="list-style-type: none"> 50.5 51.1.1.1 (betreffende zwangerschap)
3.3.	De patiënt wordt voor het onderzoek geïnformeerd over: <ul style="list-style-type: none"> de onderzoeksvorbereiding voor- en nadelen van het onderzoek risico's van contrastmiddelen risico's van stralenbelasting De wijze van informatieoverdracht (mondeling, brochures, ...) wordt bepaald in functie van het type onderzoek.	Wet patiëntenrechten Art. 8 § 1 en Art.8 § 2 (22/08/2002) ARBIS: <ul style="list-style-type: none"> 50.1
3.4.	De zorgverstrekkers en de patiënt worden op de hoogte gebracht van de noodzakelijke onderzoeks-/behandelingsgerelateerde nazorg (bijvoorbeeld: nazorg bij angio, interventionele onderzoeken/behandelingen ,...)	
3.5.	De patiënt krijgt de gelegenheid om voor het onderzoek vragen te stellen en/of het onderzoek te weigeren	Wet patiëntenrechten Art. 8 § 1 en Art.8 § 2 (22/08/2002)
3.6.	De dienst voorziet contactgegevens (telefoon, mail, ...) waarop patiënten informatie kunnen vragen.	



Justification

Q-team problems:

- gap:

-> written improvements, but bringing it into practice?

-> what is the current level of knowledge with our employees?

-> where to find procedures / how to communicate?

-> how to stimulate continuous improvement?

Justification

Q-team solutions:

- gap
 - > written improvements, but bringing it in practice?
 - > what is the current level of knowledge with our empl.?

- **internal audits: 2012-2013**

but no expertise nor pressure

=> **need for external audit**



The need for Clinical Auditing is supported by several organizations



- White paper on radiation protection, 2011
- ESR Clinical Standards and Audit templates, 2015



- EC Directive 97/43/EURATOM and EC Directive 2013/59/EURATOM
- European Commission Guidelines for Clinical Audit for Medical Radiological Practices No 159



- International Atomic Energy Agency : Quality Assurance Audit For Diagnostic Radiology Improvement and Learning (QUAADRIL)

Clinical Audit

The ESR believes that all radiology departments should have a Clinical Audit Programme in order to assure users of the quality of the service and to promote continual quality improvement.

QUAADRIL: Quality Assurance Audit For Diagnostic Radiology Improvement and Learning



- Quaadril is 100% in line with EC Guidelines No 159

By comparing the practice of the service against the standards of good practice, clinical audits can inform the staff of the health care service, as well as all other stakeholders, about the essential elements of quality and the weak points of the overall clinical service.

The audits will indicate areas for improvement and provide reassurance on issues such as safety and efficacy, all of which are essential to creating an environment of continuous development.



Clinical audit in terms of the EC Directives/EURATOM 97 and 13

The European council has adopted the Euratom Directive laying down basic safety standards for protection against the dangers arising from exposure



Whereas the establishment of

- quality assurance
- and audit programmes,
- and inspections by the competent authorities

are necessary to ensure that medical exposure is delivered under good radiation protection conditions;

› Het **technisch reglement van 19/07/2019** maakt de klinische audits **verplicht** vanaf 1 september 2019

- **alle radiologie diensten en alle connexe diensten** waar gebruik wordt gemaakt van röntgentoepassingen.
- In een eerste fase zijn enkel **zelfevaluaties** een verplichting.
- minimaal **tweejaarlijks** volgens de criteria beschreven in het **B-QUADRIL** dat opgesteld werd door BELMIP



> Het technisch reglement van 19/07/2019 maakt de klinische audits verplicht vanaf 1/9/2019

	Verschillende fasen		
	Zelfevaluatie	Interne klinische audit	Externe klinische audit
Niveau	Dienst	Ziekenhuis	Landelijk
Uitvoerder	Personeel van de dienst	Auditoren uit andere diensten binnen het eigen ziekenhuis/inrichting	Auditoren uit andere ziekenhuizen/inrichtingen
Indicatieve frequentie	Continu proces, minimaal tweejaarlijks te doorlopen	periodisch (nog niet verplicht)	periodisch (nog niet verplicht) ³
Resultaat	Zelfevaluatierapport	Intern auditrapport	Extern auditrapport
Verbeterpunten → Verbeteracties			



Quaadril Audit april 2014

Qaelum: dose-monitoring

Dr. J. Schillebeeckx
Nelly Ilcheva



Report: 34p with 'areas for improvement'

LEVEL 1 CLINICAL AUDIT TEMPLATES

Justification

Pregnancy Status

Radiation Dose

Optimisation

Communication

MRI safety

Pre-procedure Screening

Authority of requestor policy.....9

Authority of requestor policy implementation..... 10

Justification policy..... 11

Justification policy implementation..... 12

Justification policy for women of child bearing age 13

Reliable system of recording the pregnancy status in examinations involving ionising radiation..... 14

CT radiation dose records..... 15

Radiation dose in head CT in children..... 16

Dose Optimisation in CT policy 17

Implementation of dose optimisation in CT policy 18

Policy for patient identification prior to procedure 19

Implementation of policy for patient identification prior to procedure20

Prevention of MRI hazards policy..... 21

Implementation of prevention of MRI hazards policy.....??



Justification

Q-team solutions:

- gap
 - > where to find procedures / how to communicate
 - > how to stimulate continuous improvement?

- need for 'document management system'
 - > + tools for continuous improvement
 - > + overview accreditations needs
 - > + tools for communication

=> Bought a 'total quality system', integrated dose and document management system with auditing possibilities



Enter the text

Search in Title

Search Reset

Actions

Query logic OR

Options

Sort by
Alphabetical

Group by
Query

Run Query Reset Query

Select a query to load.

only meant for me

- VPK RX
- VPK MR
- Radioloog
- VPK CT
- Zorgkundigen / Logistiek assistenten echo
- Secretariaat

Load

Cancel

Justification



The screenshot displays the Total Quality Monitoring (TQM) web application interface. At the top left is the TQM logo, and the main title is "Total Quality Monitoring" with sub-headers "DOSE | OBOOK | BASELINE | BENCHMARK | MAMMO". The top right shows a user profile for "Sofie Vandormael" with options for "Profile", "Logout", and "Switch rights". A navigation menu includes "Start Portal", "Patient", "Device", "Modality", "Location", "Quality Management System", and "Settings".

The main content area is titled "tqmOBOOK" and "tqmOBOOK query". It features a search bar with the text "identificate" and a dropdown menu for "Search in" set to "Title". Below the search bar, there is a "Query 1" section with a "Select Category" dropdown and a "Query Logic" dropdown set to "OR". To the right of the query section is an "Options" panel with "Sort by" (Alphabetical) and "Group by" (No grouping) dropdowns, and "Run Query" and "Reset Query" buttons.

At the bottom of the interface, there is a notification: "Procedure actieve patiëntidentificatie jessa". The footer contains the text: "Not for medical use © 2012-2015 QAE LUM NV. All rights reserved | About".

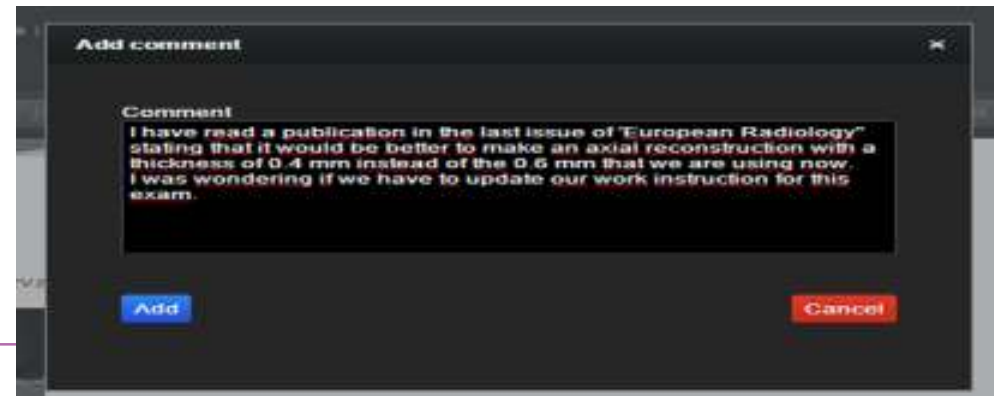


Justification

Role – **Reader (everyone on department)**

Triggered by: manual question or automatic notification

Objective: everyone can participate in quality and is stimulated to think along with department



Role – **Reviewer**

Triggered by: notification for demand for revision

Objective: persons with high level of expertise are demanded for opinion before approval

Role – **Publisher**

Triggered by: notification for approval of revision

Objective: person who are given the responsibility to publish a new procedure or to publish the procedure which is approved for revision

Justification

Follow up:

How many new procedures do I have to read?

admin: who reads new procedures ?

QBOOK Notifications					
ICON	TYPE	DOCUMENT TITLE	DOCUMENT VERSION	REMAINING TIME	MESSAGE
	QMS_READ	test_wiki	RAD_QMS-159_v2	-54	Outside achievable range
	QMS_PUBLISH	test_wiki	RAD_QMS-159_v2	4	Inside acceptable range
	QMS_READ	test_pdf	RAD_QMS-161_v1	4	Outside acceptable range
	QMS_READ	Totaal Abdomen	RAD_QMS-943_v4	38	Inside acceptable range
	QMS_REVIEW	Totaal Abdomen	RAD_QMS-943_v5	40	Inside acceptable range



Justification

Opportunity:

tested AI interfacing in total management system:

=> new leap forward

Justification

1. How did we start and improve our justification process?

- accreditation
 - => audit: baseline info and areas for improvement
 - => awareness / need for change
- tools for registration, communication

Justification

1. How did we start and improve our justification process?

2. Practical steps in justification



Justification

Cfr several chapters in (B-)Quaadriil and JCI/Qmentum:

- Knowledge of:

B-Q

- Availability/knowledge of guidelines
- Rad Order is complete
- Appropriateness or substitution (registration)
- Contraindications
- Inform the patient

Q

- Indications for available examinations
- Advantages and limitations of examination options
- Complementary nature of other examinations
- Results of prior examinations
- Risk-benefit considerations including adverse effects

⇒ Information = key ⇒ task not only for radiologist

J. Vom et al, Justification of Radiographic examinations: What are the key issues? Journal of medical radiation sciences; 64 (2017) 212-219



Justification

Practical: domains to work on

1. Referral by doctor
2. Making an appointment
3. Arriving at the radiology department
Tasks for secretary,
nurses/technicians,
radiologists



Justification

Practical: domains to work on

- 1. Referral by doctor**

2. Making an appointment

3. Arriving at the radiology department

Tasks for secretary, nurses/technicians, radiologists



Justification

Practical: domains to work on

1. Referral by doctor

Steps taken:

- set of **training sessions** for general drs (LOK)
 - Guidelines in general
 - Guidelines for lower back pain
 - Guidelines for abdominal imaging
 - Risks in a radiology department



Justification

Practical: domains to work on

1. Referral by doctor

Steps taken:

- **Rad Call center:** separate nr for referring drs
 - Very High SLA: 95% < 15" => redirected to Radiologist with subspeciality they ask for
 - * communication: we prefer a phone call to avoid suboptimal referrals (general drs feel hampered to do so)

**Today's generation will never
get to know the satisfaction**



**of slamming down the phone
during an angry hang-up!**

Justification

Practical: domains to work on

1. Referral by doctor

Steps taken:

- **Website: Belgian guidelines** available



Justification

Practical: domains to work on

1. Referral by doctor

Steps taken:

- **Radiology = no commodity => radiologists need to play a role**
 - Improved visibility of radiology in our hospital
 - Take part in oncology handbook workshops !
 - Organ focussed radiologists = contact person
 - Take part in multidisciplinary oncology meetings
 - Better relations with referring colleagues; appreciation
 - Easier communication, avoiding wrong exams



Justification

Practical:

NDSC helps bring the best available imaging guidelines to referrers

1. Referra

Opportuni
- **Electroni**



...and seamlessly delivered in real-time to ordering physicians at the point of care within the native EHR

ESR guidelines are structured into digital content...

- The art of CDS delivery*
- Localisation and translation
 - Integrate seamlessly into EHRs
 - Create user-centric 'actionable' workflow with minimal 'extra clicks'
 - Avoid alert fatigue
 - Meaningful statistical reporting on appropriate utilisation



Justification

Practical: domains to work on

1. Referral by doctor

Opportunity:

- Planning of regular feedback conversations with ER colleagues
 - Ex. Focus on Medical Imaging: renal stones
 - FUIO: Chest XR and Ultrasound Abdomen for pneumonia
- Lump sum financing: responsibilities !
 - Although: 'Right fossa pain: dd cc-itis, app-itis, colitis, renal stone?' -> ct/US?



Justification

Practical: domains to work on

1. Referral by doctor
- 2. Making an appointment**
3. Arriving at the radiology department
Tasks for secretary,
nurses/technicians,
radiologists

Justification

Practical: domains to work on

2. Making an appointment

Steps taken:

- List of examinations are flagged for secretary in booking software
 - > no appointment possible
 - > unless radiologist approves

(MRI chest, MRI ribs, XR Sinus, XR skull, mammotomy,...)



Justification

2. Making an appointment

Steps taken:

- Dynamic MRI planner:
 - Emergency Room has free semi-urgent MRI time slots available
 - Planned < 1wk
 - Ex. To avoid ultrasound or XR-Knee
 - Block of MRI time-slots reserved for urgent planning
 - Available for substitution from CT
 - Active monitoring of MRI waiting time / anatomy
 - Remediation possible with free blocks each week



Justification

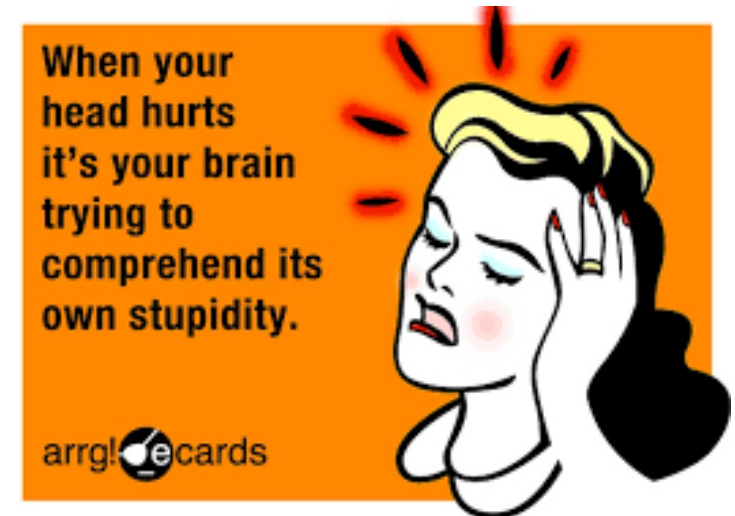
Practical: domains to work on

2. Making an appointment

Opportunity:

- Refusal of CT brain
 - Often ambulatory due to 'headache'
 - But: legal – medical responsibility

-> training of med.students !!!



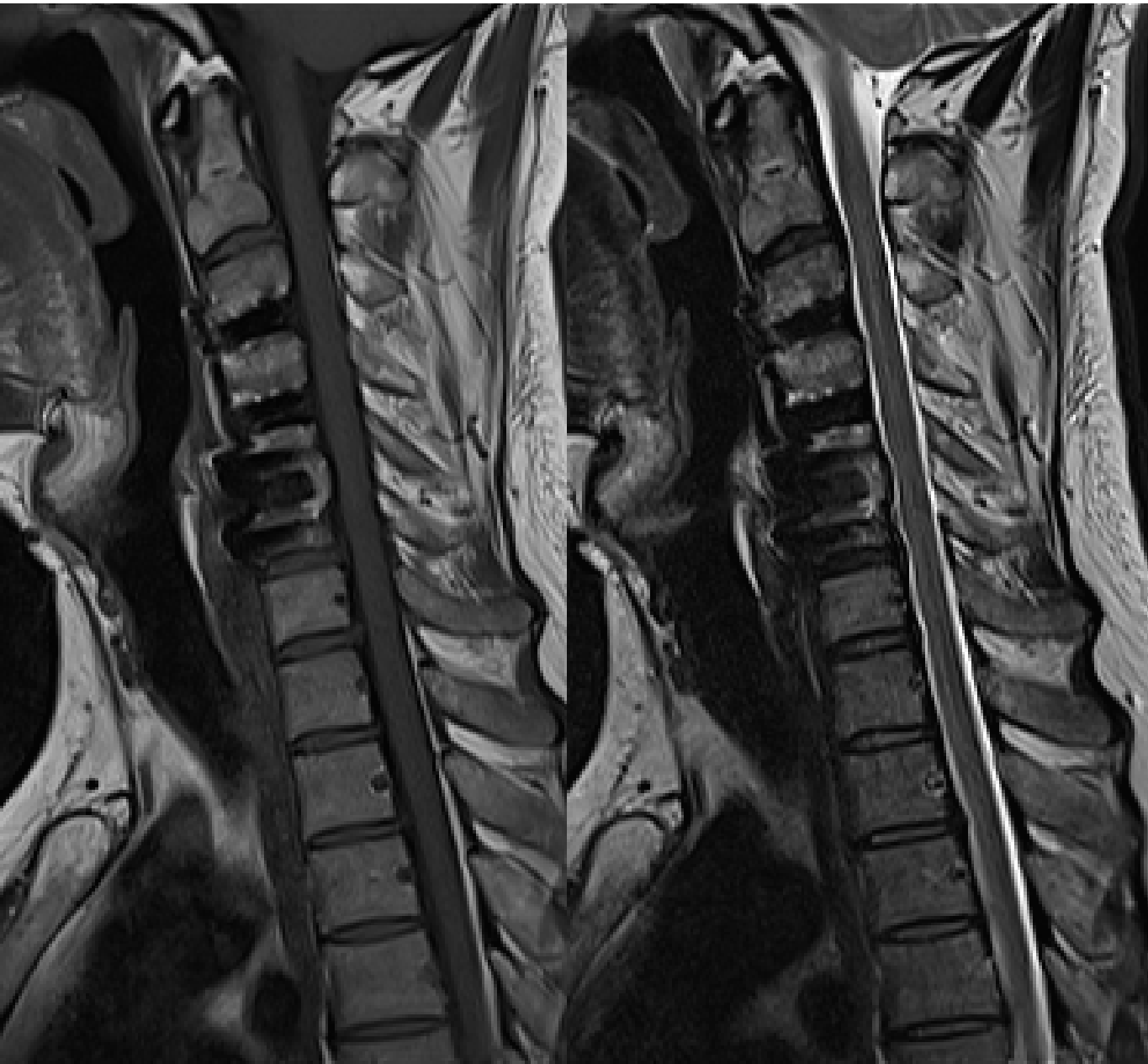
Justification

Practical: domains to work on

2. Making an appointment

Opportunity:

- Refusal of CT spine
 - But:
 - Claustrophobia
 - Operated (“surgeon knows better”)



Justification

Practical: domains to work on

1. Referral by doctor
2. Making an appointment
- 3. Arriving at the radiology department**
Tasks for secretary,
nurses/technicians,
radiologists

Justification

3. Arriving at the radiology department

Tasks for:

1. secretary,
2. nurses/technicians,
3. radiologists

No electronic ordering; every order is digitalised; workflow is digital.

All procedures / working instructions can be found in our total management system according to your profession:

important: 'at your fingertips'



Justification

3. Arriving at the radiology department

1. Written tasks for secretary:

a. Is Rad-order compliant to the RIZIV/INAMI directions?

If not: follow the written working instructions:

ex. Urgent telephone orders

ex. Missing item (not signed) -> contact referring dr.

ex. Pt forgot his/her Rad-order

Justification

3. Arriving at the radiology department

1. Written tasks for secretary:

- What if non-compliant to the RIZIV/INAMI directions?

Each working instruction describes specific tasks to do, if examination can be performed or not and how to follow up on these non-compliant orders.



Justification

3. Arriving at the radiology department

1. Tasks for secretary:

a. Is Rad-order compliant to the RIZIV/INAMI directions?

**b. Is the contraindications - safety list completed?
(MRI/CT/contrast)**

c. Is requested examination part of the 'don't book list' ?

d. Scan the Rad-order (documentation)

Justification

3. Arriving at the radiology department

2. Tasks for nurses/technicians:

X-Ray

1. Is examination compliant to the guidelines?
ex. XR Sinus => ask radiologist for substitution
2. Is examination compliant to our working instructions?
ex. XR comparing sides => ask radiologist
3. General training: XR 'whole body': get's picked up by tech
4. Write down additional clinical information
5. Safety: pregnancy status; modality can't be started without written registration

Make Tech responsible ! (last barrier)

Justification

3. Arriving at the radiology department

2. Tasks for nurses/technicians:

Contrast examination (non-CT, non-MRI), CT, MRI, interventional radiology (ultrasound):

=> Always check written justification by radiologist

Justification

3. Arriving at the radiology department

2. Tasks for nurses/technicians:

Execution examination

a. Pt identification: 'active'

b. Check safety list on the order => Always verify by asking

c. Pregnancy status: mandatory by digital way: can't start modality if not asked (and registration who asked the patient)

d. Select correct working instruction according to justification process by radiologist



Justification

3. Arriving at the radiology department

3. Tasks for radiologists

- a. Written justification of each MRI, CT, contrast examination
 - * if exam is correct ordered
 - => check safety: renal function / allergy
 - => selection of appropriate working instruction
 - ex. Multifasic CT or not



Created : 11/02/2016 13:30 Publication date : 05/04/2017 12:42

Tags: *

Tags : Verpleegkundige/technoloog | Radioloog | CT | Beeldproductie en -distributie

- [04.01 CT Thorax klassiek](#)
- [04.02 CT Thorax longembolen](#)
- [04.03 CT Thorax hoge resolutie \(HRCT\)](#)
- [04.04 CT Thorax klassiek met HRCT coupes](#)
- [04.05 CT Thorax Angio-Aorta](#)
- [04.06 CT Controle endoprothese](#)
- [04.07 CT Pre Ablatie Pulmonale Venen](#)
- [04.08 CT Thorax Ultra low Dose \(nodule screening\)](#)
- [04.09 CT ANGIO BOVENSTE LEDEMATEN](#)
- [04.10 CT TOS angio](#)

5. Abdomen

- [05.01 CT Totaal Abdomen](#)
- [05.02 CT Abdomen Ischemie/Bloeding](#)
- [05.03 CT Bovenbuik Art. Ven](#)
- [05.04 CT Bovenbuik Art. Abdomen Ven](#)
- [05.05 CT Hematurie](#)
- [05.06 CT Bijmieren](#)
- [05.07 CT Urolithiase \(uro a blanc\)](#)
- [05.08 CT Pre-Op Endoprothese:](#)
- [05.09 CT Controle Endoprothese](#)
- [05.10 CT Angio-CT OL](#)
- [05.11 CT Colonografie](#)
- [05.12 CT Diep Flap\(Dr Vangenechten\)](#)
- [05.13 CT Peritoneografie](#)
- [05.14 CT Hepatorenale polycystose sa](#)

00.00 Overzicht | protocolnummers CT | 05.08 CT Pre - Op Endoprothese

05.08 CT Pre - Op Endoprothese

Document Management System / Werkinstructie / Verpleegkundige / technoloog / CT / Abdomen /

Published document | Document under revision | Document revisions | Comments | History | User Overview | Configuration

Created : 11/09/2015 14:27 Publication date : 03/03/2017 08:28

Tags: *

Tags : Verpleegkundige/technoloog | Radioloog | Abdomen | Werkinstructie | CT | Beeldproductie en -distributie

1. **Indicaties**
 - o preoperatieve evaluatie endoprothese
2. **Voorbereiding Patiënt**
 - nuchter
3. **Injectiegegevens**
 - 70 cc Niet ionisch-laag osmolair iv-contrast
 - Debiet: 4.5 cc/s
 - Bolstracking: +180 HU
4. **Richtlijnen scan**
 - scanrichting: crano-caudaal
 - Van longbasis tot in de hezen!**
 - Enkel Arteriële reeks
5. **PACS**
 - [Berekening van angio onderzoeken met terarecon](#)
 - [Handleiding Terarecon angio berekening](#)
 - Axiaal, Cor en Sag (3/3) naar PACS
 - MIP's 8-8 coronaal
 - VRT recon in cine

8. Opmerkingen:



13 items in lijst

Ingezande aanvragen

Info voor radioloog

	Voornamg	Onderzoekscodc	Technicus	Opmerking	Behandarts	Tijdstip van de af	Tijd	Opnamezaal	Opramer	Naam onderzoek	Datum
6/02/1958 > (PN: 9790)	Altpraak	MFA80	SILJO	lever en dien j	BRQJA	8:40	7:50			NR ABDOMEN REGIO	14/04/2017
3/03/1944 > (PN: 2415)	Altpraak	MFDWZ	CAFIDA		SOUVG	7:50	8:00			NR DORSALE WERVELZUIL	14/04/2017
2/10/1958 > (PN: 10754)	Altpraak	MFSCHDR		zonder echo	SOUVG	8:10	8:00			NR SCHOLDER REGIO RECHTS	14/04/2017
8/06/1935 > (PN: 49487)	Altpraak	CTABD		<5.1 gr	WAWJR	9:30	8:00			CT ABDOMEN REGIO	14/04/2017
vna(N) <20/06/1983>	Altpraak	CTABD		<5.1; labe 7x30 gepaktgr	WAWJR	9:00	8:00			CT ABDOMEN REGIO	14/04/2017
5/01/1940 > (PN: 178)	Altpraak	CTTA		11.2 j; pat is neg op DH	BRQJA	9:15	8:02	3315	0	CT THORAX + CT ABDOMEN	14/04/2017
3/6 > (PN: 460314)	Altpraak	CTTA		11.2 gr ok	HOFRO	9:30	8:10			CT THORAX + CT ABDOMEN	14/04/2017
3/6 > (PN: 460314)	Altpraak	CTSCH		<2; na 11.2 gr	HOFRO	10:00	8:10			CT SCHEDEL	14/04/2017
5/1952 > (PN: 158778)	Altpraak	CT TH		4.1 met j; emansio/echo	HOFRO	8:30	7:42			CT THORAX REGIO	14/04/2017
6/6 > (PN: 9980)	Normaal	CTTH		<4.1 zonder icgr	WAWJR	8:05	8:08	5008	2	CT THORAX REGIO	14/04/2017
labertine (N) <30/11/195	Altpraak	CTTH		<4.2; geen gr gekend; geen nierpobl gekend in C3N; navigen bij pt aub gr	WAWJR	8:15	8:03			CT THORAX REGIO	14/04/2017
6 > (PN: 728841)	Altpraak	MFSCHDR		* bektuze; laten slenrgt	SOUVG	8:50	8:00			NR SCHOLDER REGIO RECHTS	14/04/2017
1988 > (PN: 763780)	Altpraak	MFEWR		Spelro Sint-Tsuden	SOUVG	8:30	8:07			NR FEMUR REGIO RECHTS	14/04/2017
4/1985 > (PN: 784703)	Altpraak	MFA8SCHDR			SOUVG	9:10	7:59			NR ARTHRO SCHOLDER RECHT	14/04/2017
(N) <3/04/1935 > (PN: 2	Normaal	CTABD		<5.1 gr	WAWJR		8:00	C783	1	CT ABDOMEN REGIO	14/04/2017
(<12/07/1928 > (PN: 7	Altpraak	CTCOL		5.11 j	BRQJA	14:00	7:10	2485	1	CT COLONOGRAFIE	14/04/2017
1983 > (PN: 870342)	Normaal	CTSCH		<2.1 gr I2 C3	DHEB		8:00	373C	1	CT SCHEDEL	14/04/2017
27/06/1967 > (PN: 868	Normaal	CTTH		<4.1 gr	WAWJR		8:00	C780	1	CT THORAX REGIO	14/04/2017
(<10/12/1932 > (PN: 6	Altpraak	CTSWZ	KELJA	6.2 j	HOFRO	8:15	7:33			CT SADRALE WERVELZUIL	14/04/2017

Vrij type

Informatie

Let op --> Patient heeft ook onderzoek(en) op andere zaal!

OK

305.0 Tube(OLP) 20%

135.0

Scan Astroware Raw Data

Utility

Zoom Screen Save Image Selector

Measure Filing Reset

valeriano

Middle

DOB 10.10.1938 Age 78Y

Sex M Weight kg

Comment

Contrast

Organ

Appoint Exposure record Detail Clear Emergency

Abdo 78

WL = 40 WW = 400 SUFF/

CE InstaView/O

Aquilion ONE P JESSA CAMPUS VIRGA JES

TOSHIBA Protocol User Protocol Service Protocol

Adult Child Trauma

Whole

Chest Pelvis

Group A	Group B	Group C
5.1 Totaal Abdomen 144 SUFF M	5.7 Urolithiase 150 SUFF M	
5.2 Abdomen Ischemie/Boeding 145 SUFF L	5.8 Preop Endoprothese 151 SUFF L	
5.3 Bovenbuik Arter/Veneus 146 SUFF L	5.9 Controle endoprothese 152 SUFF L	
5.4 Bovenbuik Art/Abdomen Veneus 147 SUFF L	5.10 Angio onderste ledematen 153 SUFF L	
5.5 Hematurie 148 SUFF L	5.12 DIEP-flap angio 154 SUFF L	
5.6 Bijnieren 149 SUFF M	5.13 Peritoneografie 155 SUFF M	

Repeat Exam Stop Rotate

The Medical staff is responsible for patient radiation exposure and safety.

Call Exam Next Patient

Justification

3. Arriving at the radiology department

3. Tasks for radiologists

a. Written justification of each MRI, CT, contrast examination

b. **If substitution was mandatory**

=> contact referring dr: is training !

=> registration in RIS and report

Justification

3. Arriving at the radiology department

3. Tasks for radiologists

opportunity:

self-referral:

non-radiologists need to do justification

radiologist: 'please follow-up with MRI'



Justification

Conclusion:

Justification: Not only a task for the radiologist !

Pitfalls:

- interpretation of guidelines
- quality of clinical question
- psychological pressure ('pt expects') -> re-education
- legal reasons
- need for electronic ordering (CDS)