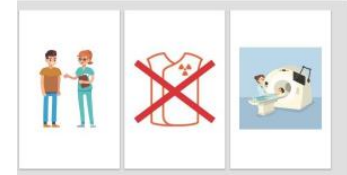




European consensus on patient contact shielding by the GAPS group



Paddy Gilligan,
Past President of European Federation of Organisations for Medical Physics (EFOMP)/ Mater
Misericordiae University Hospital/ University College Dublin, Ireland



24th EURADOS Webinar on Patient Shielding



Conflict of Interest

- Past Chair of Gonad and Patient Shielding (GaPS) Group
- No conflict of interest
- Views are not Personal !!

Outline of talk

- Patient contact shielding
- European consensus statement
- Gonad shielding in projection radiography and CT
- Thyroid shielding
- Embryo/Fetal Shielding
- Eye shielding
- Breast shielding
- Practical issues with using shielding
- Discussion

Radiographer struck off after being ruled danger to public

worked for a short period at University Hospital Waterford in 2017

© Mon, Mar 25, 2019, 19:51 | Updated: Mon, Mar 25, 2019, 21:34

Mary Carolan



Kashimbo Musonda outside a fitness to practise hearing in Dublin last year. Photograph: Donall Farmer

The president of the High Court has struck off a radiographer after being satisfied she is “a danger to the public” due to her “substandard” knowledge of the basics of radiography.



“ The SIMPSONS”

“It also found she had placed the health and safety of the mother of a child patient at risk by exposing the mother to unnecessary radiation while taking images of the child and had failed to show any, or any adequate understanding, of the potential harm to the mother from such exposure”.

ECR: Should patient radiation shielding stay or should it go?

By Will Morton, AuntMinnie.com staff writer

July 18, 2022 -- European experts are gradually reaching a consensus that radiation shielding is no longer needed for some imaging exams, yet the idea may be a hard pill to swallow at some facilities. With that in mind, a panel discussion held at ECR 2022 in Vienna addressed the pros and cons of the issue.



Mark McEntee, PhD, during a presentation at ECR 2022.

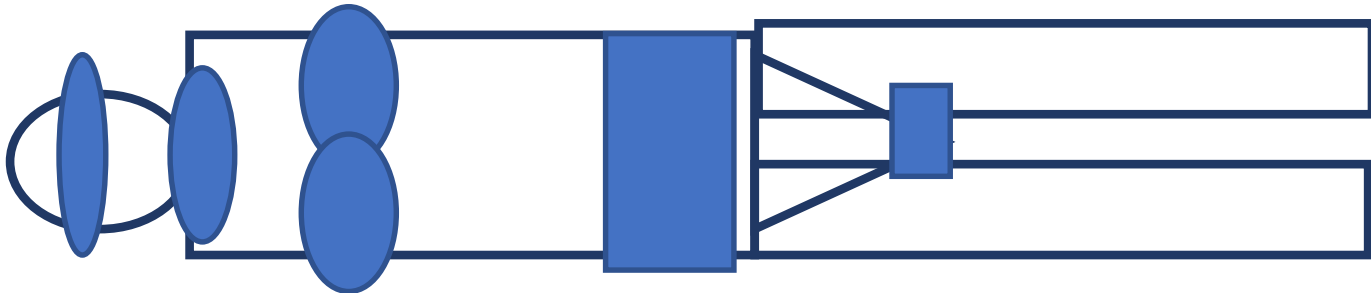


Shielding just one part of risk control



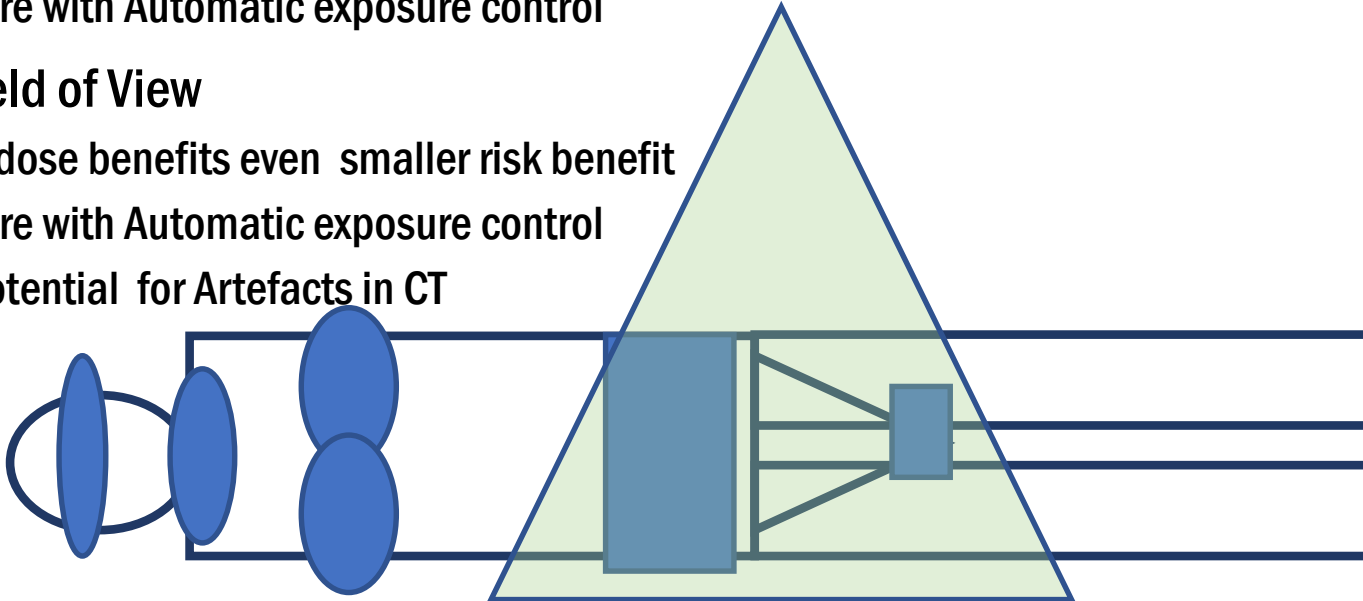
Patient Shielding Common themes

- Inside field of View
 - Artefacts
 - Obscure detail
 - Interfere with Automatic exposure control
- Outside field of View
 - Small dose benefits even smaller risk benefit
 - Interfere with Automatic exposure control
 - still potential for Artefacts in CT



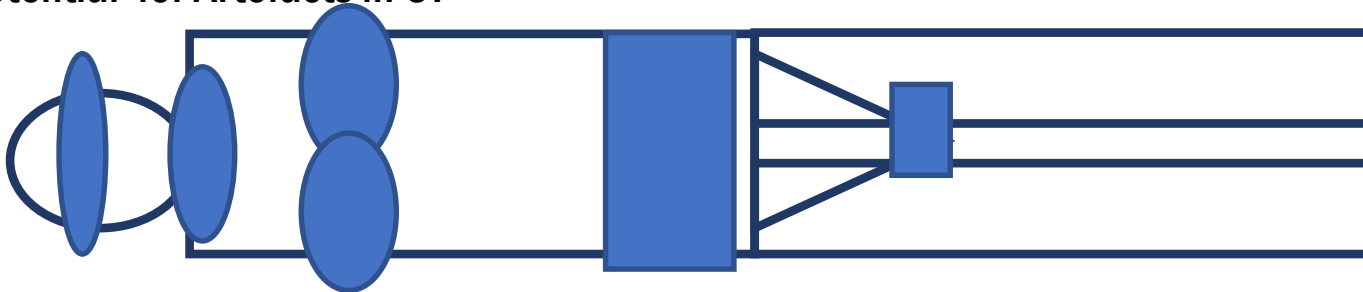
Patient Shielding

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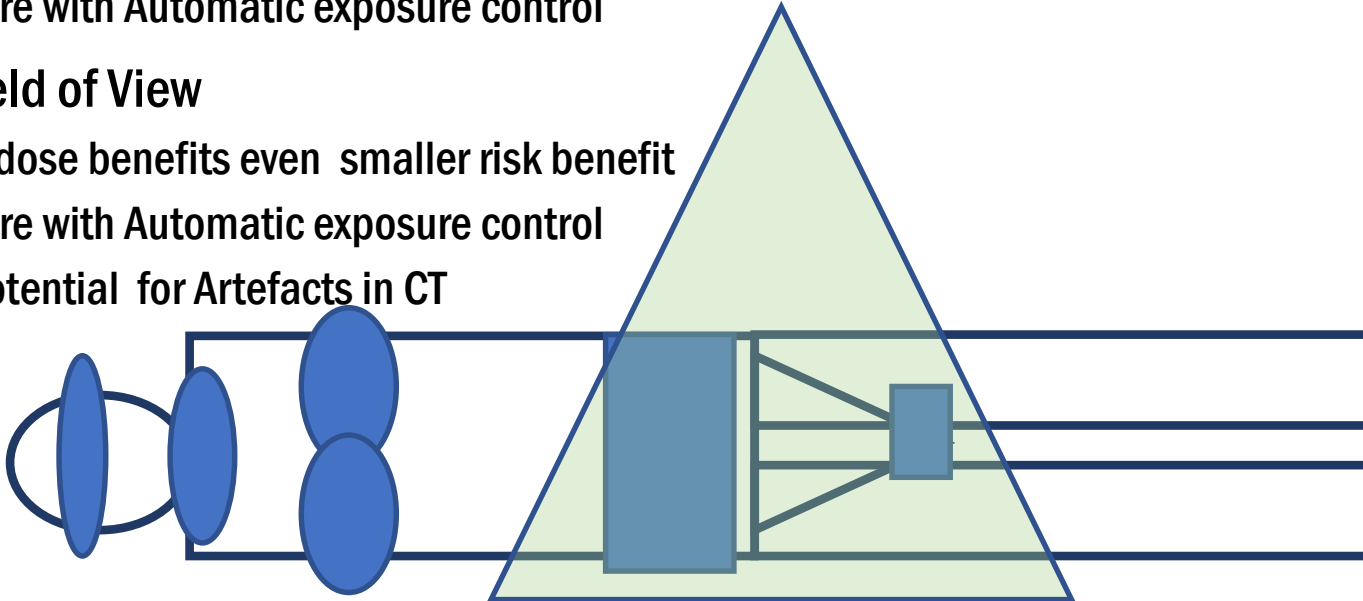
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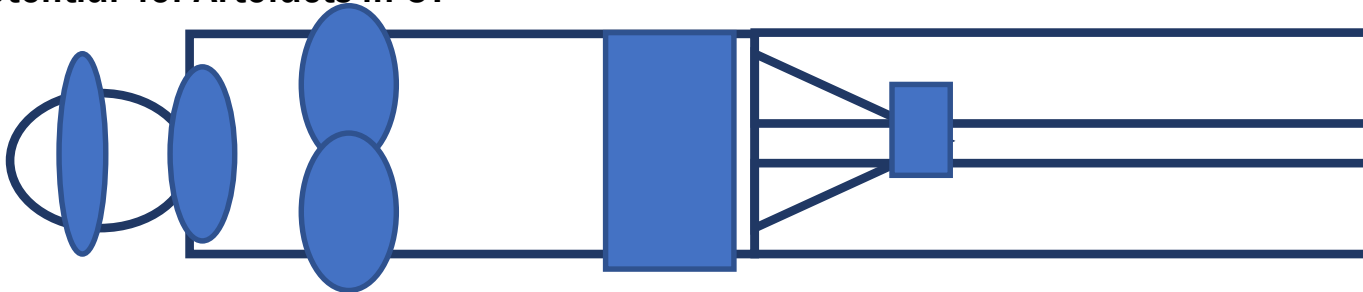
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Patient Shielding

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SSK Strahlenschutzkommission

Über die SSK | Aktivitäten | Strategien | Publikationen | Links

Strahlenschutzrichtlinie

Use of patient radiation protection equipment in the diagnostic application of X-rays on humans

Recomendation by the German Commission on Radiological Protection

Adopted at the 2019 meeting of the German Commission on Radiological Protection on 16 September 2019

By the agreement of the individual cabinet members of the German Commission on Radiological Protection, a resolution was adopted at the cabinet meeting of this cabinet, especially under the heading "to be published as an official cabinet decision" (see page 10).

Recomendation by the German Commission on Radiological Protection



icating Advances in Radiation Education for Shielding (CARES)

Documento intersocietario

SIRM AIFM FASTER

POSIZIONE DI AIFM, SIRM E FASTER SULL'USO DEI DISPOSITIVI DI PROTEZIONE INDIVIDUALE ANTI-X PER I PAZIENTI SOTTOPOSTI A ESAMI RADIOLOGICI

2020

Guidance on using shielding on patients for diagnostic radiology applications

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AAPM

POLICY NUMBER	POLICY NAME	POLICY DATE	SUNSET DATE
PP 32-A	AAPM Position Statement on the Use of Patient Gonadal and Fetal Shielding	4/2/2019	12/31/2024

Policy source
April 2-3, 2019 Board of Directors Meeting Minutes

SGSMP / SSRFM / SSRFM

Subnuclearer Gesellschaft für Strahlungsbiologie und Medizinische Physik
Societ  Societ  de Radiobiologie et de Physique M dicale
Societ  Societ  di Radiobiologia e di Fisica Medica



National Council on Radiation Protection and Measurements
7910 Woodmont Avenue / Suite 400 / Bethesda, MD 20814-3095
http://ncrponline.org



NVMBR

Richtlijn Gonadenschildering
Voor conventionele radiologie en CT

Mei 2017, Utrecht

Report on the use of patient shielding in radiological procedures

NCRP Recommendations for Ending Routine Gonadal Shielding During Abdominal and Pelvic Radiography

NCRP Statement No. 13, January 12, 2021

iapm

Patient Lead Shielding
Position Paper

iapm



Invited commentary

Patient shielding: The need for a European consensus statement

P. Gilligan , J. Damilakis

Statements recommending discontinued routine use

Dutch radiology society 2017

German society of radiology 2018

AAPM 2019

BIR (IPEM, RCR, SOR) 2020, Swiss Society 2020, AIFM 2020

NCRP 2021

AAPM and BIR useful patient staff communication exercise AAPM CARES

No European statement

Box 4 – An instrument of guidelines appraisal criteria developed by the group Agree (Appraisal of Guidelines for Research and Evaluation in Europe)

Scope and purpose

1. The overall objective(s) of the guideline is (are) specifically described.
2. The clinical question(s) covered by the guideline is (are) specifically described.
3. The patients to whom the guideline is meant to apply are specifically described.

Stakeholder involvement

4. The guideline development group includes individuals from all the relevant professional groups.
5. The patients' views and preferences have been sought.

Rigour of development

6. Systematic methods were used to search for evidence.
7. The criteria for selecting the evidence are clearly described.
8. The methods used for formulating the recommendations are clearly described.
9. The health benefits, side effects and risks have been considered in formulating the recommendations.
10. There is an explicit link between the recommendations and the supporting evidence.
11. The guideline has been externally reviewed by experts prior to its publication.
12. A procedure for updating the guideline is provided.

Clarity and presentation

13. The recommendations are specific and unambiguous.
14. The different options for management of the condition are clearly presented.
15. Key recommendations are easily identifiable.

Applicability

16. The target users of the guideline are clearly defined.
17. The potential organisational barriers in applying the recommendations have been discussed.
18. The potential cost implications of applying the recommendations have been considered.
19. The guideline is supported with tools for application.
20. The guideline presents key review criteria for monitoring and/or audit purposes.
21. The guideline has been piloted among end users.

Editorial independence

22. The guideline is editorially independent from the funding body.
23. Conflicts of interest of guideline development members have been recorded.

Gonad and Patient Shielding GAPS GROUP

- **Aim: to produce consensus document on a number of types of patient shields**
- **Using European template for consensus document**
- **Purpose to build on and learn from what had been done**
- **We did look at some newer papers**
- **Simple clear to use resource**
- **Patient representative- Erik Briers ESR Patient Advisory Group**
- **Recognise that this may represent change management for some**
- **This is a sensitive topic**
- **What is true for Europe may not be true for rest of world**

IAEA and ICRP

Gonad and Patients shielding group (GAPS): European Consensus



GAPS Group

Paddy
Gilligan

Peter Hiles

Guy Frija

Shane
Foley

John
Damilakis

Marta Sans
Merce

George
Simantirakis

Hugo de las
Heras Gala

Cristian
Candela

Ruben
Pauwels




Dario Faj


Erik Briers

Eliseo Vano

Claudio
Granata

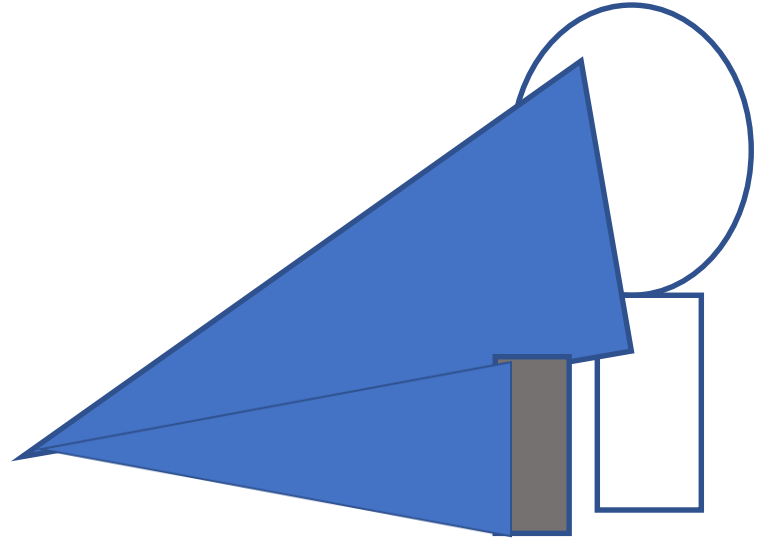
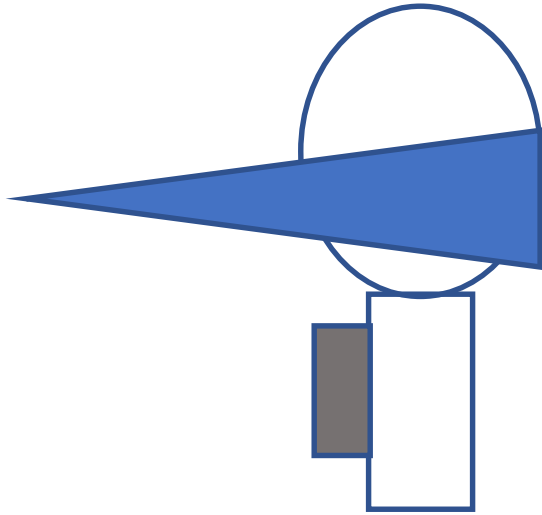
Table 2.1: Rationale for consensus statements.

Rationale	Consensus Recommendation	Symbol
Evidence that using patient contact shielding is beneficial and effective.	'Should use shielding'	
General agreement favours usefulness of patient contact shielding in some circumstances	'May use shielding'	
Evidence or general agreement not to use patient contact shielding	'Not recommended to use shielding'	






Application	Imaging modality	Inside or outside FOV	Recommendation	Symbol
Male and female gonad contact shielding	All X-ray	Both	'Not recommended'	



Dental Primary beam shield





Application	Imaging modality	Inside or outside FOV	Recommendation	Symbol
Thyroid contact shielding	All X-ray (except Ceph.)	Inside	'Not recommended to use shielding'	
Thyroid contact shielding	Cephalometric radiography	Inside	'May use shielding'	
Thyroid contact shielding	Radiography, Mammography, Fluoroscopy, CT	Outside	'Not recommended to use shielding'	
Thyroid contact shielding	Dental intraoral and cephalometric radiography	Outside	'May use shielding'	
Thyroid contact shielding	CBCT	Outside	'May use shielding'	

Patient shielding during dentomaxillofacial radiography

Recommendations from the American Academy of Oral and Maxillofacial Radiology

Erika Benavides, DDS, PhD • Avni Bhula, BDS, DDS, MSc • Anifa Gohel, BDS, PhD • ...

Sanjay M. Mallya, BDS, MDS, PhD ✉ • Aruna Ramesh, BDS, MS, DMD •

Donald A. Tyndall, DDS, MSPH, PhD • [Show all authors](#)

[Open Access](#) • Published: August 01, 2023 • DOI: <https://doi.org/10.1016/j.adaj.2023.06.015> •

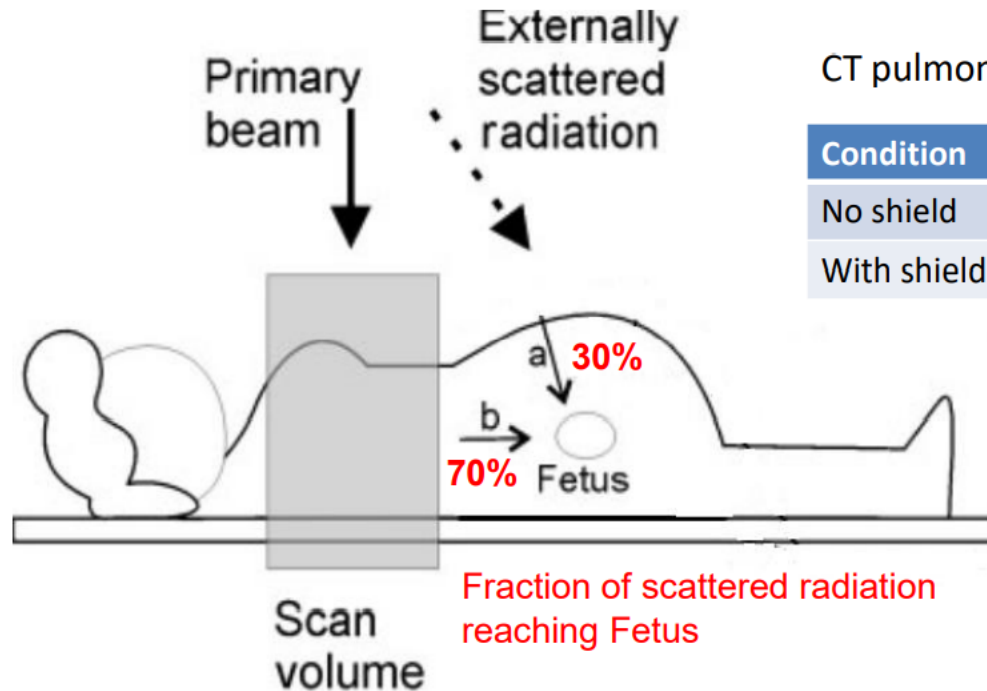
Table 3 Median thyroid-absorbed doses from dental maxillofacial imaging.*

PROCEDURE	THYROID-ABSORBED RADIATION DOSES, [†] mGy	
	Unshielded	Shielded
Intraoral Radiography, FMX, [‡] Round Collimation, F-Speed Radiograph or Photostimulable Storage Phosphor	0.8	0.5
Intraoral Radiography, FMX, Rectangular Collimation, F-Speed Radiograph or Photostimulable Storage Phosphor	0.4	0.3

Hooegeveen and Colleagues, ⁴⁶ 2015	Cephalometric	0.004	0.004-0.005
Ludlow and Colleagues, ⁵⁷ 2015	CBCT	0.345	NA
Ludlow and Colleagues, ⁵⁷ 2015	CBCT	0.162-1.374	NA
Lukat and Colleagues, ⁵⁸ 2015	CBCT	0.023	NA
Granlund and Colleagues, ⁴⁰ 2016	Cephalometric	0.040-0.048	NA
Benchimol and Colleagues, ⁴¹ 2018	Panoramic	0.040	NA
Lee and Colleagues, ⁴² 2019	Panoramic	0.024-0.036	NA
Johnson and Colleagues, ¹² 2020	Intraoral, full-mouth examination, PSP, rectangular collimation	1.086	0.448
Johnson and Colleagues, ¹² 2020	Intraoral, full-mouth examination, PSP, rectangular collimation	0.366-1.027	0.266-0.428
Li and Colleagues, ³⁸ 2020	Panoramic	0.054-0.064	NA
Li and Colleagues, ³⁸ 2020	CBCT	0.453-0.476	NA

“The European consensus on patient contact shielding was published in 2022. For intraoral, cephalometric, and CBCT imaging, the committee recommendation was thyroid contact shielding may be used. This category indicates “general agreement favours usefulness of patient contact shielding in some circumstances.” The European consensus group did not recommend thyroid shielding for mammography and CT, both procedures when the thyroid-absorbed doses are equal to or exceed those from dentomaxillofacial imaging.”

Impact of contact shielding – outside beam





CT pulmonary angiography


Condition	Fetal dose [mGy]	Risk category
No shield	<0.50	Minimal
With shield	<0.35	Minimal

- a) Transmitted externally scattered radiation
- b) Internal scatter


Iball et al. BJR 81 (2008), 400-503

Application	Imaging modality	Inside or outside FOV	Recommendation	Symbol
Embryo / Fetal contact shielding	All X-ray	Inside	'Not recommended'	
Embryo / Fetal contact shielding	Radiography, Mammography, Fluoroscopy, Dental Radiography, CT	Outside	'Not recommended'	











Application	Imaging modality	Inside or outside FOV	Recommendation	Symbol
Eye lens contact shielding	All X-ray	Both	'Not recommended'	



Application	Imaging modality	Inside or outside FOV	Recommendation	Symbol
Breast contact shielding	All X-ray	Both	'Not recommended'	

In exceptional cases where shielding is used training is needed for the following

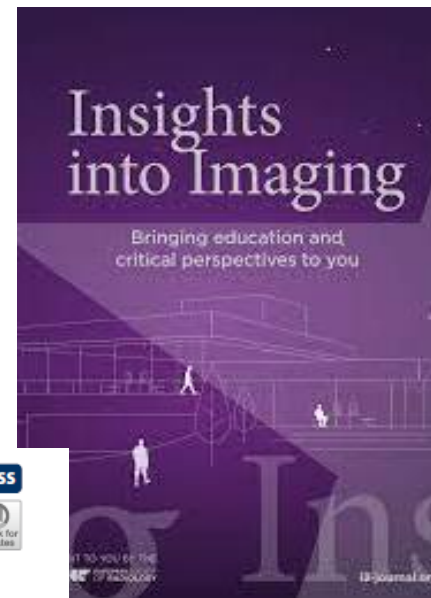
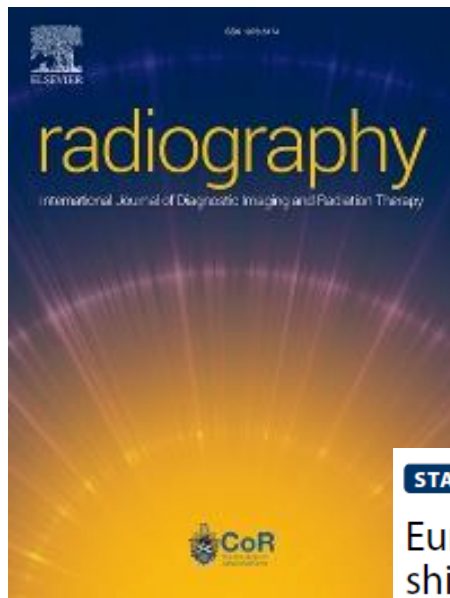
- The selection of appropriate shielding, including how to prevent shielding moving during a procedure due to patient or equipment movement (e.g. during dynamic imaging)
- The selection of appropriate radiographic techniques, including how to avoid interference with automatic exposure control systems
- How to perform quality control checks on patient contact shielding
- How to store shielding appropriately
- How to clean and disinfect shielding
- How to comply with local policies regarding patient dignity (e.g. transgender patients [Sowinski JS and Gunderman RB 2018, [35]])
- Communication skills specific to discussions with patients, parents or caretakers of children undergoing radiological examinations and healthcare professionals on the use of patient contact shielding.
- How to communicate benefit risk to pregnant patients

Application	Imaging modality	Inside or outside FOV	Recommendation	Symbol
Male and female gonad contact shielding	All X-ray	Both	'Not recommended'	
Thyroid contact shielding	All X-ray (except Ceph.)	Inside	'Not recommended'	
	Cephalometric radiography	Inside	'May do this'	
	Radiography, Mammography, Fluoroscopy, CT	Outside	'Not recommended'	
	Dental X-ray incl. CBCT	Outside	'May do this'	
Breast contact shielding	All X-ray	Both	'Not recommended'	
Eye lens contact shielding	All X-ray	Both	'Not recommended'	
Embryo / Fetal contact shielding	All X-ray	Both	'Not recommended'	

GaPS Group

- Formed from professional bodies involved in Europe in radiology
- Patient perspective
- Develop a consensus statement
- Build on previous statements
- Clear easy to use ,
- Period for review, guidance for exceptions, intra professional parity
- Published December 2021 in three journals
- Part I: Consensus statement published
- Part II : Communication to professionals and patients (Current Gaps chair, Claudio Granata)
- Survey on shielding published June 2023
- Encourage new research for the new imaging technologies and more sophisticated dosimetry





STATEMENT

Open Access

European consensus on patient contact shielding

Peter Hiles^{1*}, Patrick Gilligan^{2,3}, John Damilakis^{4,5}, Eric Briers⁶, Cristian Candela-Juan^{2,7}, Dario Faj^{8,9}, Shane Foley^{10,11}, Guy Frija^{4,12}, Claudio Granata^{13,14}, Hugo de las Heras Gala^{2,15}, Ruben Pauwels¹⁶, Marta Sans Merce^{8,17}, Georgios Simantirakis^{8,18} and Eliseo Vano^{4,19}

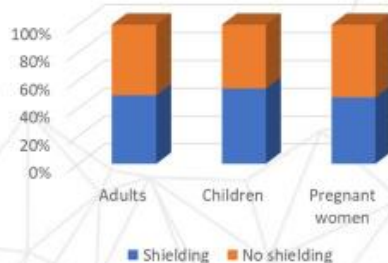


Phys Med. 2022 Apr;96:198-203. doi: 10.1016/j.ejmp.2021.12.006. Epub 2021 Dec 23.
Insights Imaging. 2021 Dec 23;12(1):194. doi: 10.1186/s13244-021-01085-4.
Radiography (Lond). 2022 May;28(2):353-359. doi: 10.1016/j.radi.2021.12.003. Epub 2021 Dec 23.

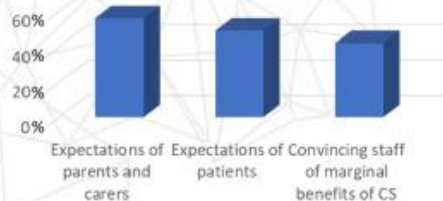
European survey on the use of patient contact shielding during radiological examinations

- Contact shielding (CS) of patients is still largely used in European radiology departments, despite increasing evidence that this practice is not useful in many cases
- Contact shielding was most frequently used in conventional radiography, where the most frequently shielded organs were the gonads, followed by thyroid, female breasts, and eye lens.
- Most European radiology departments could adopt a non-shielding policy when the main European bodies involved in radiology provide recommendations to this regard

Use of patient shielding among European centers



Main obstacles for the implementation of a non-shielding policy



According to this survey expectations of patients and carers, and skepticism among professionals about the limited benefits of CS are the most important obstacles to the application of a no-shielding policy. A strong commitment from European and national professional societies to inform practitioners, patients and carers is fundamental

Conclusion

- Patient shielding is of limited value in risk reduction in routine clinical practice with current radiological technology
- There are downsides in using shielding:
Obscuring pathology, Artefacts, Interference with Automatic exposure control, weight, workflow and infection
- There is a consensus among the European bodies involved in radiology that its routine use should be discontinued
- The current consensus is based on current knowledge, technology and practice and may need to be updated over time (5 years)
- Challenges remain in change management due to technology, autonomy, risk perception

Some references :

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- [IOMP School Webinar: Does contact shielding improve patient safety? - YouTube](#)

Thank You

