



World Health
Organization

Education and training resources for radiographers

WHO perspective

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Achieving the Sustainable Development Goals (SDGs)



The UN Member States made a commitment towards the 17 Sustainable Development Goals (SDGs) by 2030

All the 17 SDGs have implications on **human health and well-being**
SDG 3: “Ensure healthy lives and promote well-being for all at all ages”

Universal Health Coverage

- **Universal Health Coverage (UHC)** is a high priority for WHO and its Member States
- UHC includes **safety and quality** of health services
- Ensuring safe and appropriate use of radiation in medicine contributes to achieving UHC

Let's work together
towards good health
& wellbeing for all.

UHC LEAVES NO ONE BEHIND.



12-12-18
UHCDay.org

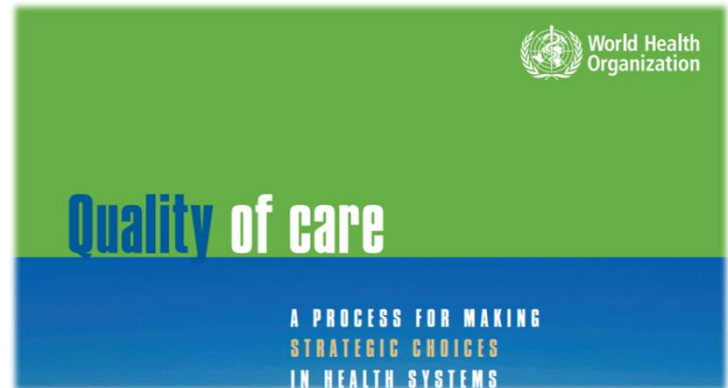


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Health Care Quality Dimensions

- Appropriateness
- Accuracy
- Affordability
- Accountability
- Safety
- Timeliness
- Patient centricity

The safe and appropriate use of radiation for diagnosis and treatment of disease and injuries is embedded in the concept of **health care quality**



Global action plan on patient safety

Global action on patient safety



Vision

A world in which no patient is harmed in health care, and everyone receives safe and respectful care, every time, everywhere.



Mission

Drive forward policies and actions to minimize, and where possible, eliminate all sources of risk and patient harm in health care based on science, strategic partnerships and patient-centredness.



The framework includes seven strategic objectives, which can be achieved through 35 specific strategies.



1

Make zero avoidable harm to patients a state of mind and a rule of engagement in the planning and delivery of health care everywhere.

2

Build high reliability health systems and health organizations that protect patients daily from harm.

4

Engage and empower patients and families to help and support the journey to safer health care.

6

Ensure a constant flow of information and knowledge to drive the mitigation of risk, the reduction in levels of avoidable harm, and improvement in the safety of care.

3

Assure the safety of every clinical process.

5

Inspire, educate and skill health workers to contribute to the design and delivery of safe care systems.

7

Develop and sustain multi sectoral and multinational synergy, solidarity and partnership to improve patient safety.



Goal

Achieve the maximum possible reduction in avoidable harm due to unsafe health care globally.

https://www.who.int/docs/default-source/patient-safety/1st-draft-global-patient-safety-action-plan-august-2020.pdf?sfvrsn=9b1552d2_4

Strategic Objective 3: safety of every clinical process (this includes radiological procedures)

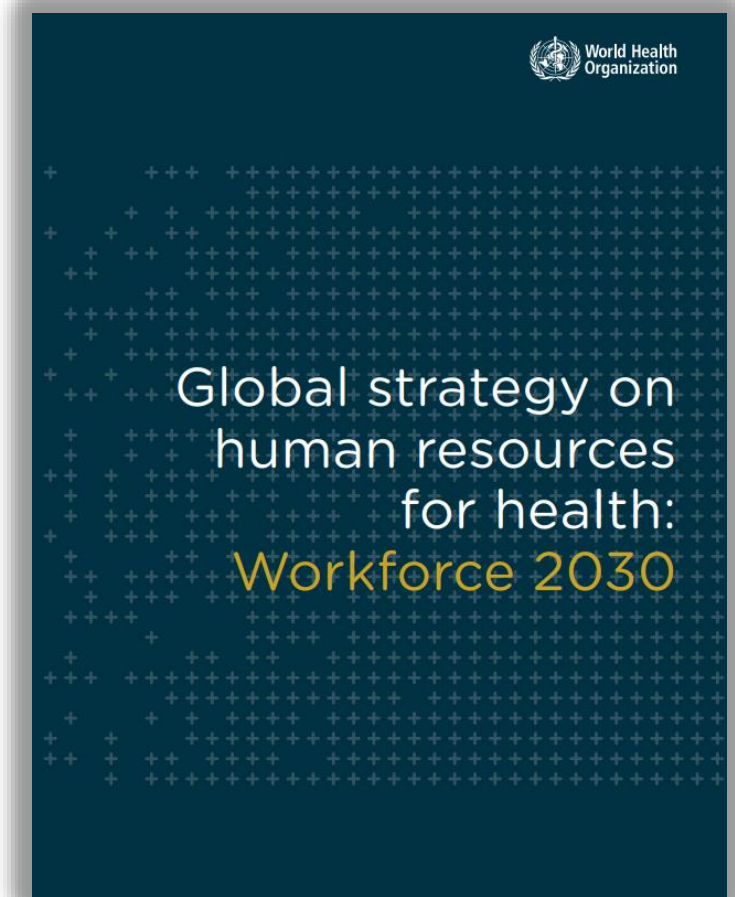
Increasing demands on human resources for health

- Lack access to quality health services is due in large part to the huge shortage, imbalanced skill mix, and uneven geographical distribution of health workers. WHO estimates that an additional 4.3 million health workers are needed worldwide.
- The shortage of health workers is compounded by the fact that their skills, competencies, clinical experience, and expectations are often poorly suited to the health needs of the populations they serve.

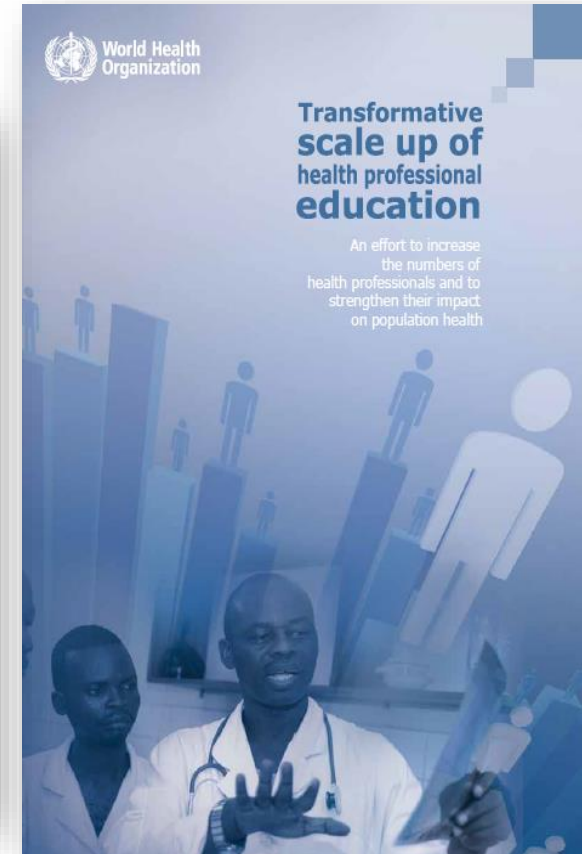


Global strategy on human resources for health

- The foundation for a strong and effective health workforce, able to respond to the 21st century priorities, requires **matching effectively the supply and skills of health workers to population needs**, now and in the future.
- Vision: all communities have **universal access to health workers** by 2030.



Education for enhancing quantity, quality and relevance of the health workforce

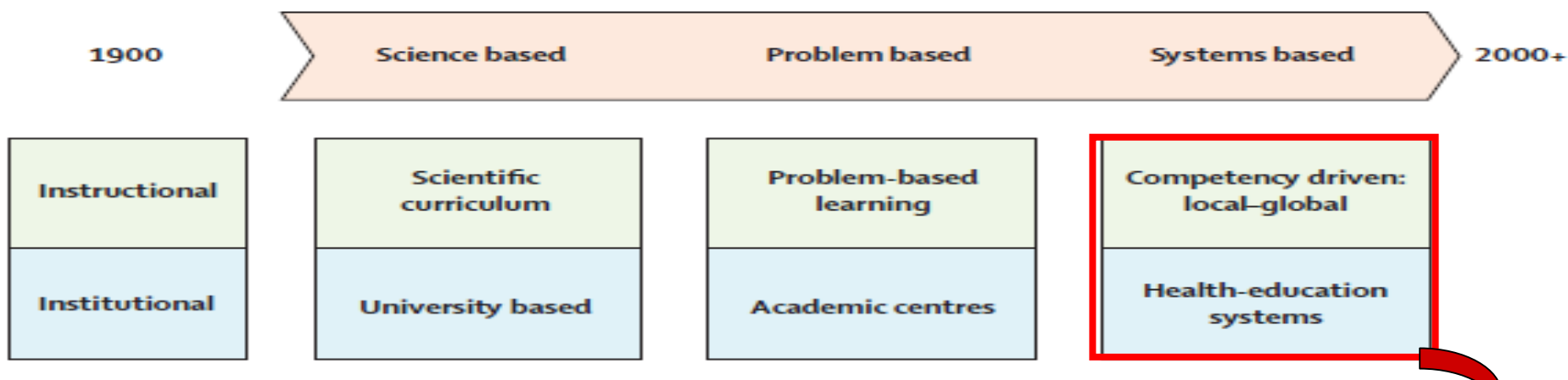


World Health Organization

Education and training of health workers

- To close this shortfall, more educational programmes are needed to produce multi-disciplinary service delivery teams, to increase the quantity, and to improve the quality and relevance of health workers to meet the needs of the 21st century and contribute to better population health outcomes.
- As countries aspire to achieve universal health coverage, new demands are placed on human resources for health, new competencies are required as part of a deeper transformation of professional education.
- This is imperative when dealing with continuously advancing health technologies such as **radiation technologies**.



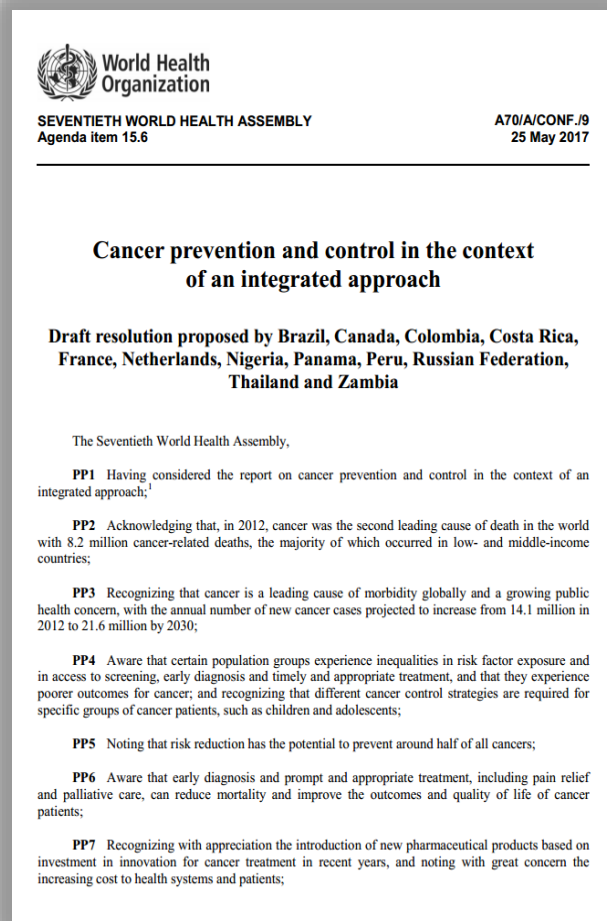


Towards an instructional reform

- Adopt **competency-driven** approaches;
- Promote **inter-professional** and **trans-professional** education and enhance collaborative and non-hierarchical relationships in effective teams;
- Exploit **information technology** for learning and strengthen educational resources;
- Promote a **new professionalism** that uses competencies as objective criteria for classification of health professionals.

WHA A70/A/CONF./9 item 12 refers to education and training of staff

- “...to promote recommendations that support clinical decision making and referral based on the **effective, safe and cost-effective use of cancer diagnostic and therapeutic services**, such as cancer surgery, **radiation** and chemotherapy; and to facilitate cross-sectoral cooperation between health professionals, as well as the **training of personnel at all levels of health system**”



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Global efforts for improving radiation protection in medicine

Bonn Call for Action

actions to improve radiation protection in medicine in the next decade

10



1. Enhancing implementation of **justification** of procedures
2. Enhancing implementation of **optimization** of protection and safety
3. ~~Strengthening **manufacturers'** contribution to radiation safety~~
4. Strengthening RP **education and training** of health professionals
5. Shaping & promoting a **strategic research agenda** for RP in medicine
6. Improving **data collection** on radiation exposures of patients and workers
7. Improving primary **prevention of incidents and adverse events**
8. Strengthening radiation **safety culture** in health care
9. Fostering an improved radiation **benefit-risk-dialogue**
10. Strengthening the implementation of safety requirements (**BSS**) globally

http://www.who.int/ionizing_radiation/about/med_exposure/en

<https://rpop.iaea.org/RPOP/RPoP/Content/News/bonn-call-for-action-joint-position-statement.htm>



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04

Action #4

Strengthen radiation protection education and training of health professionals

- ❑ Prioritize radiation protection education and training for health professionals globally, targeting professionals using radiation in all medical and dental areas;
- ❑ Further develop the use of newer platforms such as specific training applications on the Internet for reaching larger groups for training purposes;
- ❑ Integrate radiation protection into the curricula of medical and dental schools, ensuring the establishment of a core competency in these areas;
- ❑ Strengthen collaboration in relation to education and training among education providers in health care settings with limited infrastructure as well as among these providers and international organizations and professional societies;
- ❑ Pay particular attention to the training of health professionals in situations of implementing new technology.

RP education and training of health professionals:

- Targeting professionals using radiation in all medical and dental areas;
- Using newer platforms and applications;
- Integrating RP in the curricula;
- Collaborating with education providers, professionals societies and int. org.;
- Particularly considering implementation of new technology.



RP culture: education and training

- Mobilize the responsible institutional players within and across countries (e.g. academic institutions, international societies, health authorities) towards the inclusion of RP contents in the curricula in medical and dental schools.
- Empower health care providers with the required knowledge, skills and attitudes to ensure safe and effective use of radiation in health care.
- Create new opportunities for RP education and training (e.g. train-the-trainers, on-the-job learning through mentoring, coaching and continuing education).



RP education and training and good medical practice

- Good health services are those which deliver safe and effective health interventions to those that need them, when and where needed, with minimum waste of resources.
- Health service delivery is one of the building blocks of health systems. Good medical practice encompasses radiation safety.
- Health care providers, policy-makers, decision makers, hospital administrators should know that radiation protection education and training contributes to health systems strengthening.



Radiation Protection Education and Training of Health Professionals

"Half of what you'll learn in medical school will be shown to be either dead, wrong or out of date within five years of your graduation; the trouble is that nobody can tell you which half..."



*Speech to students from
Dave Sackett, father of
evidence based medicine*

Use existing guidance on RP education and training of health workers

- **ICRP report 113** "Education and Training in Radiological Protection for Diagnostic and Interventional Procedures"
- **EC Radiation Protection N° 175** Guidelines on RP education and training of medical professionals in the EU

http://ec.europa.eu/energy/nuclear/radiation_protection/doc/publication/175.pdf



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Education and training in the EU BSS

- The revised **Euratom BSS Directive** states that Member States shall ensure that practitioners and the individuals involved in the practical aspects of medical radiological procedures have adequate **education, information and theoretical and practical training** for the purposes of **medical radiological practices**, as well as relevant competence in **radiation protection**.
 - appropriate curricula is established, with recognition of corresponding diplomas, certificates or formal qualifications.
 - continuing education and training after qualification is provided
 - special case of clinical use of new technique: training provided on the techniques and the relevant radiation protection (RP) requirements
 - RP included in the basic curriculum of medical and dental schools

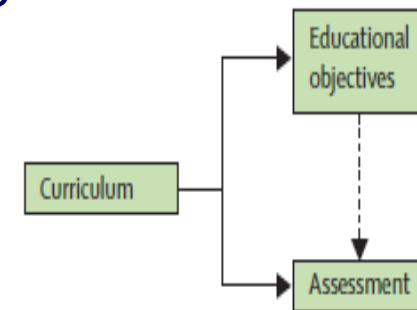


Outreach-enabling actions

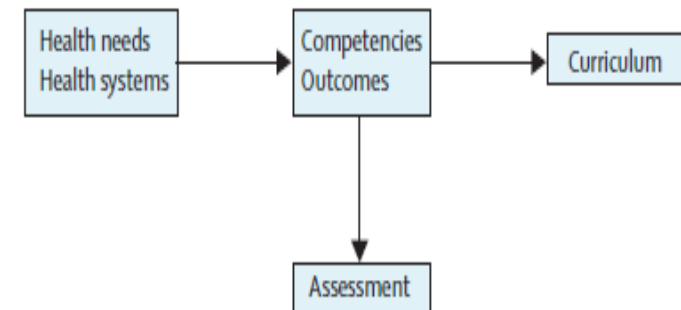


- To **engage leaders** at all levels—local, national, and global- coming from academic and professional communities.
 - backed by relevant competent authorities (health, education, radiation protection).
 - a global body can strengthen leadership and professional identity (e.g. World Federation of Medical Education /WFPR; International Society of Radiographers and Radiation Technologists/ISRRT).
- **Collaboration** on an overall strategy
 - Global commonalities and local needs (diversity)
 - Core competences (e.g. patient-centred care, evidence-based practice, RP culture, ...)

Traditional model



Competency-based education model



Radiographers and radiation technologists

- Health professionals responsible for **safely and accurately performing radiological medical procedures** in the field of diagnostic radiology, interventional radiology, nuclear medicine and radiotherapy.
- Accountable for patients' **health** (*WHO definition*) prior, during and following the procedure
- Interface between patient and radiation technology, gatekeepers of radiation safety for both patients and staff
- Key players in **radiation safety culture in health care**





Bonn Call for Action

1. Enhancing implementation of justification of procedures
2. Enhancing implementation of optimization of protection
3. Strengthening manufacturers' contribution to safety
4. Strengthening RP education and training of professionals
5. Shaping & promoting a strategic agenda for RP in medicine
6. Improving data collection on exposures of patients and workers
7. Improving the reporting of incidents and adverse events
8. Strengthening safety culture in health care
9. Promoting improved radiation benefit-risk-dialogue
10. Strengthening the implementation of safety requirements (BSS) globally

Radiographers and radiological technologists have a key role in the practical implementation of these 10 priority actions

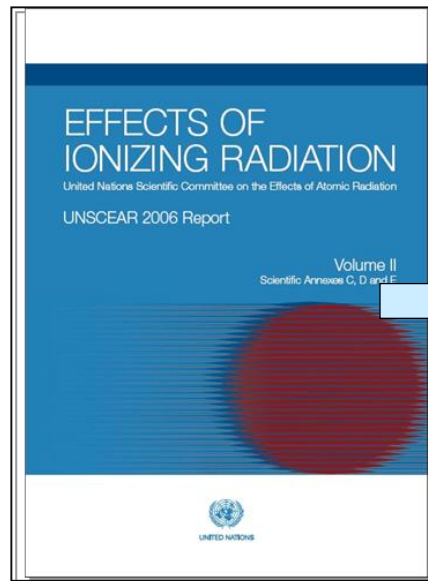
http://www.who.int/ionizing_radiation/about/med_exposure/en/index3.html

<https://rpop.iaea.org/RPOP/RPoP/Content/News/bonn-call-for-action-joint-position-statement.htm>

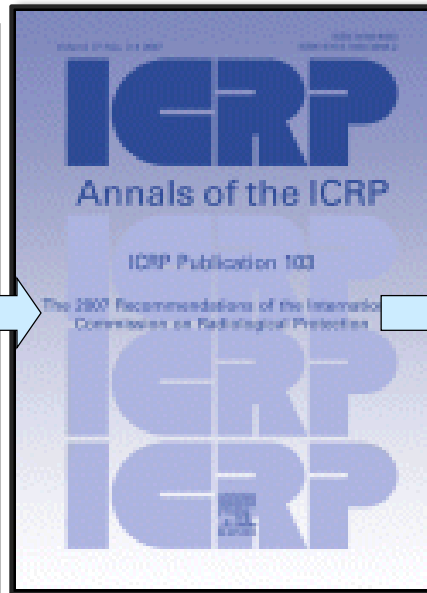


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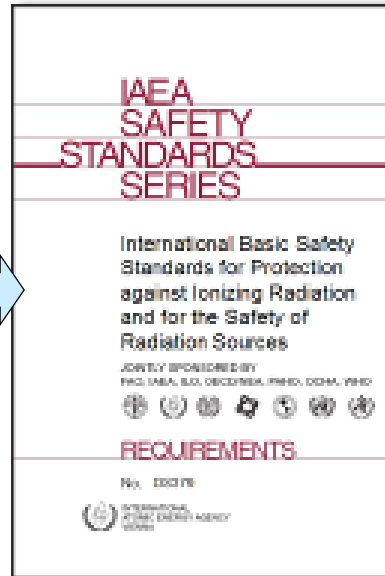
E&T to support BSS implementation



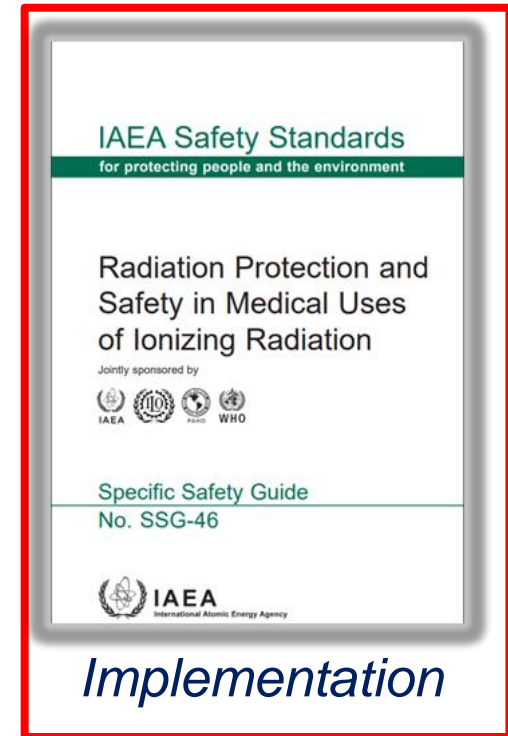
Scientific basis
Effects, risks,
sources, levels,
trends, ...



Recommendations
System of RP
(philosophy,
principles, dose
criteria, ...)



Standards
(safety requirements,
regulatory
language,..)



**Safety guides,
technical reports, tools**

The **safety guide SSG-46** support BSS implementation and provides a basis for E&T of radiographers and other health professionals

COVID-19, WHO response and chest imaging



Since the beginning of the outbreak an increasing number of papers reported the use of chest imaging



Health
ation

Use of Chest Imaging in COVID-19: scenarios considered

3 recommendations for diagnostic work-up

4 recommendations for patient management

Asymptomatic patients

Symptomatic patients with available RT-PCR testing

Symptomatic patients with no RT-PCR available

Admitting or discharging patients with mild symptoms

Patients with moderate-to-severe symptoms

Therapeutic management of hospitalized patients

Discharging hospitalized patients



CHEST IMAGING



CHEST IMAGING



CHEST IMAGING



CHEST IMAGING



CHEST IMAGING



CHEST IMAGING



CHEST IMAGING

NEW: updated literature reviews, qualitative study on contextual factors and consider use of chest imaging after hospital discharge



World Health Organization

A rapid advice guide

11 June 2020 | COVID-19: Clinical care



Use of chest imaging in COVID-19: a rapid advice guide

Web Annex B. GRADE evidence-to-decision tables

Also available in Arabic | Chinese | Russian | Spanish | French | Portuguese

Download link to Annex A

Download link to Annex B

This is currently available in the WHO website

Annex 1

Infection prevention and control for chest imaging in patients with suspected or confirmed COVID-19

A1 Introduction

Modifying working practices and training staff in the proper use of personal protective equipment and in the application of safe clinical imaging techniques, combined with environmental control and equipment disinfection are essential during the COVID-19 pandemic to reduce the risk of infection transmission to patients and staff.

This annex is part of a rapid advice guide on the use of chest imaging in COVID-19. It focuses on the imaging modalities referred in the guide recommendations (see Chapter 3). Building upon WHO guidance on COVID-19 infection prevention and control in health care settings (1)–(4), this annex addresses good practices for infection prevention and control for front line staff performing imaging procedures during the COVID-19 pandemic. Additionally, it describes specific infection prevention and control measures necessary while undertaking chest radiography both in the general imaging department and with portable radiography equipment, as well as when undertaking chest computed tomography (CT) and lung ultrasound scans.

A2 General considerations

In this section a checklist is provided on infection prevention and control when performing chest imaging in patients with suspected or confirmed COVID-19. Information in Table A1 is applicable to all imaging modalities addressed in Chapter 3 of the rapid advice guide.

Staff undertaking imaging procedures are on the front line of the health care service and therefore must follow existing local guidance/protocols. In general, the chest imaging procedures recommended in this guide require following chapter and contact precautions. Airborne precautions are reserved for aerosol-generating procedures (e.g. bronchoscopy, tracheotomy, cardiopulmonary resuscitation, non-invasive ventilation, tracheal intubation, manual ventilation before intubation, nebulization, open suction) (1). Below is a list of additional infection prevention and control considerations and best practices (A1, A4, A5).



1. Examples of aerosol-generating procedures and methods for mitigating such risks based on the evidence of the International Society of Radiology and Radiological Technologists, at https://www.isrt.org/wp-content/uploads/2019/04/ISRT-COVID-19-Checklist-17-march2020.pdf. 2. WHO guidance on COVID-19 infection prevention and control in health care settings, at https://www.who.int/publications/m/item/covid-19-infection-prevention-and-control-in-health-care-settings-11-june-2020. 3. See the WHO paper on contact and droplet precautions for COVID-19, https://www.who.int/publications/m/item/contact-droplet-prevention-covid-19-11-june-2020. 4. Ibid. 5. Ibid. as per note to footnote 1.

Use of chest imaging in COVID-19: a rapid advice guide

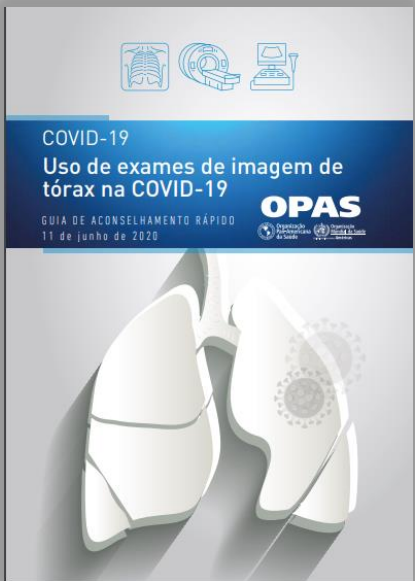
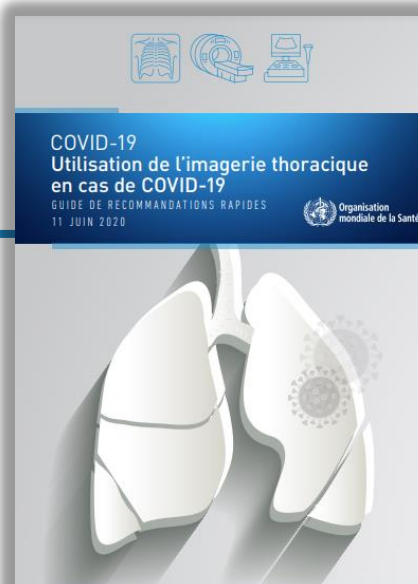
Web Annex A. Imaging for COVID-19: a rapid review

Chou R, Pappas M, Buckley D, McDonagh M, Totten A, Flor N, Sardanelli F, Dana T, Hart E, Wasson N, Nelson H

Pacific Northwest Evidence-Based Practice Center, Oregon Health and Science University, Portland, Oregon, USA

in asymptomatic individuals to clinically in patients. in different situations, remarks are provided to old benefit patients. The guide also includes questions for impact monitoring and evaluation and

Table with 2 columns: Recommendation (R1-R6) and Remarks. R1: For asymptomatic contacts of patients with COVID-19, WHO suggests not using chest imaging for the diagnosis of COVID-19. R2: For symptomatic patients with suspected COVID-19, WHO suggests not using chest imaging for the diagnostic workup of COVID-19 when RT-PCR testing is available with timely results. R3: For patients with suspected or confirmed COVID-19, WHO suggests using chest imaging for the diagnostic workup of COVID-19 when RT-PCR testing is not available. R4: For patients with suspected or confirmed COVID-19, WHO suggests using chest imaging in addition to clinical and laboratory assessment to inform the decision regarding admission versus outpatient care and ICU admission. R5: For patients with suspected or confirmed COVID-19, WHO suggests using chest imaging in addition to clinical and laboratory assessment to inform the decision regarding discharge. R6: For hospitalized patients with COVID-19 whose symptoms are resolved, WHO suggests not using chest imaging in addition to clinical and laboratory assessment to inform the decision regarding discharge.



Translation into Persian is ongoing, other translations considered...

Published in English, translated into 7 other languages: Arabic, Chinese, French, Japanese, Portuguese, Russian and Spanish



COVID-19

Use of chest imaging in COVID-19

A RAPID ADVICE GUIDE
11 JUNE 2020



Working Group on Lung Ultrasound in COVID-19 (LUS WG)

ECRI Guidelines Trust® | **Guideline Brief**

Use of chest imaging in COVID-19: a rapid advice guide.

Guideline ID: 1826

Published: 2020 Jun 11

World Health Organization (WHO)

World Health Organization (WHO). Use of chest imaging in COVID-19: a rapid advice guide. Geneva (Switzerland): World Health Organization (WHO); 2020 Jun 11. 42 p. [16 references]

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Reviews and Commentary
Statements and Guidelines

Free Access

Use of Chest Imaging in the Diagnosis and Management of COVID-19: A WHO Rapid Advice Guide

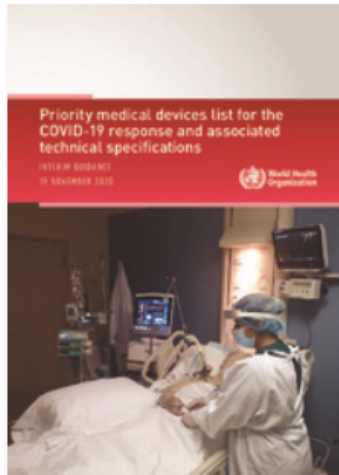
[id](#) Elie A. Akl, [id](#) Ivana Blazic, [id](#) Sally Yaacoub, [id](#) Guy Frija, [id](#) Roger Chou, [id](#) John Adabie Appiah, [id](#) Mansoor Fatehi, Nicola Flor, Eveline Hitti, Hussain Jafri, [id](#) Zheng-Yu Jin, [id](#) Hans Ulrich Kauczor, Michael Kawooya, [id](#) Ella Annabelle Kazerooni, Jane P. Ko, Rami Mahfouz, [id](#) Valdair Muglia, Rose Nyabanda, [id](#) Marcelo Sanchez, Priya B. Shete, [id](#) Marina Ulla, [id](#) Chuansheng Zheng, [id](#) Emilie van Deventer, [id](#) Maria del Rosario Perez [Show fewer authors](#)



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Priority medical devices list for the COVID-19 response and associated technical specifications

20 November 2020 | COVID-19: Essential resource planning



Download (1.6 MB)

Overview

This document describes the medical devices required for the clinical management of COVID-19, selected and prioritized according to the latest available evidence and WHO guidelines. This includes: oxygen therapy, pulse oximeters, patient monitors, infusion and suction pumps, X-ray, ultrasound and CT scanners as well as personal protective equipment. In order to facilitate access to quality assured priority medical devices, the document also includes technical and performance characteristics, standards, accessories and consumables. It is intended for policy-makers and procurement officers in Ministries of Health, procurement and regulatory agencies, intergovernmental agencies as well as the medical device industry.

This document is an update to the [List of priority medical devices for COVID-19 management](#) and [Technical specifications for invasive and non-invasive ventilators for COVID-19](#).

This document complements the [Technical specifications of personal protective equipment for COVID-19](#).

8. Technical specifications for imaging equipment

In June 2020, WHO published a rapid advice guide on the use of medical imaging in the context of the COVID-19 pandemic.¹ The guide makes recommendations for the use of chest imaging in the acute care of adult patients with suspected, probable or confirmed COVID-19, based on available evidence. The imaging modalities considered are ultrasound, radiography and computed tomography (CT), for use within the care pathway.

In view of the urgency to produce a complementary document of technical specifications of equipment to support the rapid advice guide, a working group was established with staff and consultants on imaging technologies from WHO and the International Atomic Energy Agency (IAEA). The draft was sent to experts and nongovernmental organizations for review and comment.

**GUIDANCE
PUBLISHED ON 19
NOVEMBER 2020**

In June 2020, WHO published a rapid advice guide on the use of medical imaging in the context of the COVID-19 pandemic.¹ The guide makes recommendations for the use of chest imaging in the acute care of adult patients with suspected, probable or confirmed COVID-19, based on available evidence. The imaging modalities considered are ultrasound, radiography and computed tomography (CT), for use within the care pathway.

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Education and training in COVID-19 times

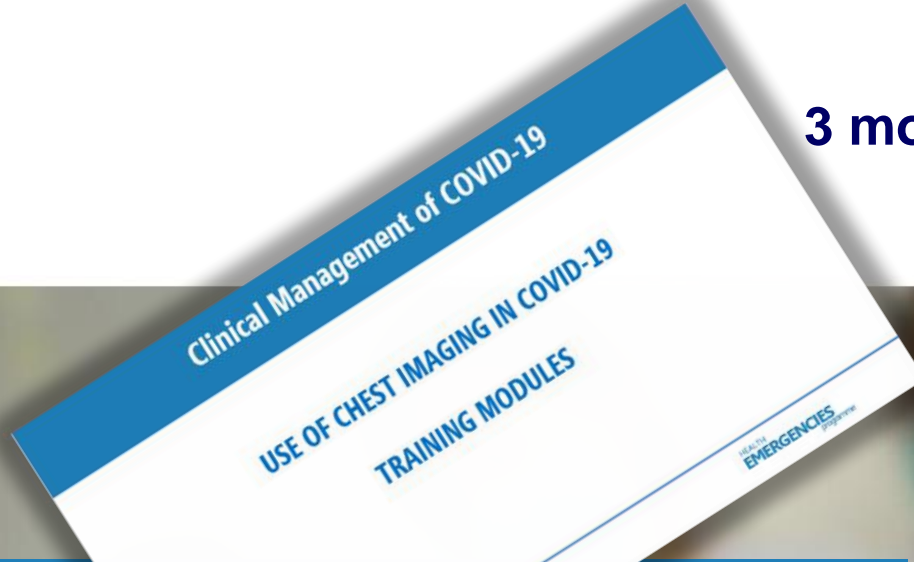
- Health workers face the challenge of keeping up with constantly evolving information. COVID-19 science is now doubling every 20 days and new guidance is being published daily by WHO and other organizations and professional societies.
- Need for solutions to deliver a wide range of knowledge resources at the point of care:
 - user-friendly apps easily accessed in almost any area with mobile phone service and tablets;
 - up-to-the-minute guidance, tools, training, and virtual workshops to support health workers in caring for patients and in protecting themselves as they do their critical work.



WHO Academy learning app

WHO free app available in seven languages – Arabic, Chinese, English, French, Portuguese, Russian and Spanish- in the Apple App Store and the Google Play Store

3 modules on chest imaging coming soon



Health

41 languages

Over 2.3 million

134 COVID-19 courses

World Health Organization

4 539 423
Course enrollments

Real-time training for COVID-19
Free online courses from WHO

- Intro to COVID-19
- Health & safety
- Clinical care
- Prevention & control (IPC)
- Protective equipment
- Hand hygiene
- Country capacitation
- Treatment facilities
- Field data tool
- Mass gatherings
- Long-term care

Attention health workers

Learn how to provide **safe, effective & quality clinical care** for patients with COVID-19

OpenWHO.org



www.academy.who.int

Infection prevention and control (IPC) for chest imaging in COVID-19

- ❑ **Why?** To reduce risk of infection transmission to patients and staff.
- ❑ **How?** By modifying working practices and training staff.
- ❑ **What?**
 - Availability of appropriate **personal protective equipment (PPE)**.
 - **Training** on proper use of PPE (including donning/doffing and hygiene before and after all patient contact).
 - Adapted **standard operating procedures (SOP)** and **imaging techniques**.
 - **Cleaning and disinfection** (working environment and equipment/devices).



Personal protective equipment (PPE) for chest imaging in COVID-19

- In general, health care workers performing **chest imaging** should be protected by **droplet and contact precautions**.
 - medical masks, long-sleeved gowns, gloves, eye/facial protection (personal eyeglasses do not provide adequate eye protection).
- If **aerosol-generating** procedures are also performed, **airborne precautions** are required.
 - respirator (N95 or FFP2 or FFP3 standard, or equivalent)

1 Perform hand hygiene 1 Alcohol based handrub Rub hands for 20–30 seconds.	or	Water and soap Wash hands for 40–60 seconds.	
2 Put on the gown			
3 Put on the mask 3 Medical mask or Respirator mask (N95, FFP2, FFP3, or equivalent). Only use if performing aerosol generating procedures.			 or 
4 Put on eye protection Put on face shield or goggles.			 or 
5 Put on gloves Ensure gloves are placed over the cuff of the gown.			

<https://www.who.int/csr/resources/publications/Contact-Droplet-COVID-19-Precautions.pdf?ua=1>



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Contact / non-contact technique (working in pairs)

Chest radiography: one radiographer positions the patient, the detector, and the anatomic marker and the other radiographer positions the X-ray tube and makes the image acquisition/exposure.

Chest CT: the positioning radiographer works in the CT scanning room and the operating radiographer stays in the “clean” console control area.



Photos courtesy from ISRRT and King
Chulalongkorn Memorial Hospital, Thailand and



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Key messages for radiographers performing chest imaging

❑ Radiation protection considerations:

- ✓ Radiation-induced cancer risk is higher at younger ages;
- ✓ Radiation protection principles (justification and optimization) and radiation safety standards should be applied to protect patients and health workers with considerations for children and pregnancy.

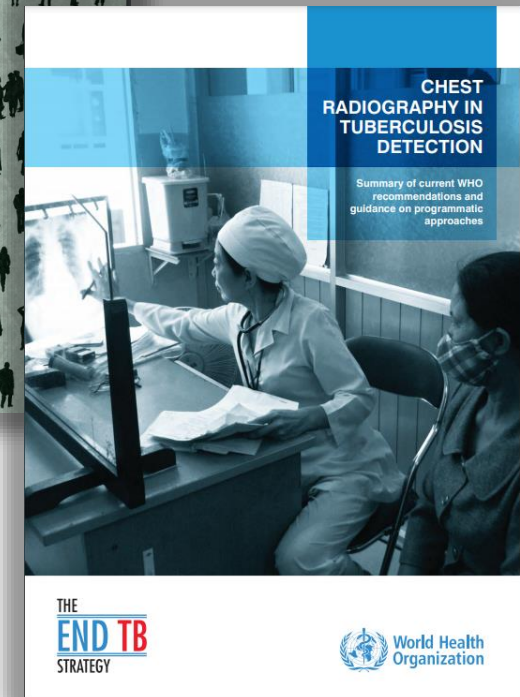
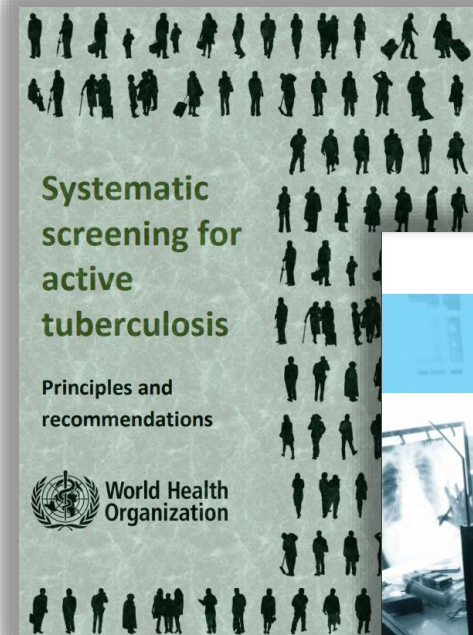
❑ Infection prevention and control (IPC):

- ❑ Remember 4 IPC key areas where working procedures for chest imaging should be focused: (i) availability of appropriate PPE, (ii) training on their proper use, (ii) adaptation of standard operating procedures and imaging techniques and (iV) implementation of cleaning and disinfection protocols; if possible work in pairs using contact/non-contact technique .



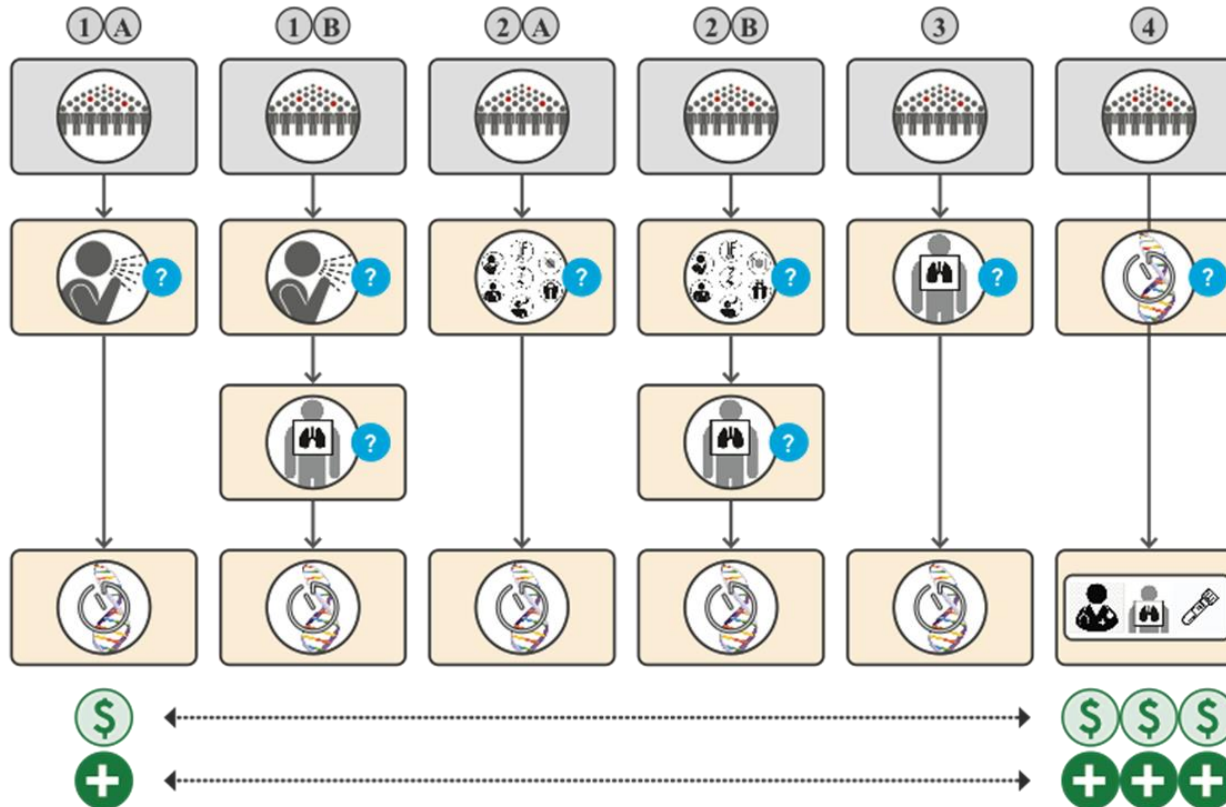
Update of WHO guidance on TB screening

- Groups: general population, contacts (household, close contacts) and prisoners;
- Screening tools to be used for each population:
 - Symptom screening
 - Molecular rapid diagnostic tests
 - Chest radiography and computer-aided detection (CAD) software



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Implementation guidance: Algorithms for screening



Recommendations for TB screening: Guideline update timeline

Guideline Development Group virtual meetings	June – October 2020
Recommendations consolidated, reviewed	October – November 2020
Draft under review by External Review Group	November – December 2020
Rapid communication release on major updates	December 2020

Planned release (TBC) World TB Day, March 24 2021

In preparation for that:

- 1) Guidance on technical specifications for procurement of equipment including mobile and portable radiography units and CAD software
- 2) Need for information, E&T (chest radiography practice and use of CAD)
- 3) Radiation protection and safety (consider all scenarios)

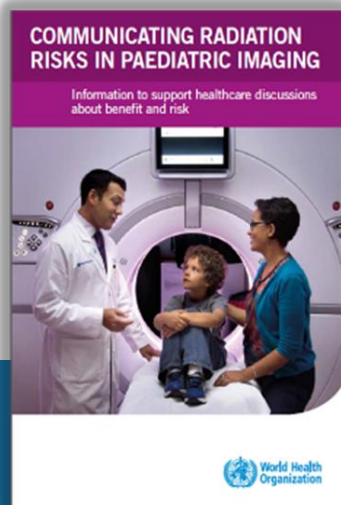
On-line courses on radiation risk communication planned for 2021

WHO Scholar Programme

WHO Scholar Level 1 pilot course on communicating radiation risks in paediatric imaging

Cohort 1 – (Spring 2021)	Level 1 English	Online	36 hours
French	Spanish	Portugues	

- Build capacity based on existing guidance and support implementation of Action 9 of the Bonn Call for Action



Many thanks !!!

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