



World Health  
Organization

# Introduction to WHO Guidance on Management of Radioactivity in Drinking-water

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# Water quality

- The quality of water, whether used for drinking, domestic purposes, food production or recreational purposes, has an important impact on health
- 829,000 diarrhoeal deaths from inadequate water, sanitation and hygiene
  - ~60% from inadequate water
  - 5.3% of all deaths < 5 years



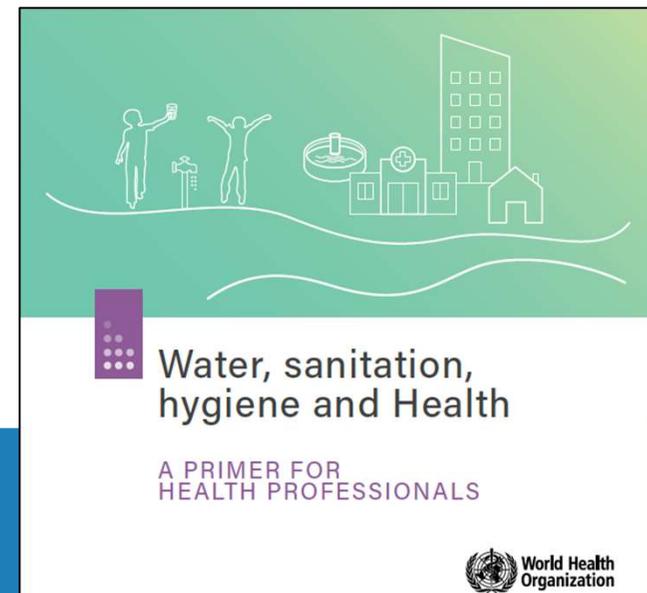
International Journal of Hygiene and  
Environmental Health  
Volume 222, Issue 5, June 2019, Pages 765-777



Burden of disease from inadequate water, sanitation and hygiene for selected adverse health outcomes: An updated analysis with a focus on low- and middle-income countries

Annette Prüss-Ustün <sup>a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Jennyfer Wolf <sup>a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Jamie Bartram <sup>b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Thomas Clasen <sup>c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Oliver Cumming <sup>d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Matthew C. Freeman <sup>c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Bruce Gordon <sup>a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Paul R. Hunter <sup>a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Kate Medlicott <sup>a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>, Richard Johnston <sup>a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z</sup>

Coming soon!



# 2030 Sustainable Development Agenda



17 Goals, 169 targets, 230 global indicators

United Nations A/RES/70/1

 **General Assembly**

Distr.: General  
21 October 2015

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Seventieth session  
Agenda items 15 and 116

**Resolution adopted by the General Assembly on 25 September 2015**  
[without reference to a Main Committee (A/70/L.1)]

**70/1. Transforming our world: the 2030 Agenda for Sustainable Development**

*The General Assembly*  
Adopts the following outcome document of the United Nations summit for the adoption of the post-2015 development agenda:

**Transforming our world: the 2030 Agenda for Sustainable Development**

**Preamble**

This Agenda is a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom. We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development.

All countries and all stakeholders, acting in collaborative partnership, will implement this plan. We are resolved to free the human race from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world on to a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind.

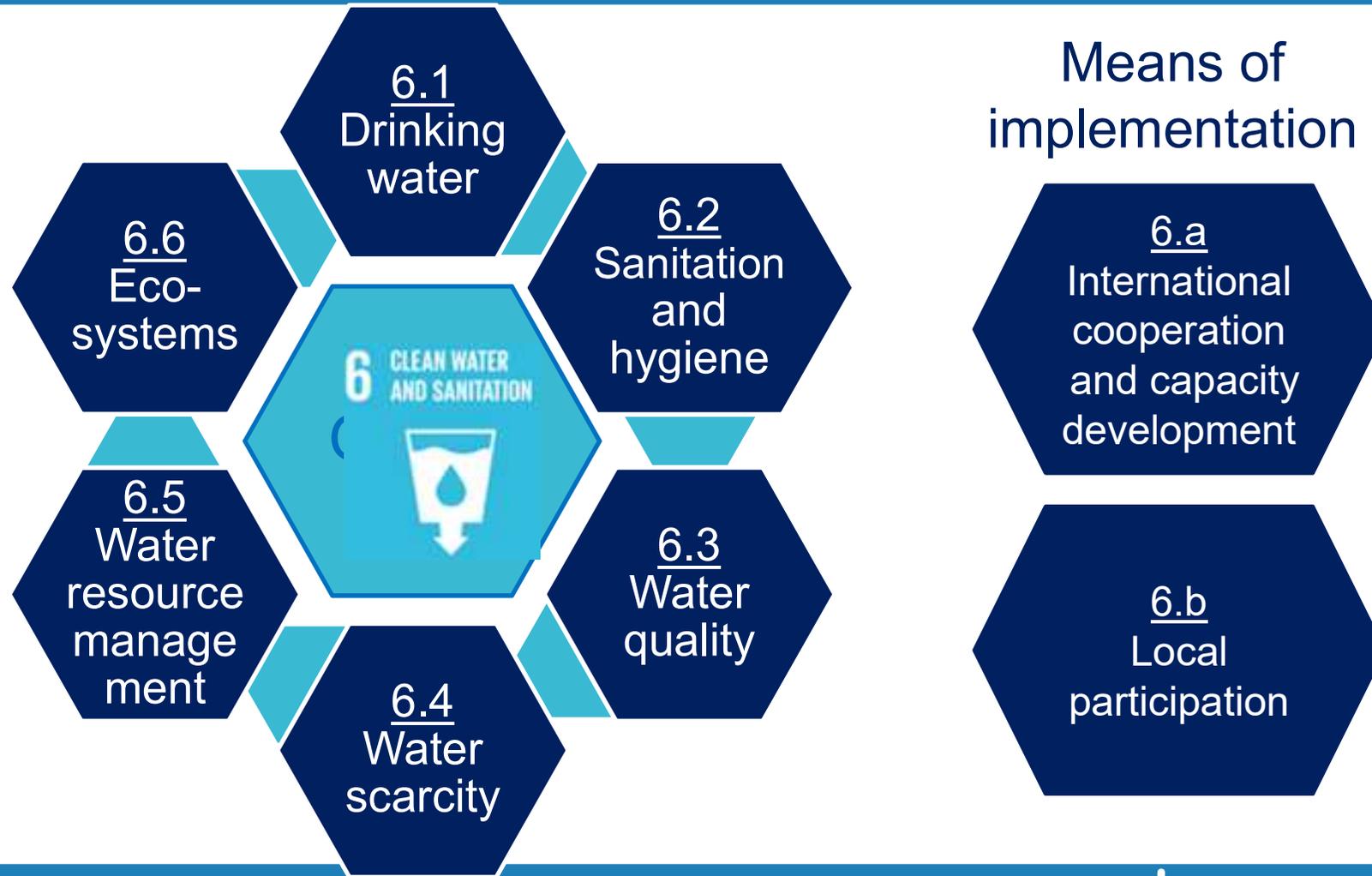
The 17 Sustainable Development Goals and 169 targets which we are announcing today demonstrate the scale and ambition of this new universal Agenda. They seek to build on the Millennium Development Goals and complete what they did not achieve. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.

The Goals and targets will stimulate action over the next 15 years in areas of critical importance for humanity and the planet.

15-16301 (E)  


Please recycle  

# Goal 6: Ensure availability and sustainable management of water and sanitation for all



# Global indicator for drinking-water



Target 6.1

## Drinking water

"By 2030, achieve universal and equitable access to safe and affordable drinking water for all"



### **PRIORITY INDICATOR: 6.1.1**

% of population using **safely managed** drinking-water services, which is:

located on premises

available when needed, and

free of faecal and priority chemical contamination

(*E. coli*/thermotolerant coliforms, arsenic, fluoride)



# Global indicator for drinking-water



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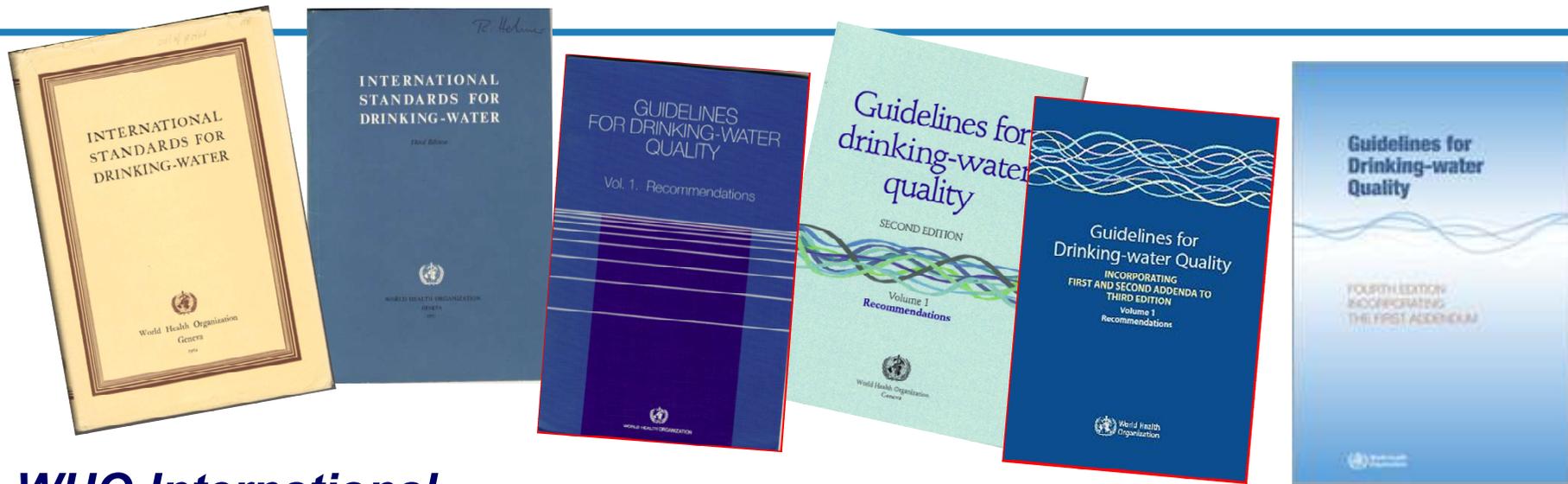
located on premises  
available when needed, and  
free of faecal and priority chemical  
contamination

(*E. coli*/thermotolerant coliforms, arsenic,  
fluoride)

**Accessibility**  
**Availability**  
**Quality**



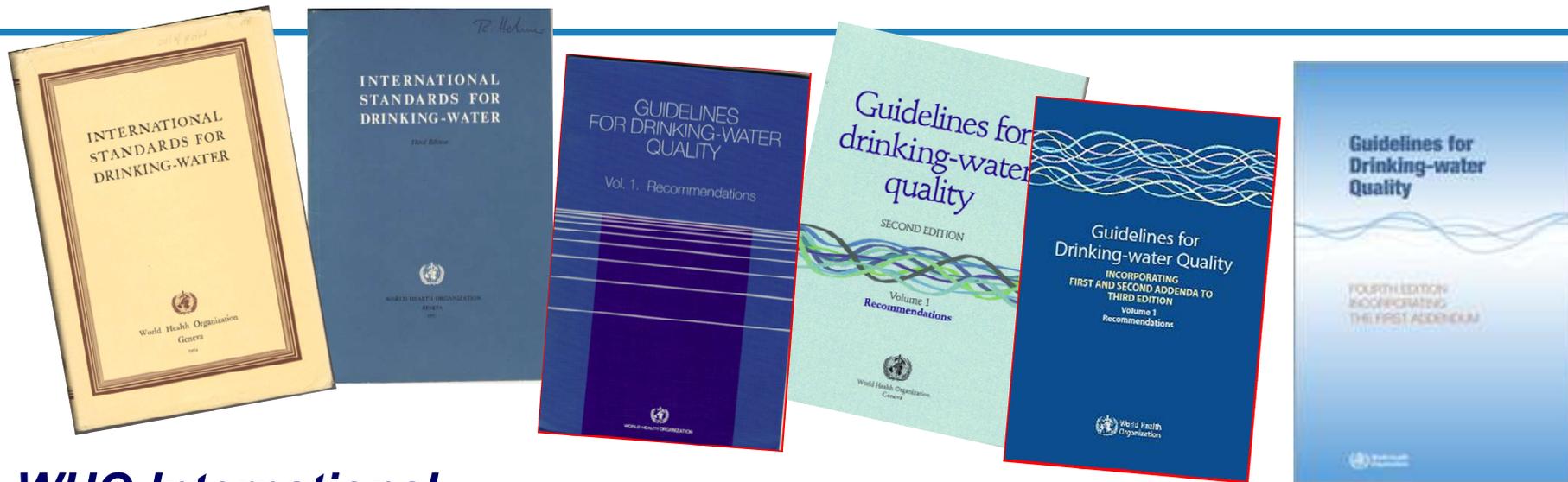
# A flagship normative publication of WHO



***WHO International Standards for Drinking-water, 1st Edition, 1958***

***Guidelines for Drinking-water Quality, 4<sup>th</sup> Edition, incl. Addendum, 2017***

# A flagship normative publication of WHO



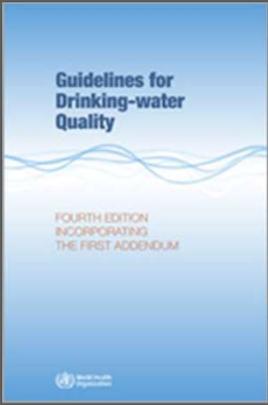
## **WHO International Standards for Drinking-water, 1st Edition, 1958**

*“Immediate and wide recognition as essential aids to the improvement of water quality and treatment”*

## **Guidelines for Drinking-water Quality, 4<sup>th</sup> Edition, incl. Addendum, 2017**

*Demand for the document is among the highest and most sustained of all WHO publications*

# WHO Guidelines for Drinking-water Quality

|  |  |
|--|--|
| <b>Aim</b>   | <ul style="list-style-type: none"><li>● Protection of human health<ul style="list-style-type: none"><li>– Support setting of national standards and regulations</li></ul></li></ul>  |
| <b>Target Audience</b>   | <ul style="list-style-type: none"><li>● Regulators + (water suppliers, practitioners . . .)</li></ul>  |
| <b>Approach</b><br><br><i>Evidence-based</i><br><br> | <ul style="list-style-type: none"><li>● Best available evidence - science and practice</li><li>● Risk-benefit philosophy (advisory in nature)</li><li>● Local adaptation considering overall health protection strategies<ul style="list-style-type: none"><li>– Social, cultural, economic and environmental context</li></ul></li><li>● Preventive incorporating multiple barriers</li><li>● Incremental improvement</li></ul> |

# Core Recommendations

## Framework for Safe Drinking-water

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*Health-based targets*  
(National regulatory body)

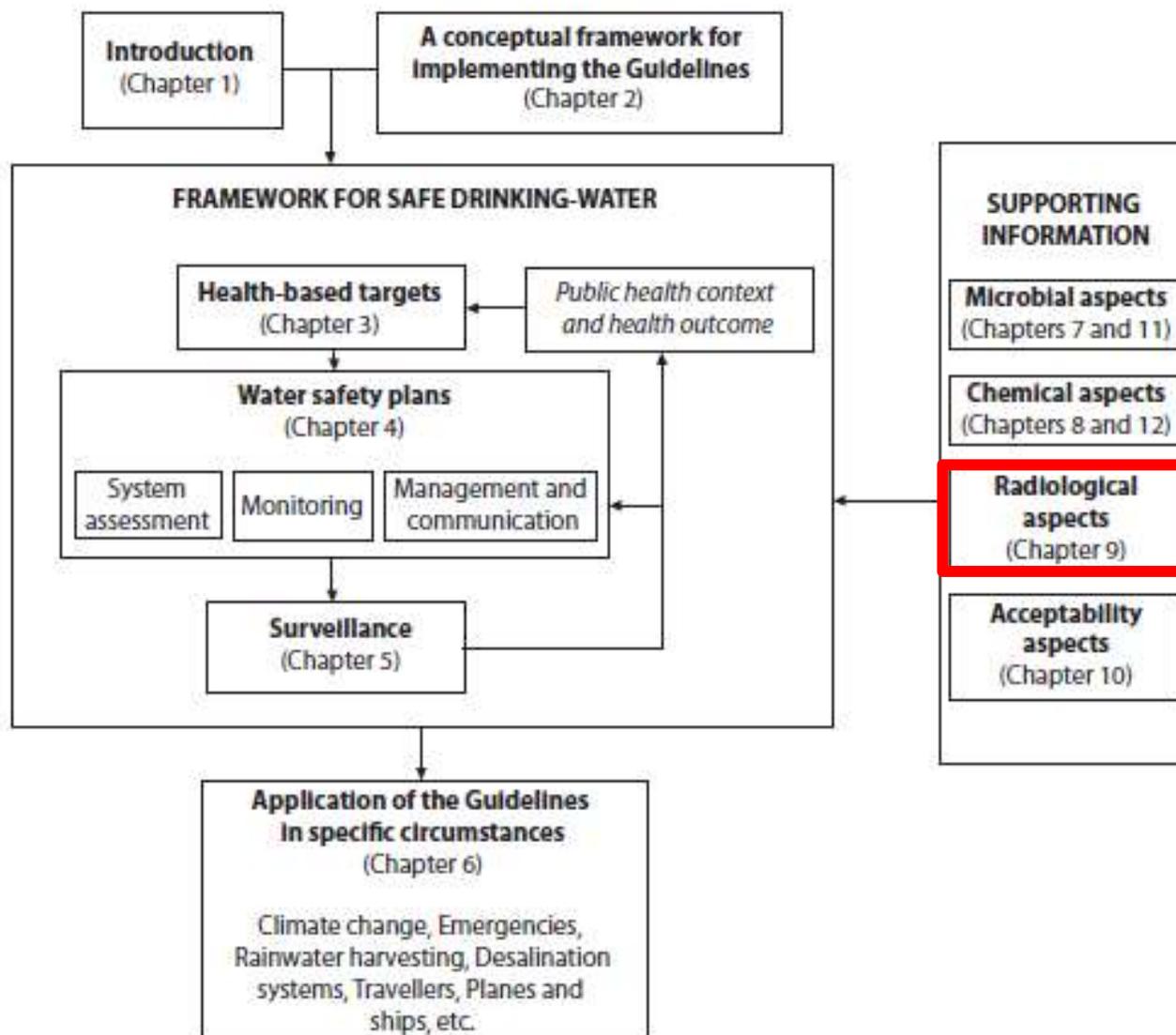
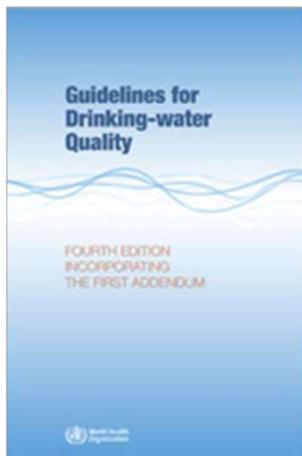


*Water Safety Plan*  
(Water utility)



*Independent surveillance*  
(Surveillance agency)

- Establish national water quality standards on relevant waterborne hazards
- Undertake site-specific local risk assessment and management from catchment to consumer
- Verify water safety through independent tests and audits



# Chapter 9 of GDWQ: Radioactivity

- Criteria with which to assess safety of drinking-water with respect to radionuclide content
- Methodology to assess potential health risks (*screening approach based on IDC of 0.1 mSv/year*)
- Guidance on actions to reduce radionuclides in drinking-water and monitoring considerations
- Information on analytical methods
- Separate guidance on radon

For situations where there could be ingestion of radionuclides in drinking-water over extended periods of time (years – lifetime)



# Chapter 9 of GDWQ: Radioactivity

## Key considerations

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- No distinction between criteria for natural and artificial radionuclides. However, management may differ (point of control and ability to control)
- Natural radionuclides usually of greater concern for drinking-water
- When considering actions to take in assessing and managing radiological risks, care should be taken to ensure that scarce resources are not diverted away from other, more important, public health concerns



# Experience with Implementation of the GDWQ Guidance Levels

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- More guidance needed on what are appropriate actions if screening levels are exceeded
  - Should there be a water supply restriction if guidance levels are exceeded (based on IDC of 0.1 mSv/year)?
  - How to consider the International BSS reference level of 1 mSv/year (explicitly referenced in the GDWQ)?



# Experience with Implementation of the GDWQ Guidance Levels

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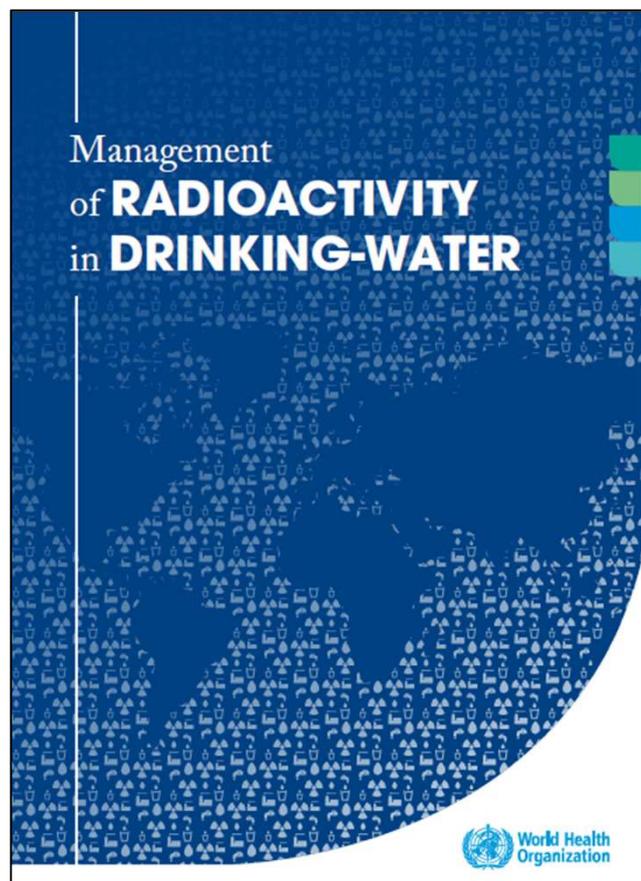
- More guidance needed on what are appropriate actions if screening levels are exceeded
  - Should there be a water supply restriction if guidance levels are exceeded (based on IDC of 0.1 mSv/year)?
  - How to consider the International BSS reference level of 1 mSv/year (explicitly referenced in the GDWQ)?

The individual dose criterion (IDC) should not be interpreted as a limit above which drinking-water is unsafe for consumption.

The International Basic Safety Standards (BSS) should not be regarded either as an “acceptable” dose or as a dose limit, and all reasonable efforts should be made to minimize the doses received.



# Guidance Developed to Support Implementation of Chapter 9 of the GDWQ



## PURPOSE

Provide practical guidance to support interpretation and implementation of the GDWQ in order to take appropriate action

## AUDIENCE

Organizations that set or enforce standards related to, or manage risks from, radioactivity in drinking-water

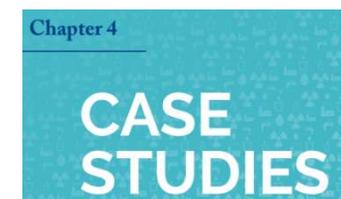
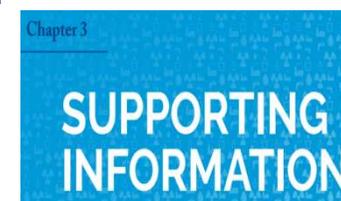
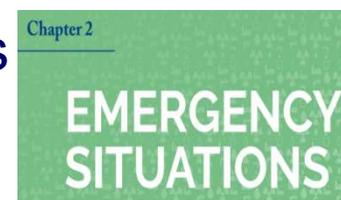
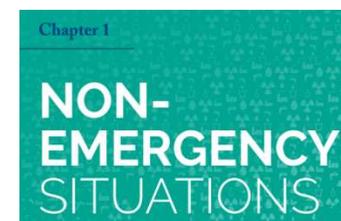
## Format

Written in the style of Q&As to enable easier reading of the issues of interest



# Content overview

- **Chapter 1**: background information, information on management of radionuclides in non-emergency situations.
- **Chapter 2**: information on management of radionuclides in emergency situations.
- **Chapter 3**: supporting information common to both non-emergency and emergency situations, including information on water treatment and analytical methods.
- **Chapter 4**: case studies
- **Annex**: information to support calculation of doses and guidance levels for specific non-emergency situations.



# Chapter 1

Chapter 1

NON-  
EMERGENCY  
SITUATIONS

## 1.6 Radon in drinking-water

- 16.1 How does radon get into drinking-water ?.....
- 16.2 Do national standards for radon in drinking-water need to be established ?.....
- 16.3 At what points in the water supply chain should measurements of radon in drinking-water be made ?.....
- 16.4 What methods can be used for sampling and measuring radon in drinking-water supplies ?.....
- 16.5 How can radon in drinking-water be managed when radon concentrations in the source water are high ?..

# Next Steps

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- Continue disseminating WHO guidance
- Address additional issues identified by GDWQ Rad WG and new evidence
- Update 5<sup>th</sup> Edition of the GDWQ



***Thank you very much!***

***For more information visit:  
[https://www.who.int/water\\_sanitation\\_health](https://www.who.int/water_sanitation_health)***