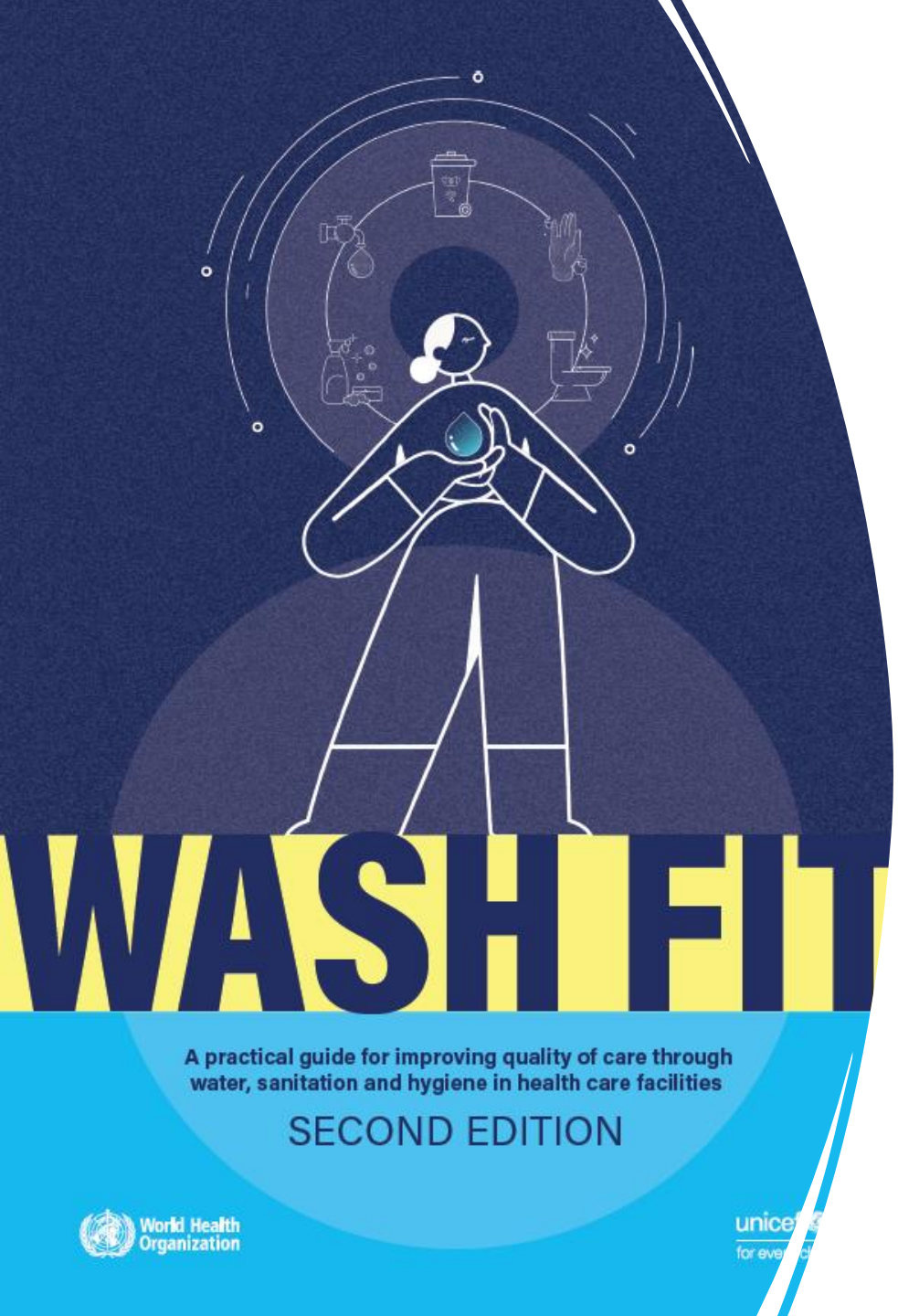


WASH FIT 2026 meet up series

Session 1: Water quality in health care facilities

19th February 2026

2026 meet up series

May	**Plumbing for health** • Considerations for plumbing in high income settings • Teaser of new standards & plumbing guidance coming in 2027 • Philippines experience	World Plumbing Council/IAPMO DOH Philippines
July	**Health care waste management** • Country experiences of mercury reduction (Montenegro, Albania, India) • Updates and new resources: WHO Academy health care waste course	International Solid Waste Association Montenegro, Albania and India
Sept.	**Emergencies** • Application of WASH FIT in emergency settings • Integration of IPCAF and WASH FIT in DRC	IRC Democratic Republic of Congo

Agenda

Introduction to water quality in health care facilities, Rory Moses McKeown, WHO

Water safety in health care facilities in Ukraine, Alla Yushchuk, WHO Ukraine

Hospital water safety management in Bangladesh, Dr Zahid Hayat Mahmud, icddr,b

Question and answer

Slides will be added to www.washinhcf.org/resources and the recording to the WASH in HCF YouTube channel

Water quality in healthcare facilities

Rory Moses McKeown, WHO

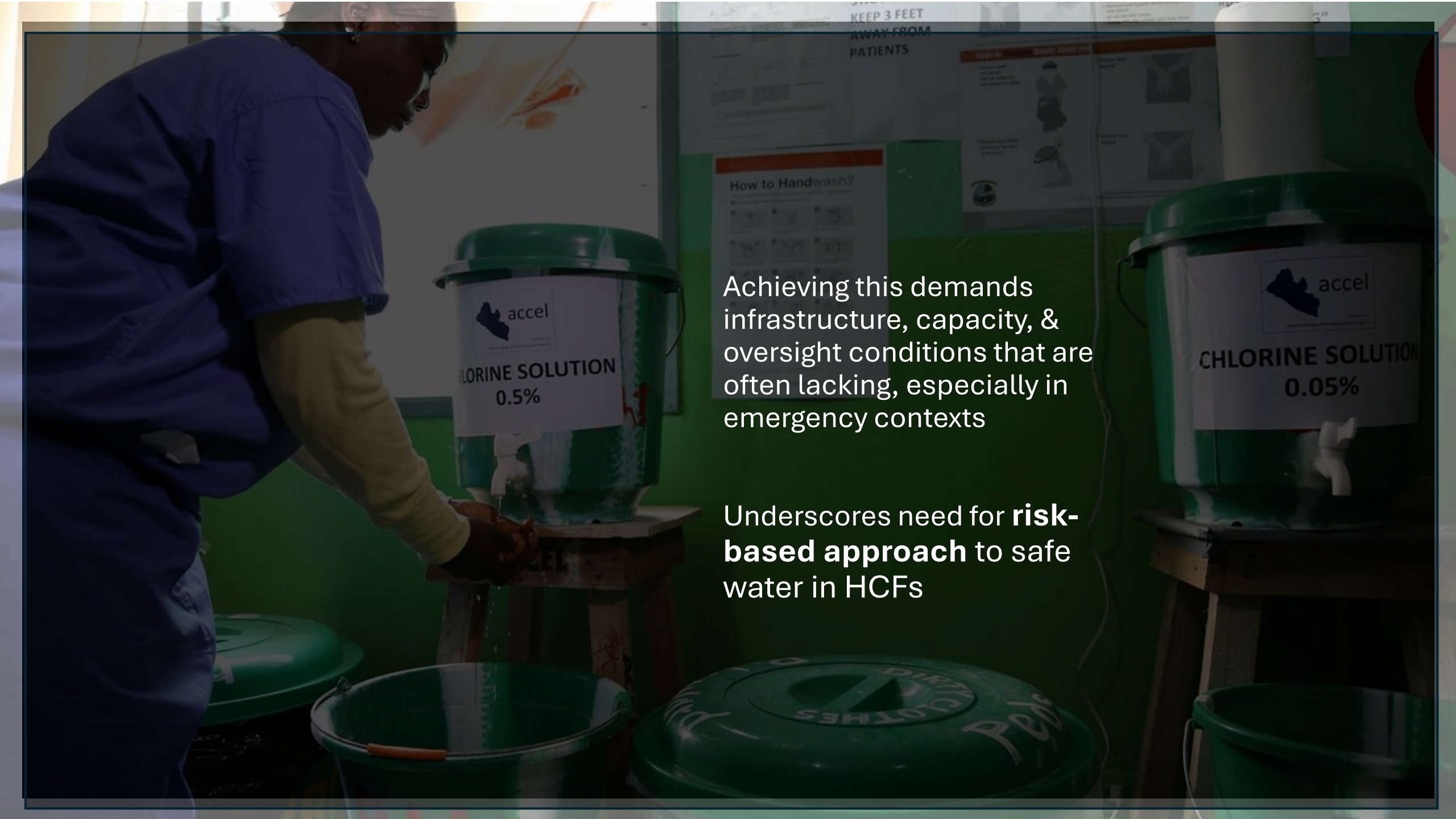

Safe water in HCFs protects the
vulnerable, prevents infections,
& delivers better care

How does safe water in HCF promote better health outcomes?

- Prevents microbial and chemical harm from drinking-water
- Prevents *Legionella* and inhalation risks in water systems
- Enables effective cleaning and infection prevention
- Facilitates effective disinfection of medical equipment
- Helps ensure high-risk services (e.g. dialysis) delivered safely & effectively

WHO min. requirements

- Water should be **available** for all HCF needs
- Water must be **on-site from an improved source** and available at all **points of care**
- Water should be **safely treated and reliable**
- Water must be of **sufficient quantity** to meet the facility's needs for 2 days

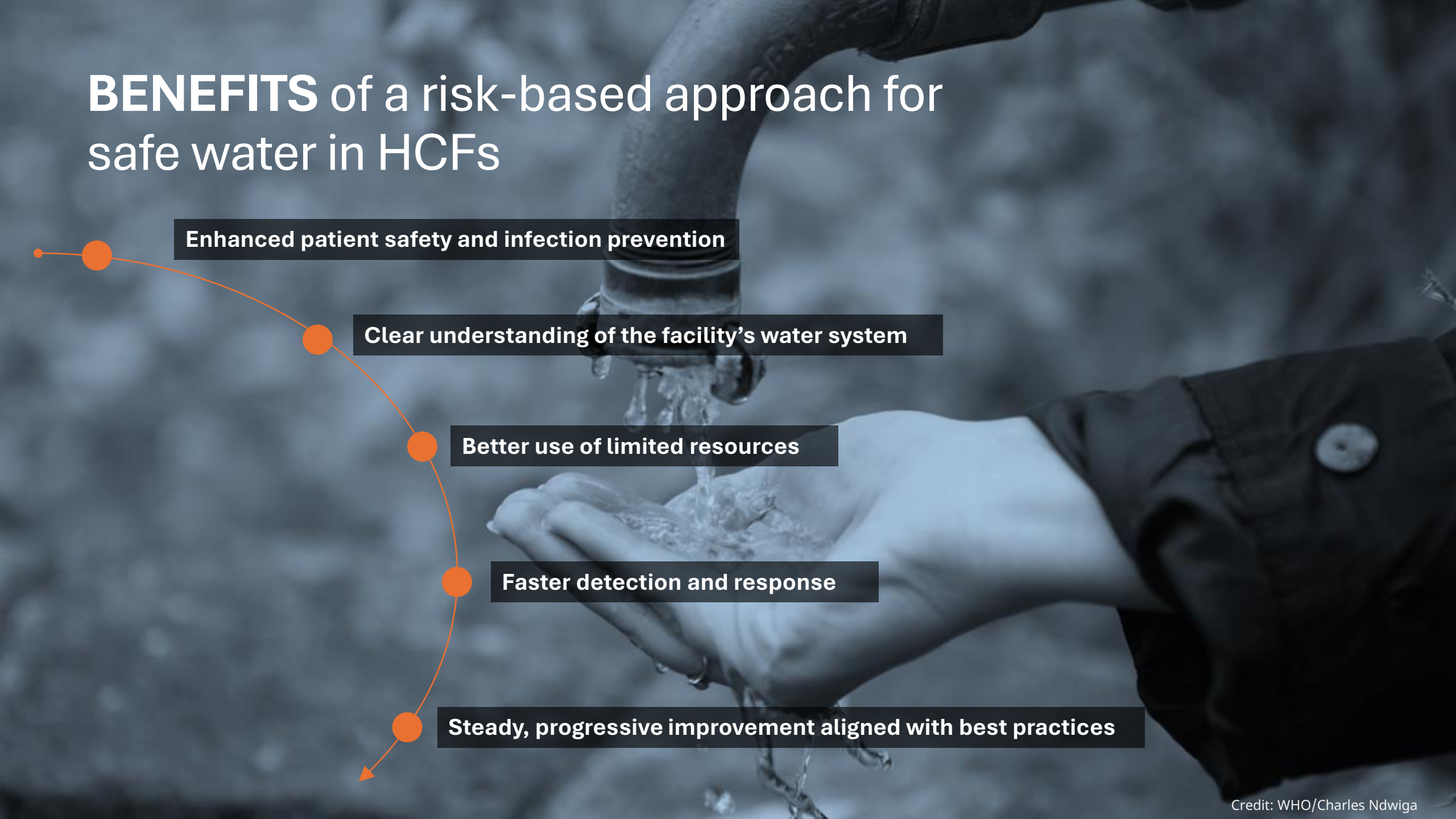


Achieving this demands infrastructure, capacity, & oversight conditions that are often lacking, especially in emergency contexts

Underscores need for **risk-based approach** to safe water in HCFs

BENEFITS of a risk-based approach for safe water in HCFs

- Enhanced patient safety and infection prevention
- Clear understanding of the facility's water system
- Better use of limited resources
- Faster detection and response
- Steady, progressive improvement aligned with best practices



Credit: WHO/Charles Ndwiga

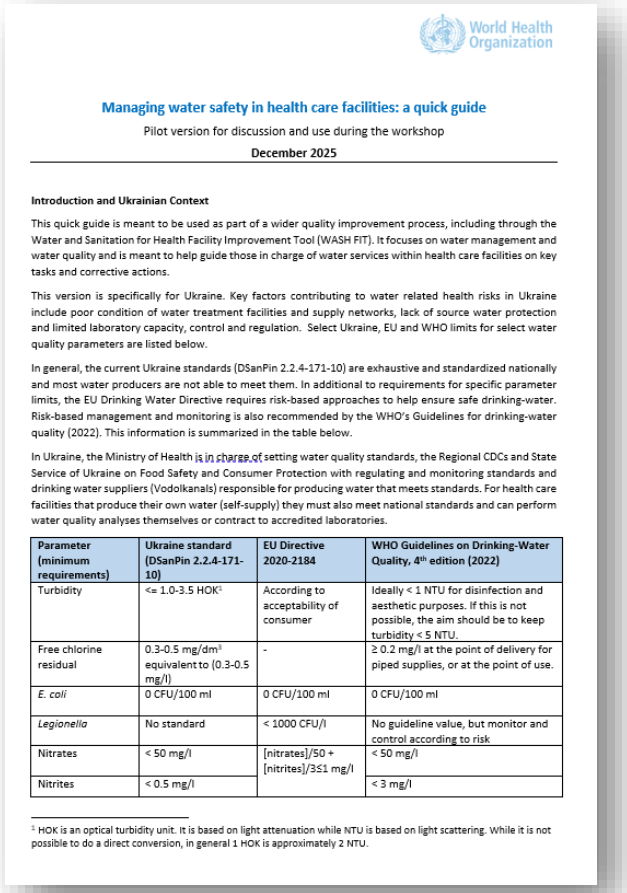
RISK-BASED principles can support safe water in HCFs, including in emergency contexts

“Quick guide” for safe water in HCFs

Distils key risk-based principles in a simplified way

QUICK GUIDE distils key risk-based principles for safe water in a simplified way

Quick guide for safe water in HCFs



World Health Organization

Managing water safety in health care facilities: a quick guide

Pilot version for discussion and use during the workshop

December 2025

Introduction and Ukrainian Context

This quick guide is meant to be used as part of a wider quality improvement process, including through the Water and Sanitation for Health Facility Improvement Tool (WASH FIT). It focuses on water management and water quality and is meant to help guide those in charge of water services within health care facilities on key tasks and corrective actions.

This version is specifically for Ukraine. Key factors contributing to water related health risks in Ukraine include poor condition of water treatment facilities and supply networks, lack of source water protection and limited laboratory capacity, control and regulation. Select Ukraine, EU and WHO limits for select water quality parameters are listed below.

In general, the current Ukraine standards (DSanPin 2.2.4-171-10) are exhaustive and standardized nationally and most water producers are not able to meet them. In additional to requirements for specific parameter limits, the EU Drinking Water Directive requires risk-based approaches to help ensure safe drinking-water. Risk-based management and monitoring is also recommended by the WHO's Guidelines for drinking-water quality (2022). This information is summarized in the table below.

In Ukraine, the Ministry of Health is in charge of setting water quality standards, the Regional CDCs and State Service of Ukraine on Food Safety and Consumer Protection with regulating and monitoring standards and drinking water suppliers (Vodolkanals) responsible for producing water that meets standards. For health care facilities that produce their own water (self-supply) they must also meet national standards and can perform water quality analyses themselves or contract to accredited laboratories.

Parameter (minimum requirements)	Ukraine standard (DSanPin 2.2.4-171-10)	EU Directive 2020-2184	WHO Guidelines on Drinking-Water Quality, 4th edition (2022)
Turbidity	<= 1.0-3.5 HOK[1]	According to acceptability of consumer	Ideally < 1 NTU for disinfection and aesthetic purposes. If this is not possible, the aim should be to keep turbidity < 5 NTU.
Free chlorine residual	0.3-0.5 mg/dm^3 equivalent to (0.3-0.5 mg/l)	-	≥ 0.2 mg/l at the point of delivery for piped supplies, or at the point of use.
E. coli	0 CFU/100 ml	0 CFU/100 ml	0 CFU/100 ml
Legionella	No standard	< 1000 CFU/l	No guideline value, but monitor and control according to risk
Nitrates	< 50 mg/l	[nitrates]/50 + [nitrites]/3≤1 mg/l	< 50 mg/l
Nitrites	< 0.5 mg/l		< 3 mg/l

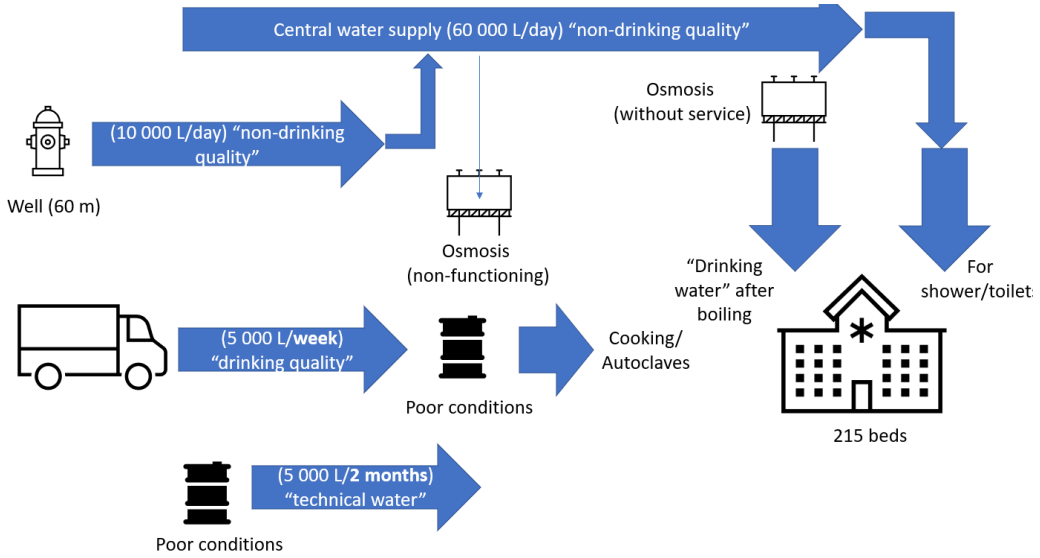
[1] HOK is an optical turbidity unit. It is based on light attenuation while NTU is based on light scattering. While it is not possible to do a direct conversion, in general 1 HOK is approximately 2 NTU.

- Incorporates risk-based thinking, inline with WASH-FIT principles
- Supports deeper dive into safe water operations & maintenance, management, and monitoring
- Can inform progressive improvement planning via WASH-FIT framework
- Can be supported by basic risk management & monitoring tools, including routine sanitary inspection

QUICK GUIDE for safe water in HCFs

Application of the guide requires:

1. Understanding (and mapping) the HCF water supply system
2. Monitoring the effectiveness of control measures for key vulnerability points in the system (operational monitoring)
3. Implementing proactive operations and maintenance (O&M)
4. Water quality testing and sanitary inspection to verify the water is safe, and identify opportunities for progressive improvement



QUICK GUIDE for safe water in HCFs

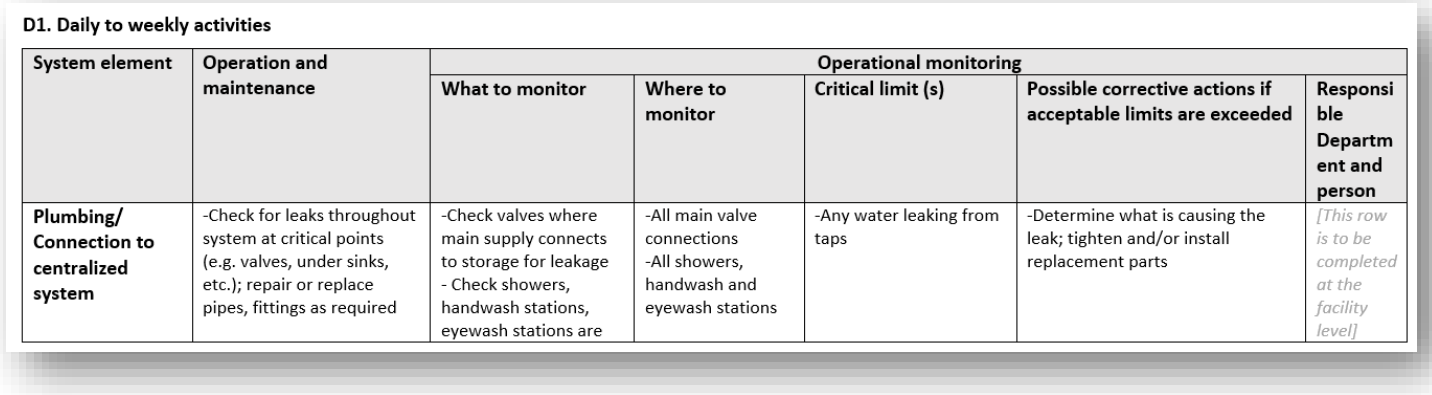
Application of the guide requires the following

1. Understanding (and mapping) the HCF water supply system

2. Monitoring the effectiveness of control measures for key vulnerability points in the system (operational monitoring)

3. Implementing proactive operations and maintenance (O&M)

4. Water quality testing and sanitary inspection to verify the water is safe, and identify opportunities for progressive improvement



D1. Daily to weekly activities

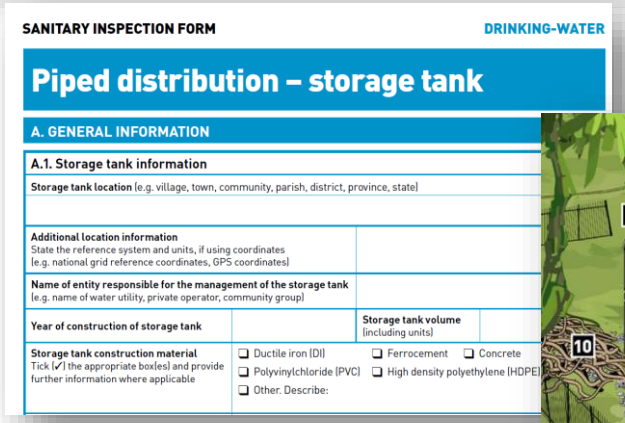
System element	Operation and maintenance	Operational monitoring				
		What to monitor	Where to monitor	Critical limit (s)	Possible corrective actions if acceptable limits are exceeded	Responsible Department and person
Plumbing/ Connection to centralized system	-Check for leaks throughout system at critical points (e.g. valves, under sinks, etc.); repair or replace pipes, fittings as required	-Check valves where main supply connects to storage for leakage - Check showers, handwash stations, eyewash stations are	-All main valve connections -All showers, handwash and eyewash stations	-Any water leaking from taps	-Determine what is causing the leak; tighten and/or install replacement parts	*[This row is to be completed at the facility level]*

QUICK GUIDE for safe water in HCFs

Application of the guide requires the following

1. Understanding (and mapping) the HCF water supply system
2. Monitoring the effectiveness of control measures for key vulnerability points in the system (operational monitoring)
3. Implementing proactive operations and maintenance (O&M)
4. Water quality testing and sanitary inspection to verify the water is safe, and identify opportunities for progressive improvement

Item/Action (listed incrementally, starting with basic and more advanced)	What to monitor	Where	When	Critical limit (s)	Corrective actions if limits are exceeded
-Visual and physical inspections	- check the appearance, taste and odour of the water	-Priority taps[2] -All water storage tanks -All drinking-water containers - all trucked water	-Daily[3]	- The following observed during visual inspection of the water may indicate problems with the water quality: cloudiness (e.g. turbidity); milkiness (e.g. air in the pipes); red/orange tinge or sediment (e.g. iron); brown/black tinge or sediment (e.g. manganese), blue (e.g. copper); eggy odour (e.g. hydrogen sulphide); metallic taste (e.g. general metal contamination)[4].	-Investigate the potential source with relevant stakeholders (e.g. water supplier, plumbers etc). If microbiological water quality is in doubt, boil or disinfect water used for drinking and medical purposes. -For sediment or other noticeable color for storage tanks and drinking water containers, clean with detergent and disinfect
-Basic quality parameters	-free chlorine residual (where	-Priority taps -All water storage tanks	-Daily[3]	-free chlorine residual < 0.2 mg/l	-Adjust chlorination to achieve a free chlorine residual at the point of use of greater than 0.2 mg/l - Monitor upstream of low chlorine fixtures to


SANITARY INSPECTION FORM DRINKING-WATER

Piped distribution – storage tank

A. GENERAL INFORMATION

A.1. Storage tank information

Storage tank location (e.g. village, town, community, parish, district, province, state)

Additional location information
State the reference system and units, if using coordinates
(e.g. national grid reference coordinates, GPS coordinates)

Name of entity responsible for the management of the storage tank
(e.g. name of water utility, private operator, community group)

Year of construction of storage tank

Storage tank volume (including units)

Storage tank construction material
Tick (✓) the appropriate box(es) and provide further information where applicable

❑ Ductile iron (DI) ❑ Ferrocement ❑ Concrete
❑ Polyvinylchloride (PVC) ❑ High density polyethylene (HDPE)
❑ Other. Describe:

facilitates progressive improvement

Advanced 1
Operational monitoring – visual inspections and water quality measurements
On-going operations & maintenance
Sanitary inspection **and advanced water quality testing** (free chlorine, pH, turbidity **and *E. coli*; priority chemicals**)

Enhanced 2
Operational monitoring – visual inspections **and water quality measurements**
On-going operations & maintenance
Sanitary inspection and basic water quality testing (free chlorine, pH, turbidity)

Intermediate 3
Operational monitoring – visual inspections only
On-going operations & maintenance
Sanitary inspection to confirm effective risk management practices

Basic 4
Operational monitoring – visual inspections only
On-going operations & maintenance

Start here

Water safety in healthcare facilities in Ukraine

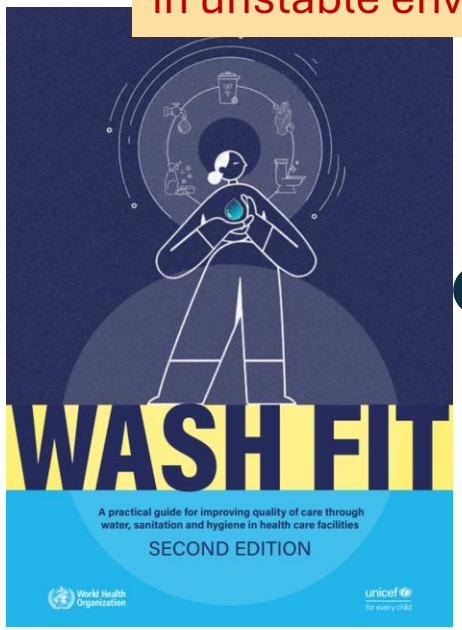
WASH FIT in Ukraine

- **Pilot projects** in **2022** (western Ukraine)
- **200+ healthcare facilities** (mainly in the **frontline areas** implemented by different expert groups)

WASH FIT in Ukraine

- Tailored **adaptation** of indicators to **Ukrainian legislation**
- **Extended** indicators in **HeRAMS** (*Health Resources and Services Availability Monitoring System*) self-reporting
- Translation of **WASH FIT guiding materials** into Ukrainian

in unstable environment



Structured approach for rapid assessment

Stronger coordination and donor support

Mentoring and capacity building

WASH FIT applied in tandem with IPCAF

(Infection Prevention and Control Assessment Framework)

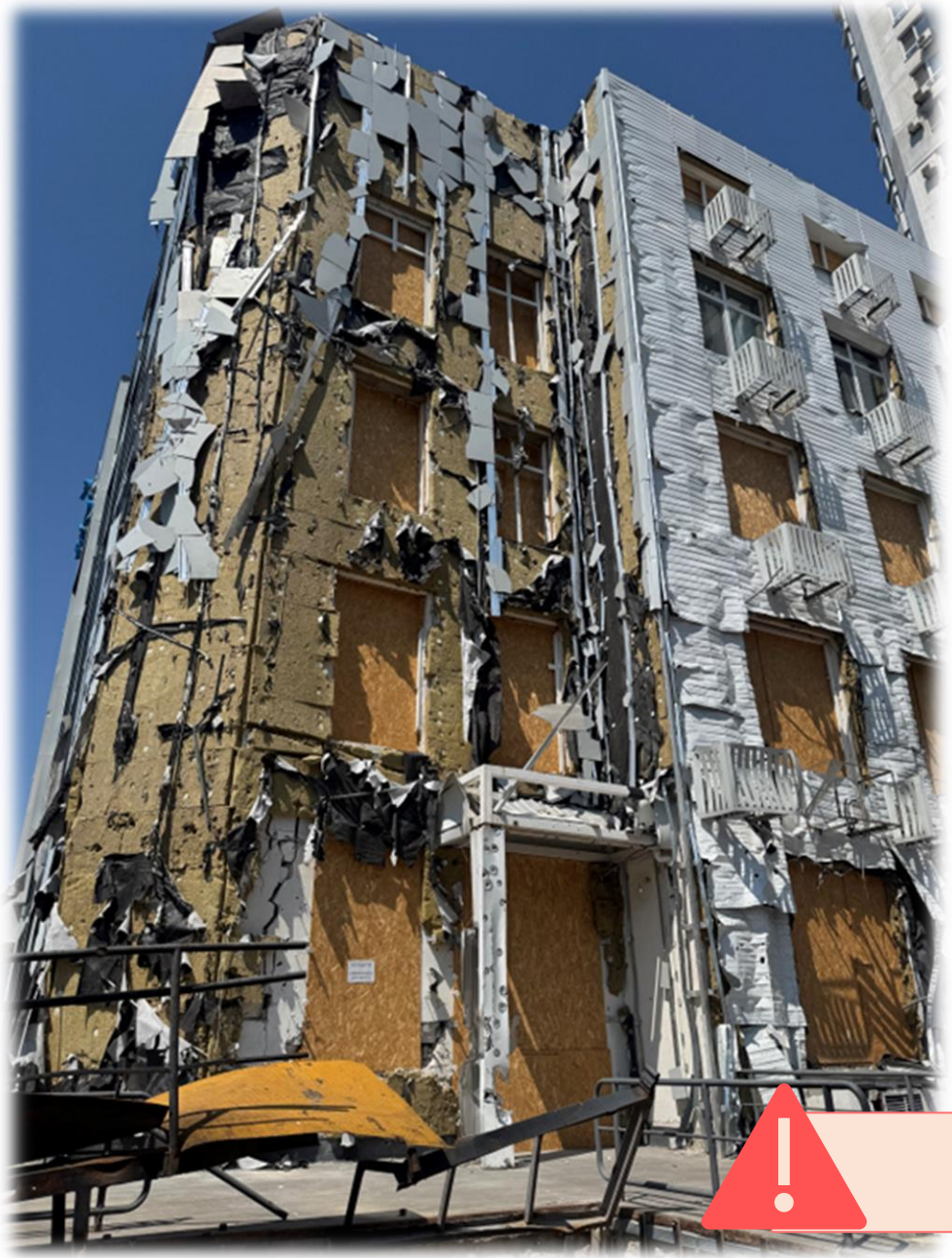
How water safety is critical for IPC measures:

- Essential for hygiene practices
- Cleaning and disinfecting the environment
- Water systems can be reservoir of pathogens (e.g. *Legionella*)
- Medical equipment reprocessing
- High-risk clinical procedures rely on safe water (e.g. hemodialysis)

Why water sector becomes critical

Pre-existing vulnerabilities

- Aging infrastructure
- Uneven access in rural areas
- Limited monitoring and knowledge of water quality/safety



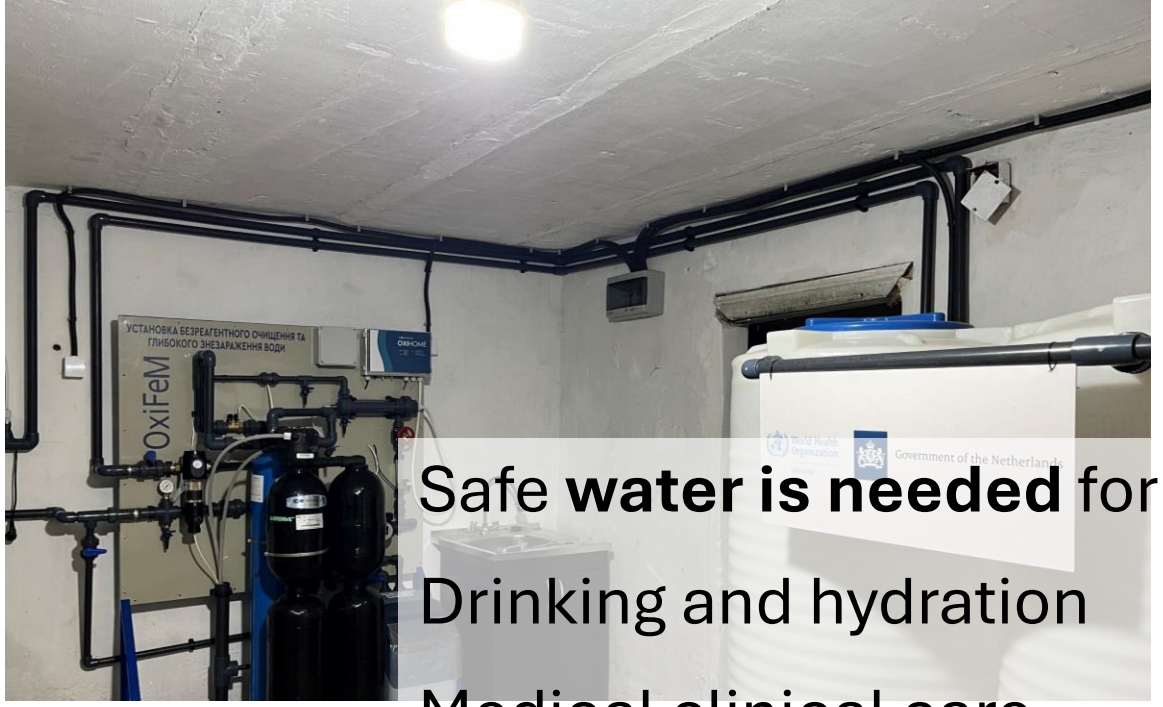
War-related

- Attacks on healthcare facilities
- Temporary facilities and shelters
- Power outages and water supply interruptions

Autonomous systems

Water supply infrastructure

- Installation of **boreholes**
- Water **treatment stations** (on site)
- Water **storage** tanks
- **Back up energy** supply sources (generators, renewable energy sources)



Safe **water is needed** for:

Drinking and hydration

Medical clinical care

IPC measures

Sanitation and hygiene

Responsibilities for water safety in HCFs

- **Water supply in HCFs** is provided on a contractual basis, and the provision of water is subject to **licensing requirements**
- The water supplier (manufacturer) is responsible for service quality and maintaining **external water supply** networks
- The HCF (consumer) is responsible for maintaining its **internal water pipeline systems**
- In case of disruptions **local authorities** and service enterprises must ensure the **availability of back up** water supply options

Water safety: quality control

Drinking water standards are regulated by the *State Sanitary Norms and Rules*

Normal conditions:
epidemiological, radiation, chemical, and organoleptic criteria

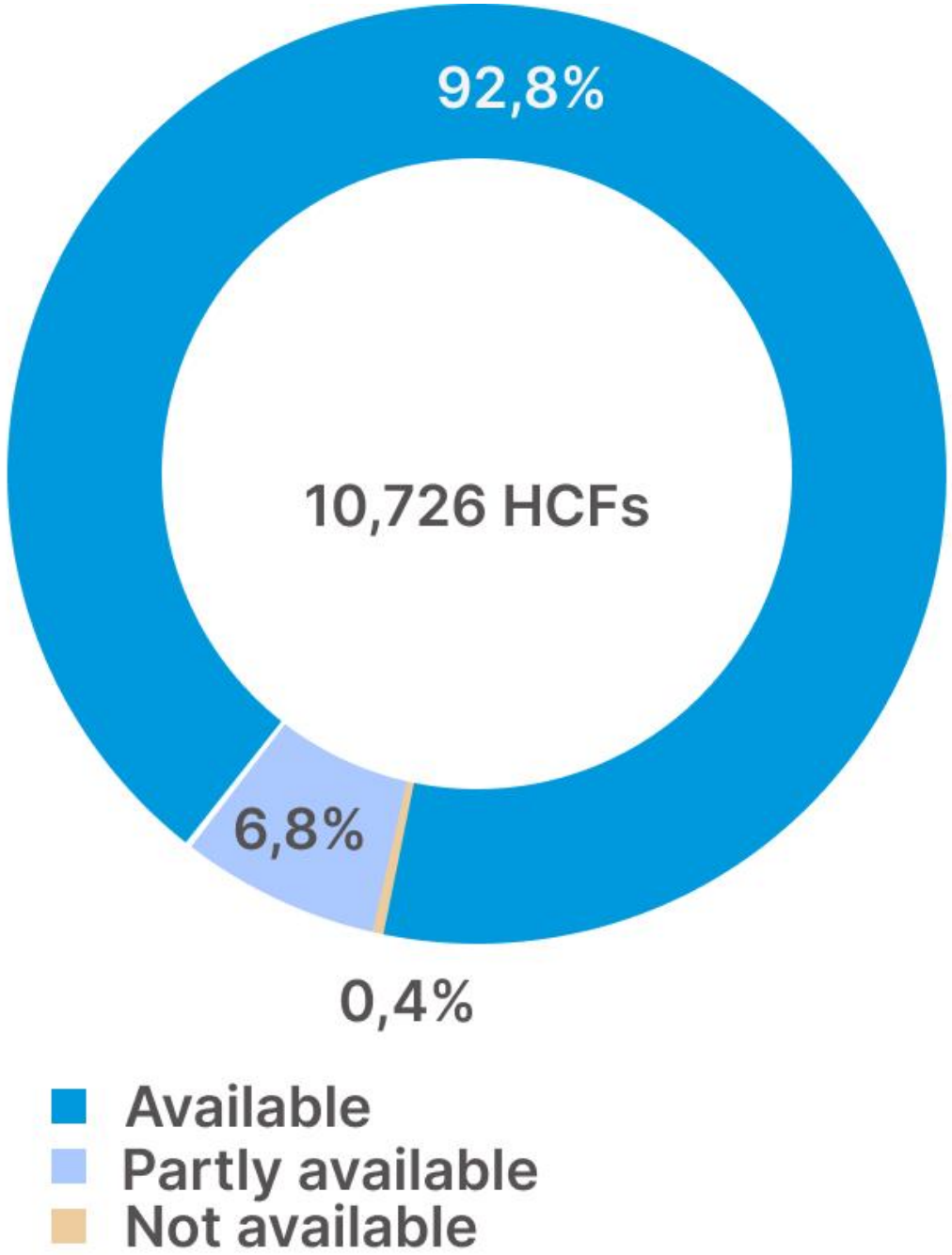
During emergencies under martial law:
Primary focus **epidemiological safety** and microbiological control

Parameter	Ukraine standard (DSanPin)	EU Directive 2020-2184	WHO Guidelines on Drinking-Water Quality, 4th edition (2022)
Turbidity	<= 1.0-3.5 HOK	According to acceptability of consumer	Ideally < 1 NTU for disinfection and aesthetic purposes. If this is not possible, the aim should be to keep turbidity < 5 NTU.
Free chlorine residual	0.3-0.5 mg/dm^3 eq. to (0.3-0.5 mg/l)	-	≥ 0.2 mg/l at the point of delivery for piped supplies, or at the point of use.
E. coli	0 CFU/100 ml	0 CFU/100 ml	0 CFU/100 ml
Legionella	No standard	< 1000 CFU/l	No guideline value, but monitor and control according to risk
Nitrates	< 50 mg/l	[nitrates]/50 + [nitrites]/3≤1 mg/l	< 50 mg/l
Nitrites	< 0.5 mg/l		< 3 mg/l
Arsenic	< 0.01 mg/l	< 0.01 mg/l	< 0.01 mg/l
Fluorides	< 0.7-1.5 mg/l	< 1.5 mg/L	< 1.5 mg/l
Lead	< 0.01 mg/l	< 0.01 mg/l	< 0.01 mg/l

Water supply in HCFs: current state

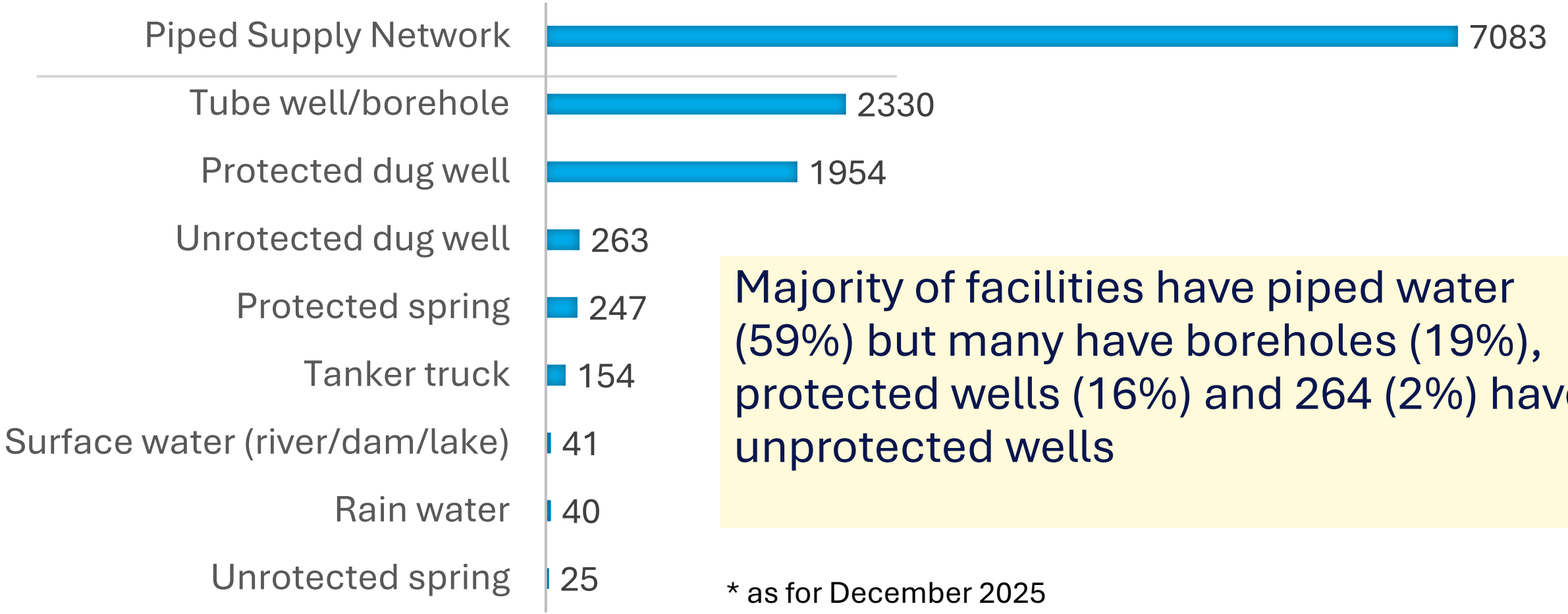
HeRAMS self-reporting: water supply

- **92.8%** (9,956 HCFs) had water available
- **744** (out of 770 reported no/partial) water were **primary health care facilities (PHC)**
- **45 PHC facilities** had no water



* as of December 2025

HeRAMS self-reporting: water sources



Majority of facilities have piped water (59%) but many have boreholes (19%), protected wells (16%) and 264 (2%) have unprotected wells

* as for December 2025

Operational challenges

- Insufficient knowledge for **estimating water needs**
- Lack of knowledge on **water storage** maintenance and operation
- Ensuring **water quality** (water testing at the point of use)
- Lack of distribution system for **technical water**
- Water **accounting and saving** strategies
- Limited technical staff expertise of **water safety practices**
- Absence of **internal** policy documents (SOPs, guidelines)

Support for managing water safety – quick guide

Managing water safety in health care facilities: a quick guide

Pilot version discussed during the workshop

(16-17 December 2025, Kyiv, Ukraine)

Workshop: purpose and key stakeholders

Participants:

- Healthcare facilities (engineers, IPC staff)
- Regional Centers for Disease Control and Prevention (CDC)
- Expert groups active in the sector
- Governmental authorities and other

Purpose:

- Promote a risk-oriented approach to water management in HCFs and discuss the quick guide for managing water supply systems

Quick guide for water management in HCFs

Documenting information on water supply

Ensuring safety of water by regular operation and maintenance, operational monitoring

Using the results to **set priorities** for building resilience and planning gradual improvements

Priority actions to strengthen water safety in HCFs

- Engage **regional CDCs** to provide methodological support and guidance
- **Implement the quick guide** in selected HCFs, followed by monitoring and improvement actions
- Support in **strengthening national regulations** (water-needs estimation, maintenance of water-storage systems, water-saving strategies)

Investments in safe water in HCFs in Ukraine

- Reducing cost of **healthcare-associated infections**, incl. caused by antimicrobial-resistant pathogens
- **Reducing** the spread of **waterborne outbreaks**
- Advancing national priorities for **resilience and sustainability**
- Supporting efforts to strengthen **primary health care**
- Facilitating **alignment with EU standards** through the shift to a risk-based approach for more effective use of resources

Comprehensive Water Quality Assessment in District and National Level Hospitals across Bangladesh

Dr. Zahid Hayat Mahmud

Scientist and Head

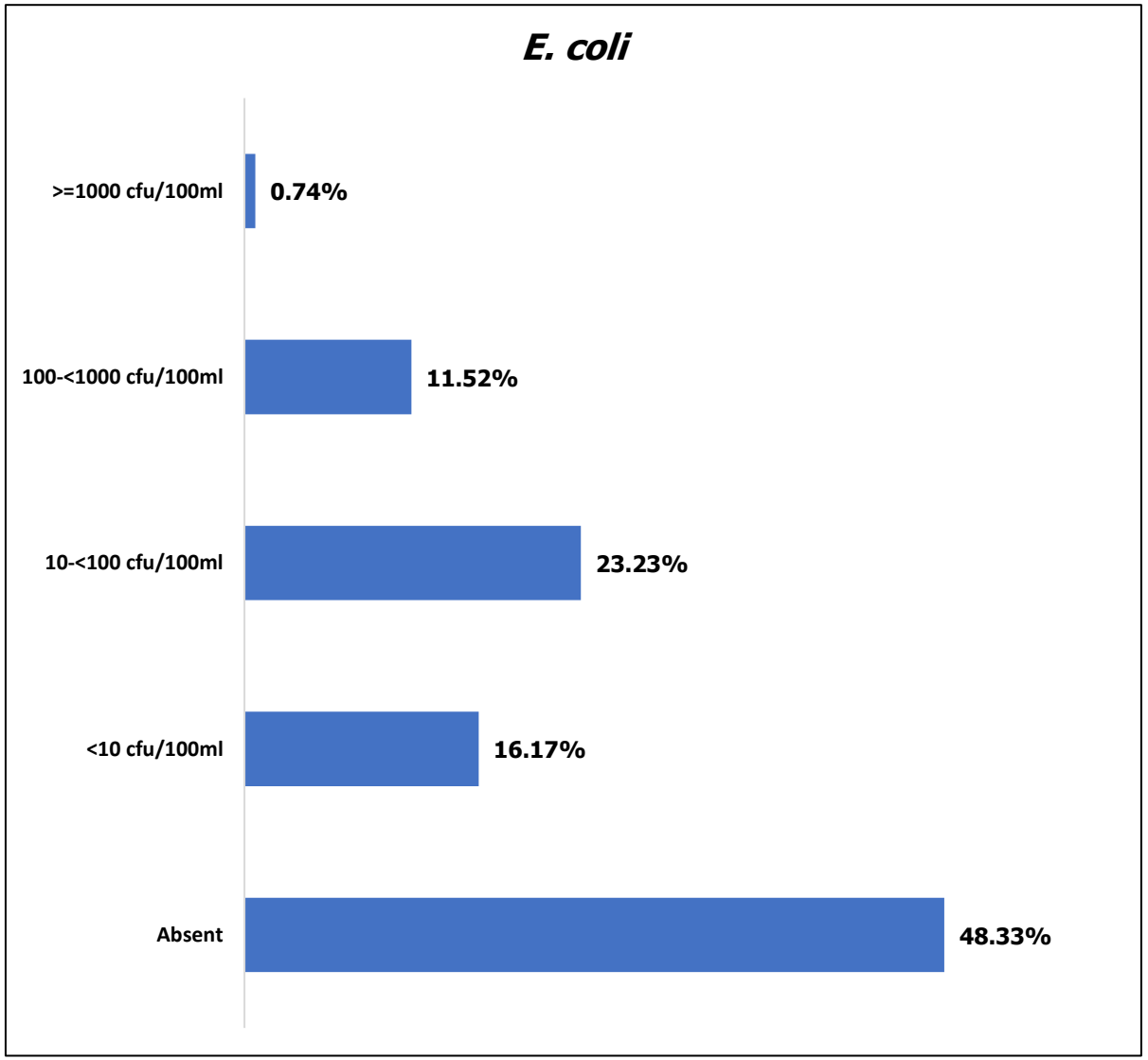
Laboratory of Environmental Health, icddr,b

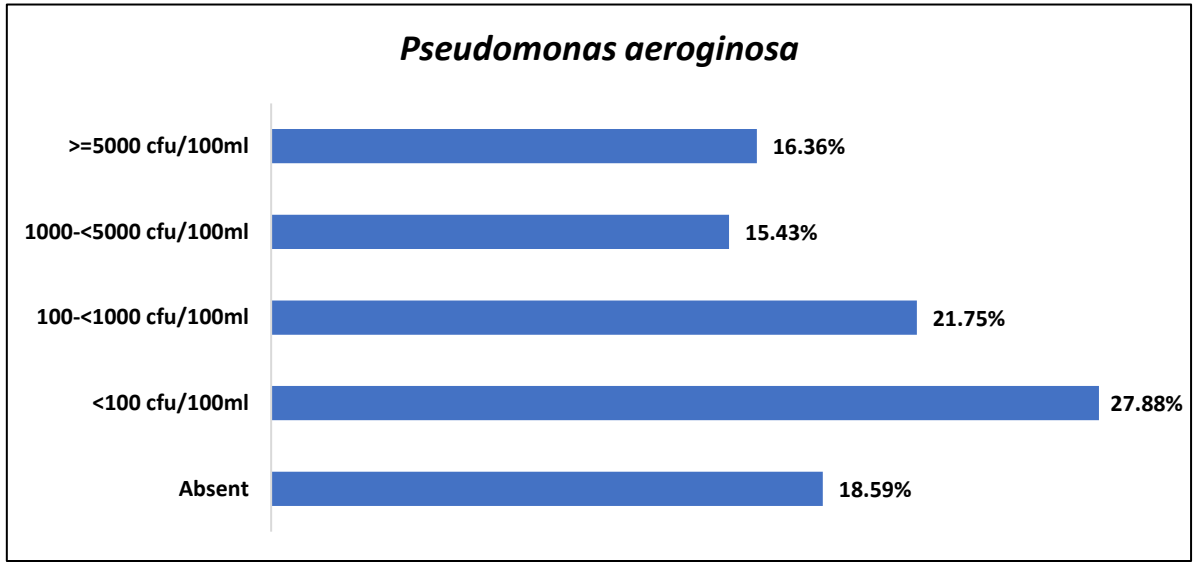
Objectives: **Systematic sampling to map water quality transition from source to tap and guide hazard control and mitigation strategies in water safety planning**

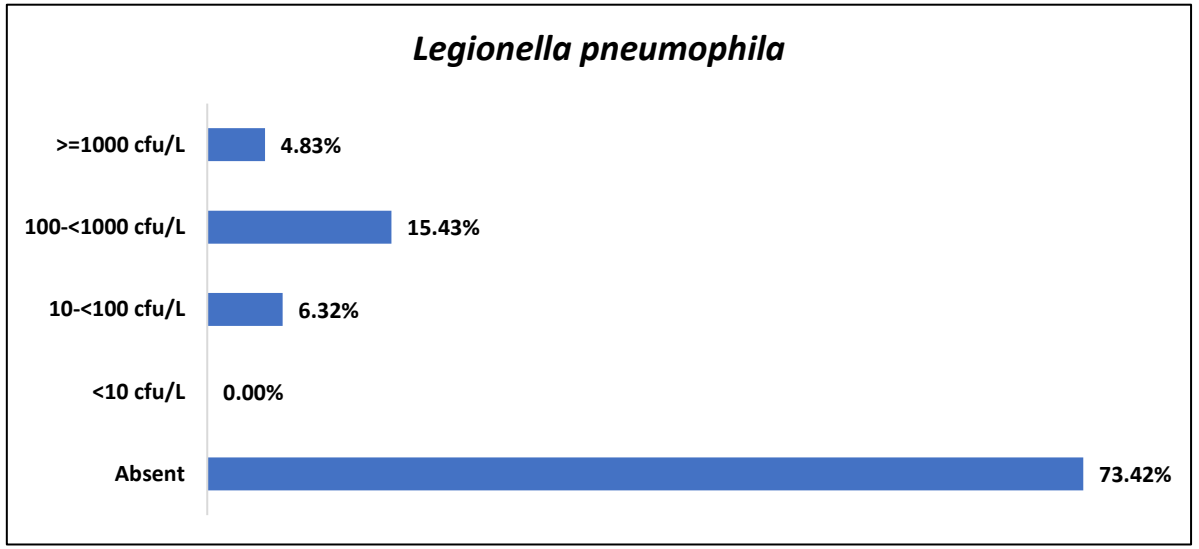
- 181 national-level hospitals across Bangladesh.
- September 2025 to June 2026

Sampling Points		Parameters
Source water		*E. coli*, Turbidity, Electrical Conductivity, Arsenic, Iron, Manganese, Lead, Fluoride
Drinking water (point of use)		*E. coli*, Electrical Conductivity, Turbidity
Tap	Labor Room/High Risk Ward	*E. coli*, *Legionella pneumophila*, *Pseudomonas aeruginosa*, Turbidity
	SCANU/ICU/NICU	
	OT	
Wastewater		*E. coli*, pH, COD, BOD DO (Dissolved Oxygen), Ammonia as Nitrogen, Phosphate, Nitrate (NO_3), Nitrite (NO_2), Total Phosphorus, Total Suspended Solids

Tap water of high risk areas (n=538)







unicef

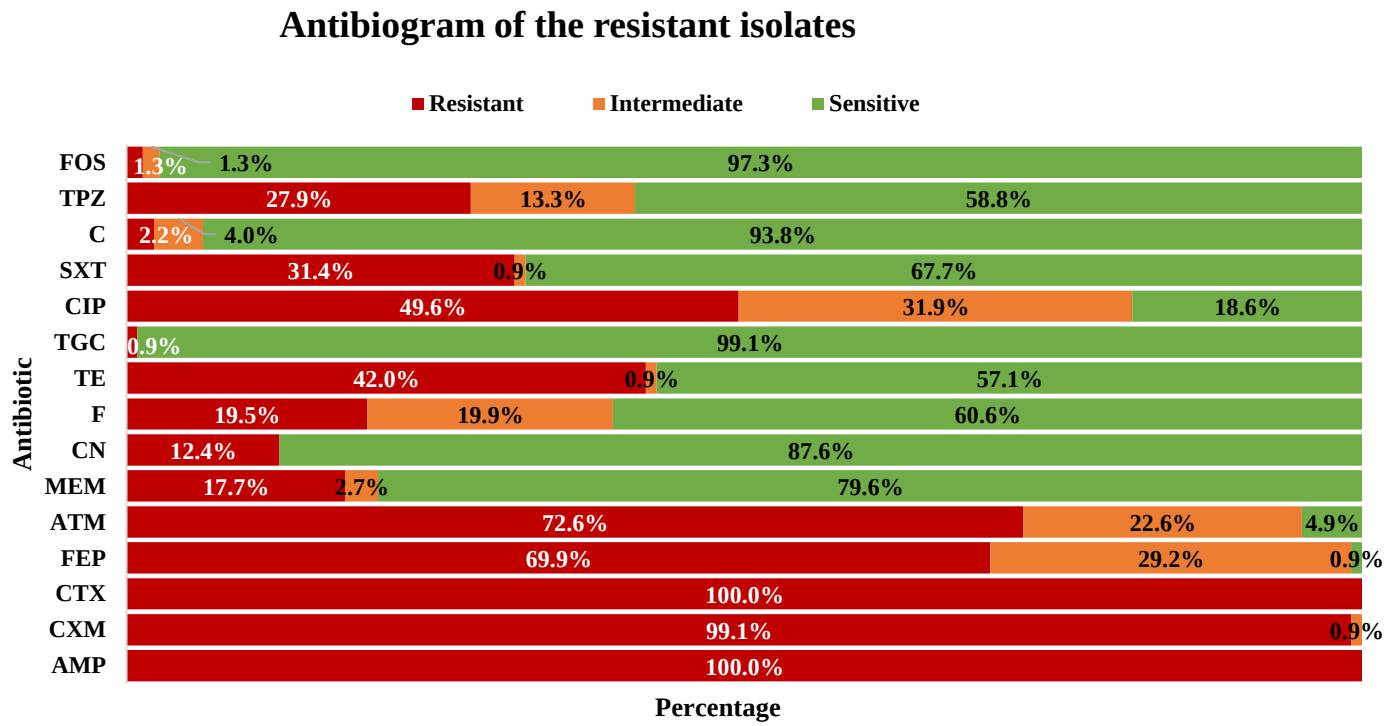
icddr,b

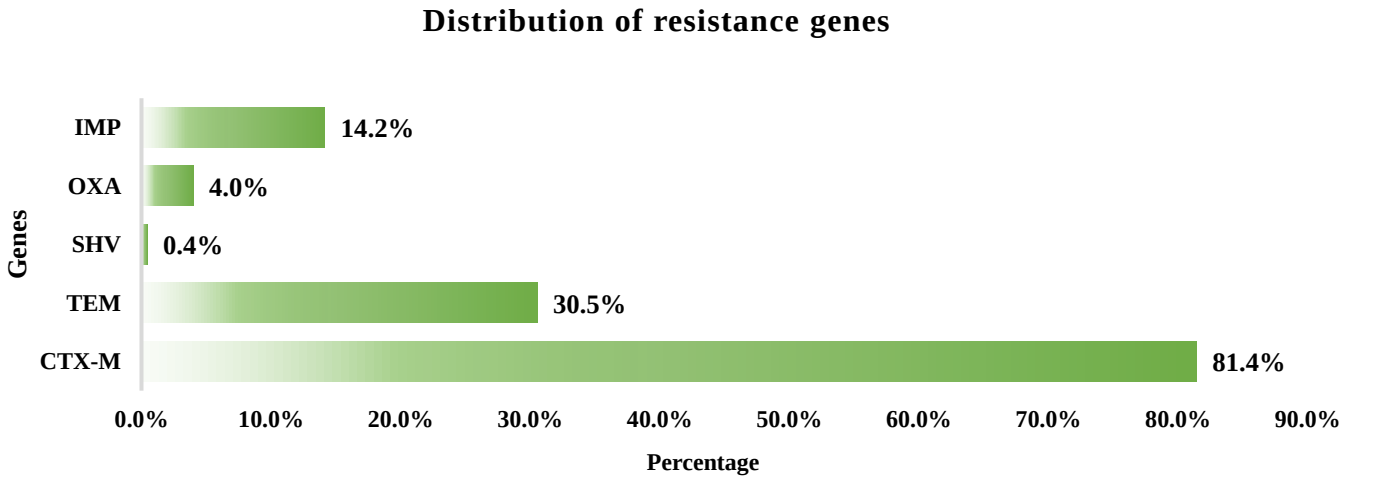
ESBL-producing *E. coli*

- ESBL *E. coli* was found in **113** out of 180 hospitals.
- A total of **226 ESBL *E. coli*** was isolated.

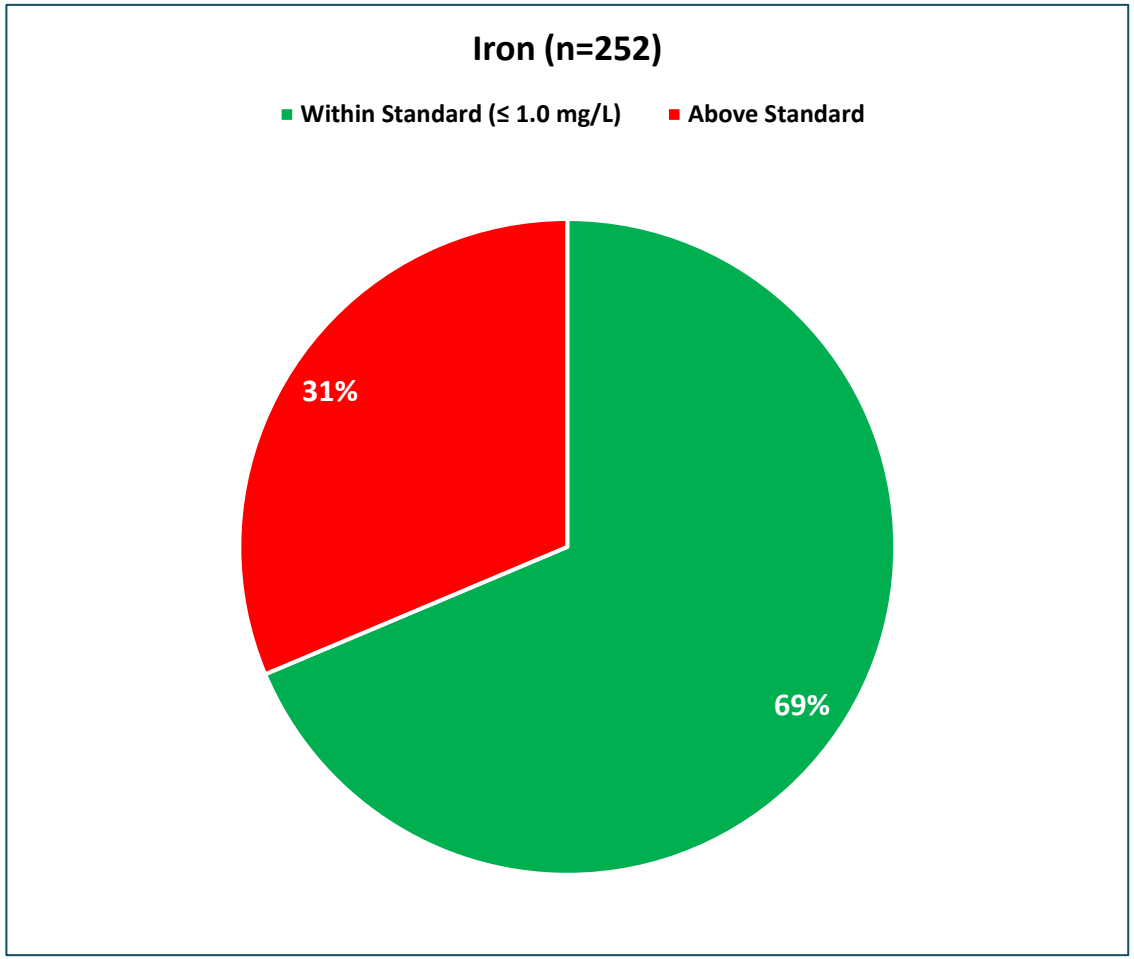
KPC-producing *E. coli*

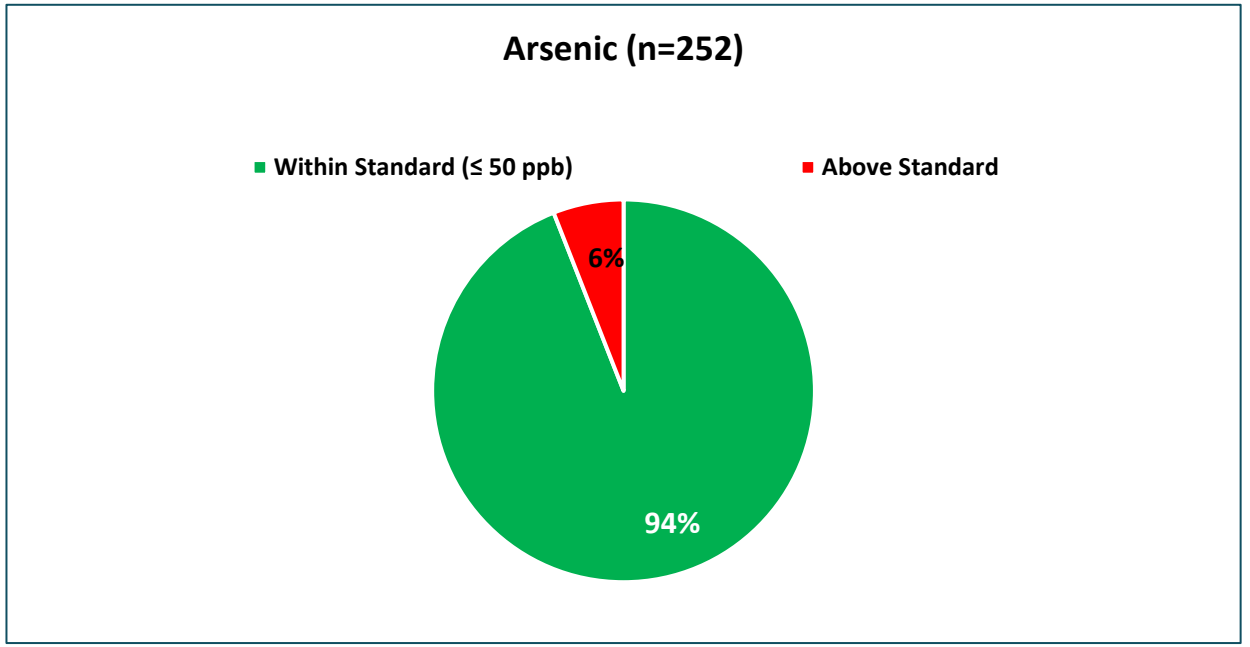
- KPC *E. coli* was found in **38** out of 180 hospitals.
- A total of **46 KPC *E. coli*** was isolated.

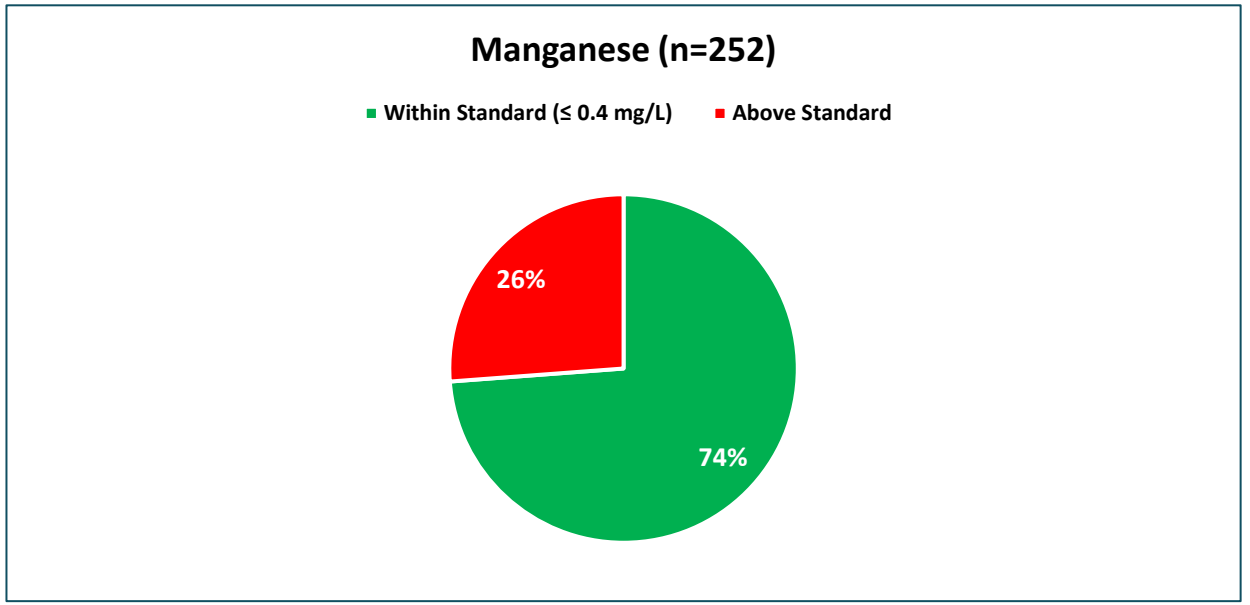




Heavy metal analysis







- **According to the ECR'23 Standard, Bangladesh**

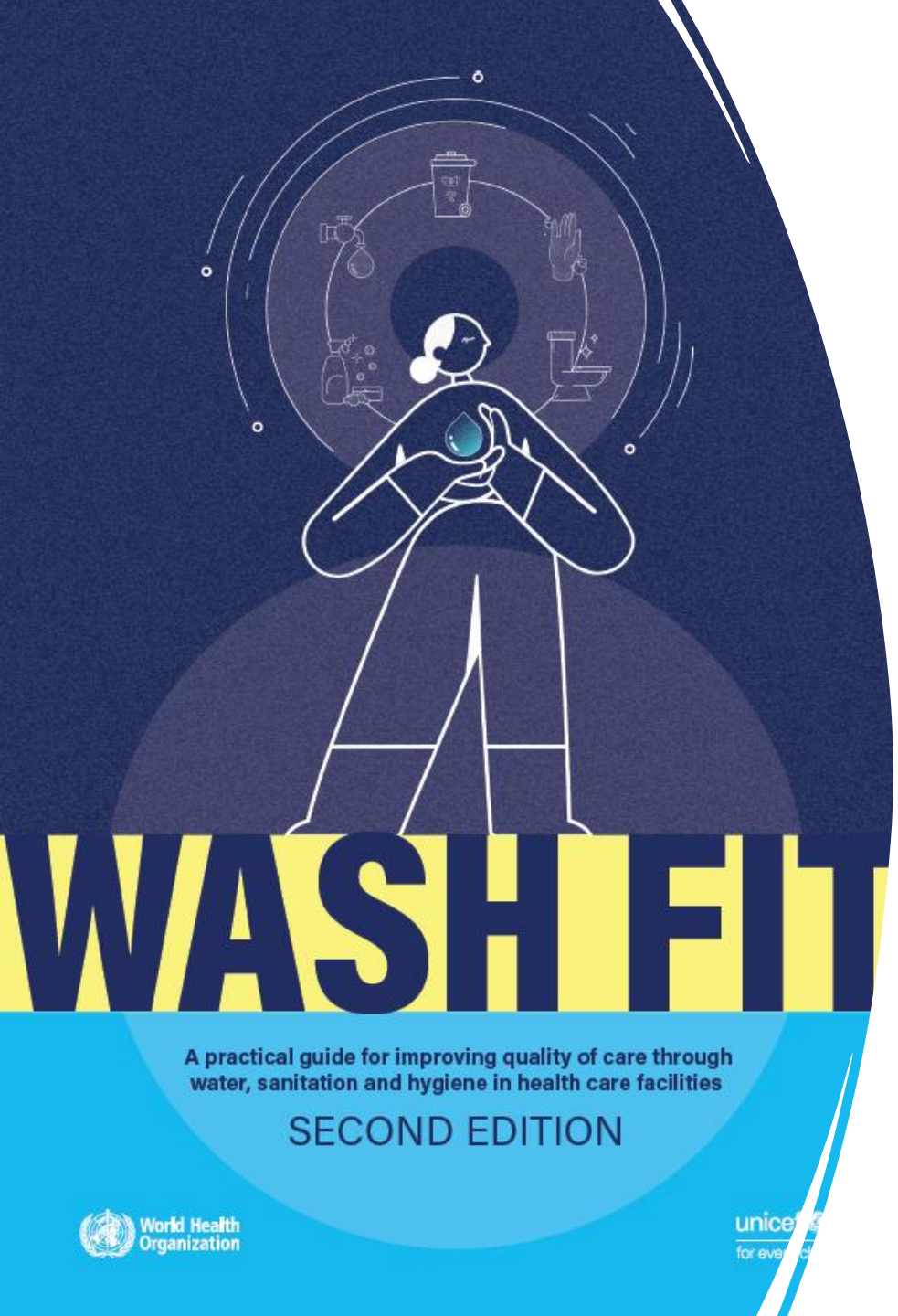
We are deeply grateful to the unicef, DGFP, DGHS, and Hospital authorities for their support and assistance.

Thank You

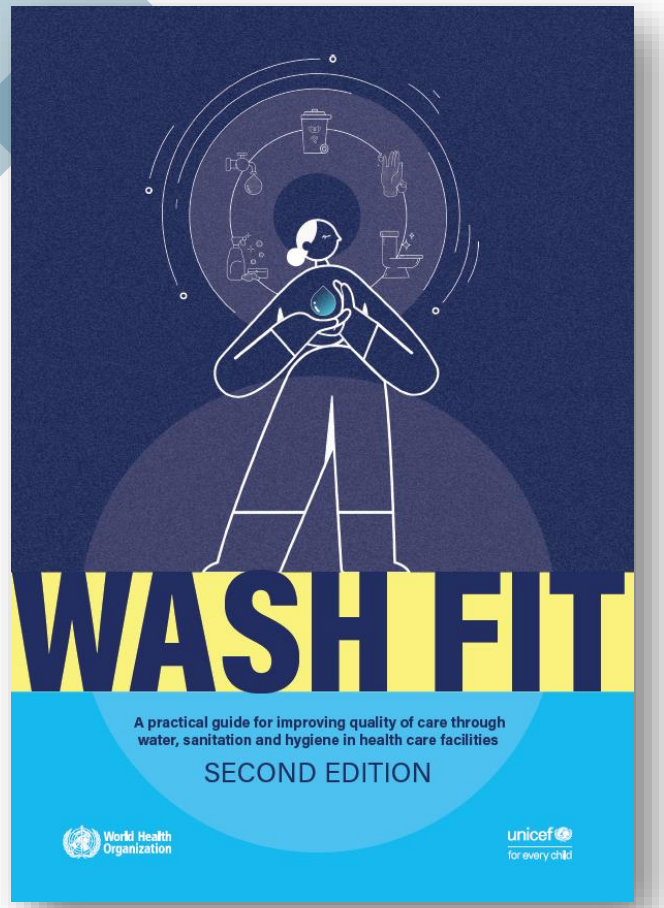
icddr,b thanks its core donors
for their on-going support

Government of the People's
Republic of Bangladesh

Canada


WASH FIT
A practical guide for improving quality of care through water, sanitation and hygiene in health care facilities
SECOND EDITION
World Health Organization

Questions



unicef | World Health Organization

Managing water safety in health care facilities: a quick guide

DRAFT VERSION-to be reviewed and revised further for Global Use

with focus on Health Care Facilities in Ukraine

February 2026

Introduction and Ukrainian Context

This quick guide is meant to be used as part of a wider quality improvement process, including through the Water and Sanitation for Health Facility Improvement Tool (WASH FIT). It focuses on water management and water quality and is meant to help guide those in charge of water services within health care facilities on key tasks and corrective actions.

This version is specifically for Ukraine. Key factors contributing to water related health risks in Ukraine include poor condition of water treatment facilities and supply networks, lack of source water protection and limited laboratory capacity, control and regulation. Select Ukraine, EU and WHO limits for select water quality parameters are listed below.

Parameter (minimum requirenmnets)	Ukraine standard (DSanPin 2.2.4-171-10)	EU Directive 2020-2184	WHO Guidelines on Drinking-Water Quality, 4th edition (2022)
Turbidity	<= 1.0-3.5 HOK[1]	According to acceptability of consumer	Ideally < 1 NTU for disinfection and aesthetic purposes. If this is not possible, the aim should be to keep turbidity < 5 NTU.
Free chlorine residual	0.3-0.5 mg/dm³ equivalent to (0.3-0.5 mg/l)	-	≥ 0.2 mg/l at the point of delivery for piped supplies, or at the point of use.
E. coli	0 CFU/100 ml	0 CFU/100 ml	0 CFU/100 ml
Legionella	No standard	< 1000 CFU/l	No guideline value, but monitor and control according to risk
Nitrates	< 50 mg/l	[nitrates]/50 + [nitrites]/3≤1 mg/l	< 50 mg/l
Nitrites	< 0.5 mg/l		< 3 mg/l
Arsenic	< 0.01 mg/l	< 0.01 mg/l	< 0.01 mg/l
Fluorides	< 0.7-1.5 mg/l	< 1.5 mg/L	< 1.5 mg/l
Lead	< 0.01 mg/l	< 0.01 mg/l	< 0.01 mg/l

PART 1: Understanding (and mapping) the HCF water supply system

Sections A, B and C of this guide provide templates for systematically collecting and documenting key information on the water source(s) used in the health care facility and any water storage facilities available. Section D provides guidance on essential water quality monitoring and possible corrective actions that can

[1] HOK is an optical turbidity unit. It is based on light attenuation while NTU is based on light scattering. While it is not possible to do a direct conversion, in general 1 HOK is approximately 2 NTU.