SoPHE Article

Future-Proofing Water Safety in the NHS Estate: Rethinking Risk and the Role of POEF

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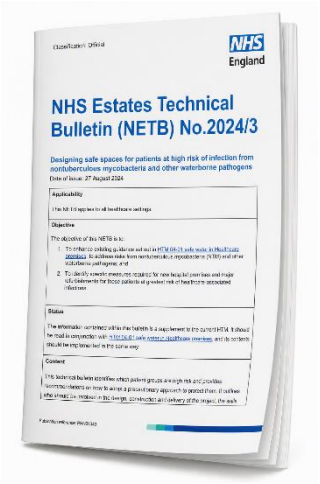


NHS Estates Technical Bulletin (NETB) 2024/3 introduces a major shift in NHS water safety, positioning engineered controls, particularly sterilising-grade point-of-entry filtration (POEF), as key safeguards in high-risk environments. While formally focused on highly immunocompromised settings, modern patient pathways and estate complexity highlight a wider need to reconsider how risk is defined and managed.

This article examines how POEF, when integrated into new builds or major refurbishments, can future-proof assets, improve resilience, and provide a consistent upstream barrier against waterborne pathogens.

A Landscape of Evolving Risk

Mycobacterium abscessus

Traditional control strategies, temperature, flow, and flushing, remain important but are increasingly challenged by organisms such as nontuberculous mycobacteria (NTM), which resist standard disinfection and thrive in complex plumbing systems. NETB 2024/3 formalises a proactive, design-led approach aligned with HTM 04-01, requiring early integration into project planning and delivery. Although it defines specific “high-risk” patient groups, vulnerable individuals are not confined to specialist units. Patients at risk are routinely treated across outpatient, community, and diagnostic environments.

This gap between defined risk categories and real-world clinical pathways supports the case for broader adoption of upstream engineered barriers.

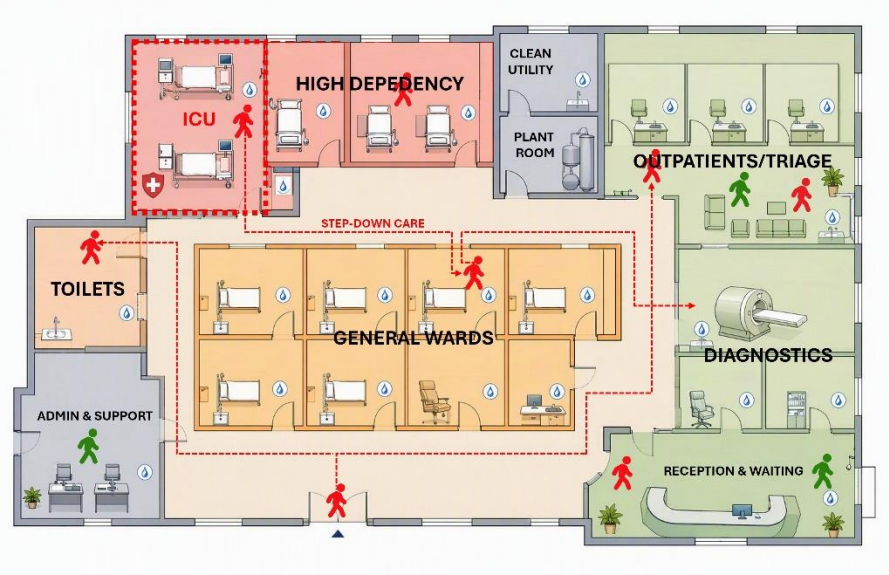
Rethinking “High-Risk”

Historically, “high-risk” has been linked to invasive interventions such as central venous access. However, many vulnerable groups fall outside this definition, including:

- Chemotherapy patients in outpatient settings
- Frail elderly patients with multimorbidity
- Individuals with chronic respiratory or immune conditions
- Renal, rehabilitation, and day-case patients

- Those with temporary or undiagnosed immune suppression

Outbreak evidence shows risk follows patient vulnerability, not departmental boundaries, reinforcing the need for system-level controls.



POEF as a Strategic Control

NETB 2024/3 identifies POEF (0.2 µm absolute, ASTM F838-20 validated) as a primary engineering control. Its function is to prevent microbial ingress at the point water enters the clinical environment, delivering consistent protection against NTM and similar pathogens, such as legionella and pseudomonas.

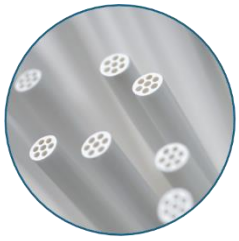
Key benefits include:

- Validated barrier: Removes reliance on variable operational controls
- System-wide protection: Shields downstream systems regardless of complexity
- Operational resilience: Maintains performance under varying conditions
- Defensible design: Provides strong assurance in audits and investigations

Technology context and selection

It is important to recognise that “POEF” is not a single technology, but a category of engineered solutions. These may include backwashable membrane systems (commonly hollow-fibre or ceramic), or cartridge-based approaches in lower-flow or localised applications. Selection should be driven by system demand, resilience requirements, maintainability, and alignment with the project-specific water safety plan. The critical requirement is not the form factor, but the provision of a validated, sterilising-grade upstream barrier.

Although complex to retrofit, POEF is ideally suited to new build and major refurbishment projects where system integration can be optimised.



Hollow Fibre

Ceramic

Cartridge

Embedding POEF in Capital Projects

Incorporating POEF at design stage establishes a long-term microbiological baseline and supports:

- Consistent performance across asset life
- Reduced exposure risk for clinical staff
- Predictable, defensible system design
- Protection from upstream water quality variability

This reflects a shift from reactive management to proactive risk elimination.

Design Considerations for POEF Integration

From a public health engineering perspective, evaluation and integration of POEF should consider:

- Incoming main sizing and pressure loss
- Duty/standby resilience strategy
- Backwash discharge and drainage provision
- Spatial requirements, access, and maintainability
- Integration with BMS and performance monitoring systems

Commissioning strategies should also include verification of microbiological performance at system entry, complementing downstream validation and supporting assurance within the project water safety plan.

Part of a Multibarrier Approach

NETB is clear that POEF must sit within a broader system strategy, including:

- Simplified, low-stagnation distribution
- Stable thermal control
- Elimination of dead legs
- Appropriate outlet selection
- Robust commissioning, including sampling for NTM

- Ongoing performance monitoring

Adopting POEF often drives improved system design, governance, and maintainability.

Value Beyond Designated High-Risk Areas
While guidance focuses on specialist units, POEF can add value across wider estate settings, including:

- Community diagnostic centres
- Ambulatory and urgent care hubs
- Day-case surgery suites
- Mental health and community hospitals

These environments frequently treat vulnerable patients without formal “high-risk” designation, making consistent upstream protection increasingly relevant.

Strengthening Governance: The PWSG
NETB 2024/3 introduces the Project Water Safety Group (PWSG), responsible for developing a project-specific water safety plan in line with HTM 04-01 and BS 8680. By bringing together clinical, estates, and engineering stakeholders, the PWSG:

- Aligns engineering controls with clinical risk
- Prevents fragmented decision-making
- Embeds water safety into project governance

This represents a critical step in ensuring long-term system performance.

Conclusion
NETB 2024/3 highlights that water safety must reflect how healthcare is actually delivered, not just how departments are labelled. Vulnerable patients are present across the NHS estate, requiring a more consistent level of protection.
While not universally applicable, particularly in constrained legacy systems where retrofit feasibility may limit adoption, POEF offers a powerful upstream control when implemented in new or refurbished assets, enhancing resilience, reducing reliance on operational measures, and aligning with modern infection risks.
As the NHS undertakes major estate renewal, the key question becomes:

How can engineered upstream controls raise baseline water safety across increasingly complex and fluid care environments?

The answer lies in proactive design, strong governance, and a focus on protecting people, not buildings.

Pull quotes

“Risk does not sit neatly within departmental boundaries; clinically vulnerable people are present throughout the NHS estate.”
“NETB 2024/3 signals a shift from procedural control to engineered resilience.”
“Future-proofing water safety begins at the point of entry.”
“Engineered upstream controls create a consistent, defensible baseline for modern healthcare environments.”

Author Biography

Scott Brannigan is Head of Technical Standards & Sustainability at Hydrotec (UK) Ltd, with 18 years' experience in water hygiene, treatment technologies, and regulatory compliance across healthcare, commercial, and industrial sectors. His career combines hands on technical expertise with industry leading work in environmental performance and technical compliance, including delivery of 29 independently verified Environmental Product Declarations covering over 200 products, development of VDI 2035 aligned treatment programmes and POEF treatment systems in alignment with NHS NETB 2024/3.

Scott has a strong record in innovation, lifecycle carbon reduction, and knowledge transfer. His broader achievements involve supporting NHS stakeholders and MEP/PH design consultants through evidence-based water safety solutions.

He is committed to sustainability, public health protection, and advancing engineered approaches to water risk management within the built environment.
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