

Environmental Contamination from Healthcare Sinks: A Study on Splash Zone

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Background

Sinks have emerged as important reservoirs for multidrug-resistant organisms in hospitals. In 2015 and 2022, major outbreaks of *Pseudomonas aeruginosa* were detected in critical care units in Kelantan, Malaysia. Investigations traced the pathogen related to sinks located near to patient beds and baby incubators.

Method

A cross-sectional survey was conducted across critical care wards in three major hospitals in Kelantan, Malaysia. The study involved sink mapping, identification of items located within two metres of sinks, and measurement of water splash zones using tracing paper.

Results

- Domestic sinks were more common than clinical sinks in critical care areas.
- Splash zones >1 metre were mainly associated with domestic sinks, especially with high-velocity water flow.
- Clinical sinks with low-velocity taps showed significantly smaller splash areas.
- Items within splash radius often included medical equipment and patient-care materials.



Figure 1: Method for sink splash study
(using absorbent paper sheets to visualise splash zone)

Type of sink	Low velocity splash zone		High velocity splash zone	
	<1.0m (%)	>=1.0m (%)	<1.0m (%)	>=1.0m (%)
Domestic	63	100	59	78
Clinical	34	0	37	22
Laboratory	3	0	4	0

Table 1: Distribution of sink splash zones by sink type and water flow velocity.

Discussion

- Domestic sinks with high-velocity taps produced larger splash zones, increasing contamination risk¹.
- Similar outbreaks linked to sinks have been reported in ICUs².
- Sink design, tap placement, and water flow strongly influence splash patterns³.
- Key measures: maintain 2-metre clearance, avoid storing patient-care items near sinks, and involve IPC teams in planning⁴.
- Water-free sink models may offer safer alternatives in critical care⁵⁻⁷.

Conclusions

Sink design and water flow velocity are key factors influencing splash zone size and contamination risk. Clinical sinks with low-velocity taps reduce environmental contamination, and items should ideally be placed more than two metres away. Infection control teams must be involved in ward layout and planning, while water-free sink models may offer safer alternatives in the future.

References

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