Current version — Nov 1, 2026. Update history: https://healthcarefacilityhub.org/can-upper-air-uv-disinfect-hospital-air-sanilume-pilot/

Upper-Air UV Quick Card: Field Qualifier & Safety Limits

A direct 2-page field standard for hospital facility directors, plant engineers, and infection preventionists evaluating upper-room UVGI.

CORE TECHNOLOGY PRINCIPLE (CDC FRAMEWORK)

Upper-room ultraviolet germicidal irradiation (UVGI) is established technology with **over 70 years of hospital use** (principally against tuberculosis). The CDC treats it as a legitimate way to add clean air to an occupied room: fixtures create a controlled germicidal zone above occupants. Natural convection or fan assistance circulates room air up into the UV zone where pathogens are inactivated, delivering equivalent clean air back to the breathing space without treating occupants directly.

RULE 1: PHYSICAL ROOM QUALIFIER

CDC Ceiling Height Criteria

8.0 ft Min / 8.5 ft Preferred

Ceiling Height Rule: CDC guidance specifies that upper-room UVGI requires spaces at least 8.0 feet tall, with 8.5 feet strongly preferred to maintain disinfection volume above occupants.

The Air-Movement Check: Active vertical air movement is mandatory. Convection currents, HVAC supply/returns, or mixing fans must lift bioaerosols into the upper zone.

Underperform Flag: Low ceilings (<8.0 ft) and still, stagnant air are the exact conditions where upper-air UV systems underperform.

RULE 2: OCCUPIED-ZONE SAFETY LIMIT

Wavelength: 254 nm

6.0 mJ/cm² over 8 Hours

Accepted Exposure Limit: The established maximum permissible UV dose for occupants in the lower room zone is strictly **6.0 mJ/cm² over an 8-hour period** at 254 nm.

Measurement Protocol: The occupied zone must be measured, not assumed. A credible installation is commissioned with a calibrated radiometer at eye level (standing and seated).

Recommissioning Trigger: Must be re-checked with a calibrated meter after any lamp replacement, fixture adjustment, ceiling shift, or room layout change.

RULE 3: MAINTENANCE & THE "QUIET FAILURE" TRAPS

The guideline literature is blunt: upper-room UV systems fail quietly without audible alarms. Operators must audit three failure modes:

1. Dusty Lamps
Dust layers block UV-C emission while lamp still shows blue glow.

2. Dead Lamps in Place
Burned-out tubes left unreplaced leave clinical zones unprotected.

3. Fans Switched Off
Fan-assisted units lose upward air delivery if fans are powered off.

Surveyor Standard: Lamps need scheduled cleaning and replacement, and an Environment of Care maintenance log with an assigned owner name that a surveyor can inspect.

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RULE 4: THE BASELINE-FIRST RULE (CMS COP §482.41 & §482.42)

In infection-control governance, an engineered air control sits inside your physical environment and infection prevention programs — **42 CFR §482.41** and **42 CFR §482.42** territory under the CMS Conditions of Participation.

"A pilot that cannot show before-and-after air measurements in the same occupied spaces, across a respiratory season, has shown a purchase, not a result."

CHAIR HOSPITAL PILOT TARGETS (OCT 28, 2026 PROGRAM ANNOUNCEMENT)

CHAIR announced facility-wide hospital pilots of SaniLume (Illumisoft, Ottawa), with signed Letters of Intent with Shared Health / Winnipeg Health Sciences Centre and BC PHSA. Intended to start in November, subject to funding. *Letters of intent are not installations.* Targets are specific:

Target Metric	Stated Program Target	Clinical & Operational Reality Check
Airborne Pathogens	**>90% reduction**	Must be measured in real time in clinical spaces during live patient care.
Surface Contamination	**>50% reduction**	Tests secondary deposition reduction from continuous airborne inactivation.
Onward Transmission	**>30% reduction**	Must verify reduction of respiratory illness (flu, COVID-19, RSV) across winter season.

EVIDENCE MATRIX: LEEDS CHAMBER VS. LIMA FIELD TRIAL VS. ASHRAE 241

Evidence Source	Specific Testing Parameters & Numbers	Facility Director Takeaway
Univ. of Leeds Chamber (Aug 2022, Dr. L. Fletcher)	Aerobiology chamber (6 ACH) with continuous pathogen release. SaniLume reduced airborne *S. aureus*, *P. aeruginosa*, and Phi-6 virus surrogate by **97%–98%** (lowest setting) and **99.1%–99.7%** (max). Estimated **216 to 1,994 eACH** (best conventional device tested there managed 8–12 eACH).	Strongest chamber performance on record. However, company-funded testing in a 6 ACH chamber is not an occupied ward across flu season. That gap is why hospital pilots matter.
Lima, Peru Field Trial (2009 TB Ward Study)	Air from human TB ward vented to animal chambers on alternating days. **35% infection rate** on control days vs. **9.5% infection rate** on days with upper-room UV and mixing fans operational.	Gold-standard field proof that upper-air UV with active fan mixing cuts real onward respiratory transmission by more than two-thirds.
ASHRAE Standard 241 (Infectious Aerosols)	Counts mechanical ventilation, filtration, and air cleaning (like UVGI) together as equivalent clean airflow. Does not rank technologies; sets clean-air targets and lets facility combine methods.	The question is never "UV or ventilation." It is how much verified clean air each option adds in your rooms, at what cost, and with what upkeep.
Health Economics Factor	CHAIR estimate: approx. **$5,000 per bed** capital cost, plus a few hundred dollars/year to run. (1 of 13 linked studies in program).	Must be validated in real physical plant budgets alongside maintenance labor costs.

Summary Checklist for Facility Operators:
• Confirm ≥8.0 ft ceiling (≥8.5 ft preferred) & air movement • Commission eye-level occupied zone ≤6.0 mJ/cm^2 over 8 hrs • Assign named owner to cleaning/lamp logs • Document before-and-after baseline across respiratory season under CMS §482.41/§482.42.