

# Guide to Evaluating Countertop UV-C Disinfection



## Summary

Smartphone and tablet use within hospitals is growing exponentially. Staff, patient & visitor device use all present the same challenge: ensuring these devices don't harbor bacteria and increase the risk of infections. Academic studies have shown high bacterial loads on mobile devices, and commonly available hospital wipes will often damage touchscreens or result in poor compliance rates.

Since 2014 a number of countertop UV solutions have been introduced to address this challenge. This guide is designed to help stakeholders critically evaluate claims made by manufacturers and understand the impact that different features can have on effective hospital implementations.

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**Note:** The terminology and standards in this guide are applicable to facilities in the USA and Canada.

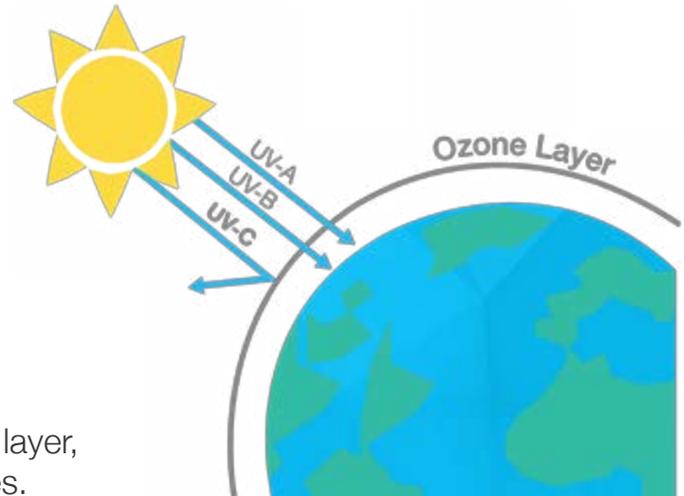
# 1. The Science of Ultraviolet (UV) Light

## What is UV Light?

Germicidal UV has been used in healthcare, food processing, and biotech for over 30 years. UV light is categorized according to wavelength:

- UV-A: 400-320nm (nanometers)
- UV-B: 320-280nm
- UV-C: 280-100nm

UV-C light, which is normally blocked by the ozone layer, can be used to deactivate bacteria, viruses & spores.



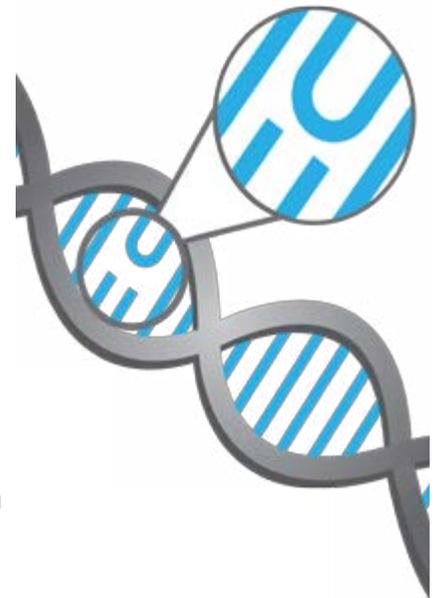
## How Does UV-C Kill Pathogens?

UV-C light disrupts the DNA of pathogens, destroying their ability to function and to replicate. It does not physically remove the cells. This technology works by line of sight, so the light must reach a surface in order for bacteria or spores to be de-activated.

[See this article](#) for a full explanation on germicidal UV.

## Useful Facts about UV Light for Mobile Devices

- UV light won't harm touchscreens, cameras, or IR sensors. It can accelerate natural aging of white plastics (similar to being left out in the sun). You should confirm with each manufacturer that they've conducted accelerated materials testing.
- UV is optimal for hard, non-porous surfaces. It is unlikely to be 100% effective on fabrics.
- Bioburden (ie. skin cells, fingerprint oils and other substances) can shield pathogens from UV light. It's important to ensure that efficacy testing includes bioburden. Otherwise, disinfection may only be achieved if devices are wiped down prior to every use cycle which can negate some benefits of using UV light.
- In the event that a device is heavily soiled (aka blood spatter or accumulated proteins) facilities should provide a way for staff to wipe down the device prior to UV disinfection that doesn't rely on harsh chemicals (ex. a damp microfiber cloth).



## 2. Categories of Desktop & Countertop UV Solutions

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Countertop UV disinfection solutions can be placed into three broad categories:

▶ **Rapid Disinfection.** These solutions are designed to integrate into the daily workflow of hospital staff, patients and visitors. Specifications typically include:

- 30-75 second cycle time
- 1-4 phones or tablets sanitized at once
- No device charging due to fast cycle time

*Solutions include but are not limited to: CleanSlate UV, ReadyDock® DUO, PhoneSoap® Med+, AUVS, and Sky 7xi®. Claims between systems vary.*

▶ **Terminal Disinfection.** With a cycle time of 5-15 minutes, these solutions are designed to sanitize while devices are charging. They typically add value via device management features and can be paired with rapid disinfection solutions. Most solutions have a 5-10 device capacity.

*Solutions include but are not limited to: SealShield ElectroClave® and ReadyDock® RD5.*

▶ **Consumer Sanitizers.** These systems are typically sold direct to consumer. They have a cycle time of 5-15 mins, charge devices while sanitizing, and kill ~99.9% of household bacteria. They are inexpensive but often lack the efficacy of hospital-grade UV sanitizers.

*Solutions include but are not limited to: PhoneSoap® 3.0, PhoneSoap® XL, and LeadYoung UV.*

### 2.1 Should You Use Rapid or Terminal Disinfection? Or Both?

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This decision typically comes down to workflow and desired impact. As outlined above, rapid disinfection solutions are designed to quickly sanitize staff and visitor devices as they walk throughout a hospital or department. They allow frequent and consistent disinfection, addressing infection control concerns throughout a shift.

If you plan on frequently returning devices to charging bays and want to leverage that downtime for secondary disinfection, a terminal disinfection solution may be effective.

Facilities will sometimes deploy a rapid disinfection solution across multiple departments while also leveraging terminal disinfection for specific 'frequent charge' deployments.

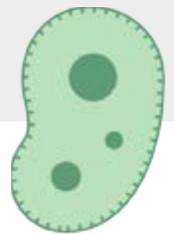


### 3. Key Questions When Evaluating a Solution

Several countertop UV solutions have come to market in the past three years - many making similar claims with regard to efficacy, workflow and overall infection control.

To choose the optimal UV system for your facility, ask yourself these questions:

- A. *What Are the Assumptions Within the Efficacy Claims?*
- B. *Are There Proper “Instructions For Use” On the Device?*
- C. *What Kind of Safety Certifications Does the Product Have?*
- D. *Is the Product Easy to Use? Is it Visitor Friendly?*
- E. *Do You Want to Log & Track Compliance?*
- F. *Does The Product Support Broader Infection Control Goals?*
- G. *What Are The Maintenance Requirements?*



#### A. What Are The Assumptions Within The Efficacy Claims?

Efficacy claims are the most important factor to critically examine. Several UV sanitizers on the market, especially those being sold at lower price-points, have assumptions built into their efficacy testing regimes that can skew results.

The first thing you should do is request a copy of 3rd party lab testing. The testing protocols should be based off of ASTM E1153, the same standard used by chemical disinfectant wipes. This is an EPA recognized standard for efficacy claims on non-food contact surfaces.

When you examine the efficacy data itself, be on the lookout for:

- **Testing times different than the default cycle time** (ie. Testing conducted with 60 second UV exposure but the product’s default cycle is 30 seconds).
- **No simulated soiling.** Several UV solutions test without 5% soil present, which means they are assuming that the devices will be wiped down prior to UV disinfection.
- **UV coverage.** If the solution uses a metal mesh basket, this will affect efficacy. Light cannot deactivate bacteria that it cannot reach.
- **Pathogens tested.** Some pathogens (ie. *C. Difficile spores*) are more difficult to deactivate with UV light. Ensure manufacturers have run individual tests against all claimed superbugs.

**THE BOTTOM LINE:** Manufacturers can manipulate several variables to make a product seem more effective than it is. Ensure the product’s claims align with the default use case and check that log-kill claims are externally proven using EPA recognized standards.

## B. Are There Proper “Instructions For Use” On the Device?

UV light is effective through line of sight. If users are not clearly instructed on device placement, devices may touch or overlap, undermining the solution’s effectiveness. Additionally, UV light is not suitable for semi-critical or critical medical devices. This should be made 100% clear via signage on the device.

User instructions should be clearly visible in order to ensure the safe and effective use of the product, especially if visitors will be allowed or encouraged to use the product.

### *Example Safety Label*

*ATTENTION: Do NOT Sanitize  
Critical or Semi-Critical Items.*

## C. What Kind of Safety Certifications Does the Product Have?

Hospital environments demand rigorous product certifications. It’s important that any solution leveraging novel technology adheres to established UL/IEC product safety standards.

If you’re deploying countertop UV in a hospital there are three standards you should be aware of:

- **Electrical safety UL 61010-1.** This is a safety standard recommended for hospital & biotech equipment. It ensures the product is safe and can withstand the rigors of daily hospital use.
- **UV safety IEC 62471.** This is especially important for countertop UV solutions. It ensures that the UV light is contained and that users are protected from accidental exposure.
- **EMC/EMI Safety.** The standard for lab equipment is IEC 61236 or FCC Part 15 Subpart B. This will ensure the product doesn’t generate magnetic noise that could impact other devices.

Ensure that the certifications were conducted by an accredited test lab (UL, TUV, CSA, etc) and always ask for a copy of the certifications for review by your staff.

## D. Is the Product Easy to Use? Is it Visitor Friendly?

One of the primary challenges with chemical wipes is that people simply don’t want to use them on expensive devices - especially visitors and patients. Hospitals are turning to countertop UV to encourage more frequent disinfection without corrosive chemicals.

Look for products that are intuitive and require little-to-no training. This is especially important if you’re planning to have patients and visitors use the disinfection solution regularly. Ensure the signage on the product provides clear and simple instructions.



## E. Do You Want to Log & Track Compliance?

One of the disadvantages of manual wipes is not being able to log usage and track compliance. Several UV solutions can be equipped with RFID technology, which logs each time a hospital-owned device is sanitized. By tracking what devices are sanitized and when, you can monitor compliance and produce records of disinfection (which can be useful during JCAHO audits).

When evaluating an RFID-enabled solution you will want to ask:

- Is compliance logging automatic or does it require an extra user step? (ie. Are the RFID tags scanned during disinfection, or does the user have to tap a separate reader?)
- Does the solution assume staff-owned devices will be linked to the compliance system? This is often difficult from a privacy and enforcement perspective.
- Does the solution use any built-in functions that are usually disabled on hospital-owned devices for security reasons (ie. NFC)?
- Does the solution include a web dashboard and/or email reporting function? This will decrease the time required to monitor compliance.



## F. Does The Product Support Broader Infection Control Goals?

**Reducing bacterial loads on mobile devices is often a standalone goal. But UV solutions can also support broader infection control initiatives.**

First, you want to ensure the solution is fast enough to use while washing or sanitizing hands. Speed is a driving factor in compliance, especially if your department mandates device disinfection when you enter or exit. *This is why it is important to verify that default cycle times align with efficacy data.*

Second, **you'll want to ensure that you can retrieve devices without re-contaminating your hands.** If a user has to grab a handle or open a slot to retrieve their device, this can spread bacteria to clean hands and undermine the entire process.



## G. What Are The Maintenance Requirements?

UV bulbs degrade over time and will need to be replaced. You will want to ensure that bulbs can be quickly replaced. Look for solutions that allow hospital staff to replace bulbs with minimal training or labour. Some solutions require costly external technicians or depot maintenance, which is something you should ask manufacturers about.

## Conclusion

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Mobile device hygiene is a growing challenge in healthcare. Countertop UV disinfection can be a fast and effective solution to this challenge - but not all solutions are created equal.

We hope this guide was helpful in explaining some of the questions and criteria that your facility should consider when evaluating a UV solution for tablets, phones & other hospital devices.

Our team at CleanSlate UV has been working since 2014 to provide *intuitive, quick and effective* solutions that are proven to eliminate pathogens on mobile devices.

In the course of our product development and efficacy research we have consistently utilized the most rigorous testing standards and assumed worst-case user scenarios. This has resulted in a product that is now trusted in the healthcare, food processing, and biotech production facilities.

If you're interested in learning about how we can assist your facility in de-risking the use of mobile devices, [please get in touch.](#)



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# Appendix: Sample Evaluation Checklist for Rapid Disinfection

<b>Efficacy</b>	<b>Y/N</b>
Has the UV solution been tested according to ASTM E1153 or another EPA-recommended standard for non-food contact surfaces?	
Does the testing regime include simulated bioload/soiling (ie. 5% FBS)?	
<b>If not</b> , does the solution advertise that devices need to be wiped down prior to each cycle?	
Does the cycle time in the efficacy report match the product's default cycle time?	
Does the solution provide 360° UV exposure without interference from parts of the tray (ie. metal mesh)?	
Has the manufacturer tested their solution against each claimed pathogen in individual tests?	
Does the solution actively monitor bulb status to ensure sufficient UV exposure?	
<b>Instructions for Use</b>	<b>Y/N</b>
Does the solution instruct users how to place devices within the chamber to ensure effectiveness (no devices touching, screens visible, etc)?	
Does the solution clearly state what types of devices <b>are not suitable</b> for UV-C disinfection?	
<b>Certifications</b>	<b>Y/N</b>
Has the solution been certified to electrical equipment safety standard UL 61010-1 or UL 60601-1?	
Has the solution been certified to IEC 62471 for UV safety?	
Has the solution been certified to IEC 61236 or FCC Part 15 Subpart B to ensure the EMC/EMI from the solution won't interfere with sensitive hospital equipment?	
<b>If no to any of the above</b> , are there other globally recognized standards the solution is certified to for use in a lab/medical environment?	
Has the certification been completed by an accredited testing laboratory?	
<b>Maintenance</b>	<b>Y/N</b>
Can bulb replacements be performed in under 10 minutes?	
Can bulb replacements be conducted by hospital staff with minimal or no training?	
<b>Usage</b>	<b>Y/N</b>
Do you intend to have the solution regularly operated by untrained users?	
<b>If yes</b> , is the solution intuitive enough to use without training? Does it have clear, simple user instructions?	
Is the solution's cycle time fast enough to integrate into nurse or doctor workflow?	
Is the solution's tray large enough to sanitize an array of different shaped portable electronics?	
Is the solution durable enough for a healthcare environment?	
<b>Compliance Tracking</b>	<b>Y/N</b>
Is monitoring the usage and compliance rate of mobile disinfection important to you?	
<b>If yes</b> , are devices automatically scanned each cycle without requiring the user to take an extra step?	
Does the solution include an online dashboard or email reporting that can easily present analytics?	
<b>Broader Infection Control</b>	<b>Y/N</b>
Is the solution fast enough to align with washing or sanitizing your hands?	
Does the solution allow for touch-free retrieval of devices after disinfection to eliminate cross-contamination?	
Can the solution be easily paired with a hand sanitizer?	
Does the solution encourage users to wash or sanitize their hands while devices are being sanitized?	

*This is provided as a template for infection control managers, nurses, purchasers and biomedical engineering. The criteria on this checklist are not exhaustive and may vary from facility to facility. To receive a .docx version please contact CleanSlate UV.*