



CADWELL WHITEPAPER

THE CASE FOR SINGLE-USE, DISPOSABLE EEG CUP ELECTRODES

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SEMI-CRITICAL CARE AND DISINFECTION

EEG and EP electrodes and their lead wires are categorized as semi-critical patient care items because they may come into contact with mucous membranes (nose, mouth, eyes, etc.) or non-intact skin (as in skin that has been prepped using an abrasive to lower impedance).

Semi-critical items require high level disinfection, which warrants autoclave or 10 to 30 minutes of full liquid immersion in an EPA-approved high-level disinfectant chemical sterilant.

"High-level disinfection of semi-critical patient care items cannot be achieved by a spray or wipe method."¹

THE LARGEST OUTBREAK OF HEPATITIS B IN A HEALTHCARE SETTING WAS ATTRIBUTED TO OUTPATIENT EEG LABS

A chief technician with a high viral load and inadequate infection control practices in the six partner clinics were responsible for what is probably the largest documented outbreak of Hepatitis B in a health care setting.

14,000 cases of Hepatitis B were acquired from 1991 to 1996 at six EEG labs owned by the same physician and chief technician, with one death reported during those five years. Centers for Disease Control and Prevention report that HBV can live on an inanimate surface for one week.

Hepatitis B virus (HBV) is transmitted primarily by sexual contact and intravenous drug use. Transmission in a health care setting occurs through contact with blood from an infected patient or health care worker, usually via a needle-stick injury.¹

OSHA's Standard Precautions and Body Substance Isolation includes all body fluids and substances. As this is federal law, **a neurodiagnostic technologist may not elect to provide a lower level of disinfection for electrodes.**¹⁸



HEALTHCARE ASSOCIATED INFECTION CONTROL

To improve the standards for health, the risk of healthcare associated infection (HCAI) must be reduced, the risks associated with the use of medical devices must be minimized, and all reusable medical devices must be properly decontaminated.

Cleaning a patient's skin to prep them for EEG may break the skin. "Many reusable electrodes, deemed clean and ready for the next patient, could still harbor harmful pathogens."² "Any breach of the epidermis, even with only slight rubbing to lower electrode impedance, predisposes the skin to leakage of tissue fluid that may become contaminated and provide a medium for cross-infection."³

"Use single use, disposable items whenever possible." Additionally, "When considering disposable versus reusable items, look at the quality of the products, the personnel and time needed for reprocessing, safety, life of the reusable item, cost, reprocessing time for sterilization, frequency of use, problems associated with disposal of products, and storage space. Resterilization of items can be expensive when considering the time required to clean and package items, and the cost of the sterilization method used."⁴

"Develop good habits; wear gloves for patient preparation, electrode application, maintenance, and removal. Skin preparation agents contain an abrasive element that scrapes the skin and breaks the surface, creating non-intact skin and the risk of BBP. Ungloved hands that also have non-intact skin from chapping, chaffing, or hangnails are a port of entry or exit for microorganisms."⁵

Do no harm. "Be mindful for the higher incidence of acutely and chronically ill, as well as immuno-compromised individuals who enter our workplace as outpatients."⁶ "Newborn infants are at increased risk for development of infection, and premature, low-birthweight infants are at greatest risk."⁷

FOLLOW THE RESEARCH

The case for switching from reusable EEG cup electrodes to disposable EEG cup electrodes is based on multiple studies and the demand for Universal Precautions within the workplace. "Use of single-use electrodes and research on scalp infection and infection reduction interventions are warranted."⁸

In a multicenter study, 22.6 % of cleaned reusable EEG cup electrodes and lead wires were found to contain bacteria that were potential risk or at risk for infection, including MRSA and Chicken Pox.⁹



CLINICAL AND FINANCIAL IMPLICATIONS

PATIENTS WITH HEALTHCARE ASSOCIATED INFECTION (HCAI) COST 2.8 TIMES MORE PER CASE TO TREAT, STAY IN HOSPITAL 2.5 TIMES LONGER, AND ARE SEVEN TIMES MORE LIKELY TO DIE.¹⁰

"USE OF SINGLE-USE EEG CUP ELECTRODES MAY BE ASSOCIATED WITH OVERALL HOSPITAL SAVINGS."¹⁷



PROPER HANDLING OF REUSABLE EEG CUP ELECTRODES

REDUCE INDIRECT CONTACT INFECTION TRANSMISSION RISK FOR PATIENTS AND STAFF MEMBERS.

- Follow ASET Procedures: Skin Safety During EEG Procedures – A Guideline to Improving Outcome and its Addendum: Neonatal Continuous EEG.
- A small amount of skin preparation materials should be placed in a single-use container.¹¹
- “Isolate contamination... Sheathe electrodes in a paper towel and then remove your gloves. If carrying used electrodes to another area for disinfection you may wear clean gloves. The contaminated electrodes must be contained in a manner so they are not in contact with the air and not directly visible.”¹²
- “Dirty electrodes must be contained (covered) and go directly to the dirty utility area for processing. The sink used to disinfect cannot be in the patient testing area. The sink used to disinfect cannot be in a clean storage area.”¹⁴
- “Items may not be left soaking after shift ends. All items should be cleaned and disinfected and not left soaking overnight. Disinfectant may not be left in the container unless container is covered, marked, and testing daily for potency.”¹⁵
- Follow disinfection protocol (*see Excerpt from Infection Prevention, page 6*) and use FDA-cleared high-level disinfectants.

USE THE PROPER DISINFECTION, FOLLOW MIXING AND ACTIVATION INSTRUCTIONS CAREFULLY, AND ENSURE YOUR STAFF KNOWS IF THE DISINFECTANT IS HARMFUL.

- Safety glasses (in addition to personal eyeglasses, when worn) must be worn when scrubbing electrodes and pouring or emptying disinfectant.
- Dilution may yield high, intermediate-high, intermediate, or low levels of disinfectant. For example, the shelf life of unopened bleach is one year, but the potency (useful life) of bleach is only four weeks from uncapping, which impacts correct concentration levels. Additionally, a mix of potent bleach with water for high-level disinfectant 0.1% sodium hypochlorite must sit undisturbed for 30 minutes prior to use in order for the chlorine to become free.¹³

EXCERPT FROM INFECTION PREVENTION: 2013 REVIEW AND UPDATE FOR NEURODIAGNOSTIC TECHNICIANS¹⁶

Neurodiagnostic staff must know the steps to disinfect their work areas, and these steps should be written in the department's procedure manual.



1

Isolate contamination, especially if moving items to a different area for cleaning. Sheathe electrodes in a paper towel and then remove your gloves. You cannot wear gloves in the hallway, so must remove your used gloves before leaving the work area. However, if carrying used electrodes to another area for disinfection you may wear clean gloves. The contaminated electrodes must be contained in a manner so they are not in contact with the air and not directly visible.



2

Once in the cleaning area, wear gloves throughout the cleaning and disinfecting process.



3

Clean the items before disinfection. All traces of collodion, paste, or other soil must be removed.



4

Disinfect for the proper contact time. This means all facets of the item must stay wet for that length of time. This can only be accomplished by immersion. Remember to include any brushes used for cleaning.



5

After the initial cleaning and during the disinfection soak, wipe down wires and jackbox [headbox] with a hospital grade low level disinfectant or wipe.



6

Wipe any reusable prep tools (tape measure, marker, combs, hair clips), prep cart (including drawer pull), and anything that may have been touched during patient prep.



7

Remove gloves and wash hands.



8

After the disinfection time has been met, rinse electrodes with water. Dry, or allow to air dry.



9

Remove electrodes from dirty utility area (clean items cannot be stored in the area used to clean).



10

Some busy labs have employees initial and date the electrode sets they have disinfected for quality assurance measures.

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