

TABLE 1

Panel A. The findings of Meyers et al. (2014)⁷:

- Developed a hitherto lacking method for the *in vitro* replication of native (authentic, tissue-derived) infectious virions of HPV;
 - Notes that, traditionally, high-level disinfection is expected to inactivate all viruses;
- Studied the susceptibility of HPV (type 16) to 11 disinfectants, including three commonly used, FDA-cleared high-level disinfectants: 2% glutaraldehyde (Cidex), 3.4% glutaraldehyde (Cidex Plus), and 0.55% *ortho*-phthalaldehyde (Cidex OPA);
 - Reported that the infectivity of HPV (type 16) was not significantly reduced by any of the tested glutaraldehyde or *ortho*-phthalaldehyde solutions when each of these FDA-cleared high-level disinfectants is used according to its respective labeling;
 - Found that the tested 0.55% *ortho*-phthalaldehyde and 3.4% glutaraldehyde solutions (and presumably, the 2% glutaraldehyde solution, too) to be ineffective for the inactivation of HPV (type 16) *even* during an exposure time of 24 hours;
 - Raises concerns about the effectiveness of these three FDA-cleared solutions for the high-level disinfection of semi-critical devices that may be contaminated with HPV; and
 - Discusses the possibility of HPV transmission via medical instruments (e.g., intracavitary ultrasound probes) that are routinely “high-level disinfected” using any of these three tested glutaraldehyde and *ortho*-phthalaldehyde solutions; and
- Reports that, to date, no high-level disinfectant has been shown to reduce the infectivity of HPV when used according to its FDA-cleared labeling;
- Concludes that several disinfectants currently used in healthcare settings may not be effective for the inactivation of infectious HPV on environmental surfaces;
- Of the remaining 8 tested disinfectants, also studied were the susceptibility of HPV (type 16) to 1.2% peracetic acid-based and 0.525% hypochlorite solutions.
 - Reported, in contrast, that both of these solutions inactivated HPV (type 16) and may be suitable for environmental disinfection (but not for disinfecting reusable semi-critical devices, because neither solution is cleared by the FDA for high-level disinfection and both may present some materials’ incompatibility⁸).
- Recommends revision of current infection-control practices to address concerns that HPV may not be adequately inactivated by all types of disinfectants;
- Found HPV “quasivirions”^{*} to be generally more susceptible to disinfection than “organotypic” (i.e., native, authentic, tissue-derived) viral particles;

^{*} In this context “quasi-virions” (or pseudo-virions) refer to HPV particles that are spontaneously assembled from artificially expressed proteins and DNA.⁸

- Concludes, therefore, that the use of quasivirions to evaluate a disinfectant's effectiveness, at least for the inactivation of HPV (type 16), may yield inaccurate results;
- Suggests, therefore, that the efficacy claims of disinfectants be based on testing using the more resistant native HPV virions.⁸