Reviewer’s report

**Title:** Comparative cost-efficiency of EVOTECH ECR versus Medivator DSD-201 in a real-world Canadian hospital endoscopy setting.

**Version:** 2  **Date:** 4 February 2011

**Reviewer:** Lawrence Muscarella

**Reviewer’s report:**

February 4, 2011

Discretionary revisions:

1. The manuscript states: “Due to the increased manual wear and tear on endoscopes with manual brushing, scopes would have to be replaced and/or repaired more frequently.” The authors are respectfully asked to include a reference in the manuscript documenting this statement’s validity.

2. The authors of this manuscript are respectfully asked to explain why for the Evotech device (and the Medivator device) the median time required to reprocess colonoscopes (37.42 minutes) listed in Table 2 was longer than to reprocess bronchoscopes (36.04 minutes). Might this difference be due to the physical complexity of the former and the relative simplicity of reprocessing the latter?

Moreover, the authors of this manuscript are respectfully asked to explain why the difference in the time required for the Evotech and the Medivators devices to reprocess colonoscopes is significantly greater (12.46 minutes) than for reprocessing bronchoscopes (5.66 minutes).

3. The manuscript’s page 4 states: “As a result, the SGNA states that, ‘inadequate cleaning of endoscopes has been one factor cited in transmission of infection by flexible endoscopes.’” The authors are asked to supplement this reference by including another citation to a clinical report that linked inadequate cleaning of GI endoscopes or another type of flexible endoscope to disease transmission.


4. The manuscript’s page 5 states that the Evotech reprocessing system is the
first system to both clean and high-level disinfect endoscopes. The authors are respectfully asked to clarify and modify the text to be more accurate. Although the Evotech is indeed the first (and, to date, only) device cleared by the FDA to eliminate manual pre-cleaning of the endoscope prior to its automated processing, it is not the first device used in Canada or cleared by the FDA as a “washer-disinfector.” Other devices prior to the commercial distribution of the Evotech have been available for cleaning and high-level disinfecting endoscopes (but not for eliminating manual pre-cleaning of the endoscope).

5. Reviewer’s commentary: The authors acknowledge an important limitation of their study, that: “an evaluation of the effectiveness of reprocessing scopes in EVOTECH ECR versus Medivators DSD-201 could not be incorporated in conjunction with the time and motion study.” This is important to have noted, because an automated reprocessing device might be considerably more efficient to operate, but this apparent advantage is an obvious safety hazard if the device renders the processed endoscope less clean and more likely to transmit disease. It is true that, in general, comparisons of the effectiveness of different automated endoscope reprocessors requires some type of an evaluation of their comparative clinical effectiveness. This reviewer has previously reviewed evaluations of the effectiveness of automated endoscope reprocessors, one of which can be download and read at: <www.myendosite.com/htmlsite/2008/sleepingdogs2.pdf>.

6. Table 5 of the manuscript states: “Cidex OPA in ultrasonic.” The authors are asked to clarify this statement’s meaning, understanding that the Medivators DSD-201 is not equipped with ultrasonic technology.

Minor essential revisions:

1. The authors are respectfully asked to comment briefly on whether the data, results and conclusions of their study – namely, that the Evotech, compared to the Medivators DSD-201 reprocessing device, was more efficient and less costly to use – might apply to other marketed automated reprocessing devices.

That is, the authors are asked to briefly discuss in the manuscript whether they would expect the Evotech to be “more efficient and less costly to use for the reprocessing of endoscopes” than (in addition to the Medivators DSD-201) every other automated reprocessor on the Canadian market (e.g., the STERIS Reliance EPS, or another of Medivators’ several marketed automated endoscope reprocessing models). Or, are the authors aware of any exceptions, namely, any automated reprocessors that might be more efficient and less costly to use than the studied Evotech device itself?

2. The study uses for its calculations a technician wage of $22.20 per hour. It also states that: “All cost figures are reported in Canadian dollars.” The authors are asked to briefly apply their results to the U.S. and discuss, for example, how this rate of $22.20 per hour in Canada might compare to labor costs in the U.S., whether this manuscript’s results, cost analysis, and conclusions are unique to Canada, and whether the manuscript’s conclusions might change significantly if
applied to the labor costs in the U.S.

3. The authors state that “once (the endoscope was) placed in the reprocessors, the actual length of each reprocessing period was not timed because it was not practical to do so.” The authors are respectfully asked to explain further and discuss why this measurement was impractical.

4. What immersion time did the authors use for the Cidex OPA solution to calculate the reprocessing times and efficiency associated with the Medivators DSD-201, 5 or 12 minutes, or another comparable time? Mentioning this time in the manuscript is recommended.

Major compulsory revisions:

1. This study’s data and calculations showing that the “total time to reprocess all scope types was statistically significantly shorter in the EvoTech ECR compared with Medivators DSD-201” appear reasonable and sound. But the study’s assignment of a monetary value (in Canadian dollars) to this time saved, and its conclusion that the annual costs of using the EvoTech ECR are less than the Medivators DSD-201’s, based on this study’s translation of the saved time associated with personnel reprocessing endoscopes (i.e., the Evotech’s improved time efficiency) directly to an amount of saved money per year, is less convincing.

Specifically, the study’s “Methods” section states: “A time and motion study was conducted at a Canadian hospital to collect data on the personnel resources, consumable supplies, and capital equipment costs associated with the use of EVOTECH ECR and Medivators DSD-201.” Further, this study states: “The purpose of this economic evaluation was to determine the cost-efficiency of using the EVOTECH ECR versus another disinfection system, Medivator DSD-201, by comparing the total costs, including labour and consumable supplies, involved in using each reprocessor in an actual clinical practice setting in Canada.”

Respectfully, however, would not an important – arguably, an essential – component of these “capital equipment costs” and “total costs” be the initial purchase price of each of these two capital-equipment devices? It seems reasonable that the validity of the manuscript’s conclusions and of its comparison of the “total costs” of the Evotech reprocessing device, compared to the Medivators, would require that this study’s calculations also have included the initial cost (e.g., $XX,XXX) of each device (possibly normalized as an additional itemized annual cost in Table 7).

This point is well-taken, because the manuscript states that: “The value of the total time saved every day with EVOTECH ECR (6.2 hours) was $138.41 per day and $35,987 per year.” If the Evotech were to have an initial cost that was significantly higher than the Medivators’, say, $20,000 more, then this noted amount of $35,987 saved per year by using the Evotech might be offset or altogether mooted, significantly diminishing the potential impact of this calculation and any conclusions that are based on it.
According to a recent publication (Footnote A), the Medivators DSD-201 has a purchase price of no more than $36,320, whereas a similar document by the same committee published in 2009 (Footnote B) lists the Evotech’s purchase price of $57,000 – a difference of almost $21,000 that would appear to diminish the significance of the manuscript’s statement that: “The analysis showed that the value of the time saved would be about $35,987 per year in a technician’s salary”; or its statement that “The Evotech was … less costly to use for the reprocessing of endoscopes than the Medivators DSD-201.”

Gastrointest Endosc 675-80)

Gastrointest Endosc 671-6)

The authors are therefore respectfully asked to explain in the manuscript why Table 7’s “total cost” calculations do not include the purchase price of each reprocessor (and, if relevant, why this table also does not include the approximate annual cost of labor and materials to maintain each device in working order as might be associated with, or required by, a manufacturer’s annual or quarterly preventive-maintenance policy or contract, which is independent from the costs of replacing the devices’ water filters, to ensure that the terms of their manufacturer warranties are not voided).

2. The manuscript’s Table 5 lists the following reprocessing products and prices for reprocessing endoscopes in the Medivators DSD-201: “Fibertech Enzymatic soap (4L)”: $0.70 (cost per scope) and $7,207.53 (cost per year); and “Cidex OPA”: $4.15 (cost per cycle) and $42,822.86 (cost per year).

The authors are asked to perform the same calculations, and to discuss in the manuscript the implications of, using another, less expensive disinfectant (and detergent), such as 2% glutaraldehyde – unless it is required in Canada that the Medivators device use these, and only these, two products (Fibertech Enzymatic soap and Cidex OPA).

It may be that the authors chose to use Cidex OPA for their calculations associated with the Medivators device because, presumably to compare apples to apples, it is a similar type of product to that used by the Evotech. But, this would not be an entirely valid argument, because the Cidex OPA product used by the Evotech is unique, cleared by the FDA only for use with the Evotech, and a single-use concentrate. In contrast, the Cidex OPA product that the Medivators device uses is, like the less expensive 2% glutaraldehyde, a reusable, multiple-use product (not a concentrate) that can be used with several other automated reprocessors, too.

Therefore, because performing the calculations for the Medivators device using the more expensive Cidex OPA (compared to 2% glutaraldehyde) might
introduce a measurement bias, the authors are respectfully requested to perform a similar set of calculations using 2% glutaraldehyde (in addition to Cidex OPA) and include these calculations (or, at least, discuss them) in the manuscript if the result of such a calculation could affect the manuscript’s conclusions, which seems likely.

3. The authors are respectfully asked to clarify whether the EvoTech (and Medivators) reprocessing device can reprocess ERCP side-viewing duodenoscopes (with an exposed wire channel), double-channel colonoscopes, enteroscopes, and ultrasound gastrovideoscopes. If the Evotech cannot reprocess at least one of these types of GI endoscopes, then the authors are asked to discuss the relevancy of this limitation vis-à-vis their manuscript and how this limitation might affect their study’s data and conclusions claiming the enhanced efficiency of the Evotech, compared to the Medivators device.

This clarification raises at least two additional points that, too, might have impact on the manuscript’s conclusion that “the EvoTech ECR was more efficient and less costly to use for the reprocessing of endoscopes than the Medivators DSD-201 in this actual practice study conducted in a high-volume endoscopy unit.” Namely, the authors are similarly asked to discuss the relevancy and potential effect on their manuscript’s results and conclusions of a medical facility that, first, unavoidably uses endoscopes on patients during emergency procedures (i.e., patients were not properly prepped prior to the procedure); and, second, cannot always avoid reprocessing soiled endoscopes more than one hour after their clinical use.

Both scenarios would seem at the very least to require of the Evotech the same manual endoscope pre-cleaning steps as required of the Medivators, an acknowledgement with financial implications. The authors are asked whether this acknowledgment for these two scenarios could substantively alter the manuscript’s conclusions and might cause the Evotech device to become, at least for these two scenarios, less efficient and more costly to use for endoscope reprocessing than the Medivators device.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I am employed by Custom Ultrasonics, a manufacturer of automated endoscope reprocessors, some models of which are in potential competition with the Evotech ECR and the Medivators DSD-201.