Gas Man® simulation graphics improved for free teaching and learning

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Background/Introduction: Gas Man is a computer-based simulation that demonstrates inhalation anesthesia pharmacokinetics. The interactive Picture window allows users to carefully control the administration of anesthesia, just as they would clinically. With the Gas Man Graph, users can monitor the effect of anesthesia over time. They can also analyze and compare various situations utilizing the unique Overlay feature. To distinguish experiments within the Overlay, each anesthetic option is designated a different default color.

Methods: We used Gas Man's color capability to augment simulation visuals, increasing the ease with which users can differentiate experiments in the Overlay. If a set of exercises involved one anesthetic with varying parameters, each experiment's color was changed according to our new color scheme – the rainbow color code plus black as the first color (BROYGBV). The assigned color of each condition was based on chronological order of the exercises. If a simulation showed cost savings, it was colored green. To include Simulation Descriptions for every experiment, we created descriptions based on the Observations and Discussions in the Gas Man Workbook. The descriptions typically explained significant findings, concepts, and conditions of the exercise. We accessed the Simulation Description tab under "File" and inserted the description into the textbox. Lastly, we closely followed the Gas Man Workbook to simulate and save every exercise as a .gas file, with the above improvements implemented.

Results: We completed careful capture of all Gas Man Workbook exercises. We produced color accentuated educational paradigms and incorporated individualized exercise descriptions.

To compare the cost to reach 1 MAC in Exercises 14-1 and 14-2, we designated the color black for 14-1 and the color green for 14-2 (Figure 1). It is evident that the green curve has a much lower slope than the black curve, indicating that low fresh gas flow is more cost effective. The Simulation Description for Exercise 14-2 identifies exercise-specific elements and summarizes the main takeaway (Figure 2).

The simulations can be played back via the free Student Edition of the Gas Man program. These are posted on www.medmasimulations.org/education.
Register to get the Student Edition and have access to those simulations saved as .gas files.

Conclusions: We concluded that creating color-coded exercises and Simulation Descriptions enhanced the Gas Man experience for learners and teachers. The color scheme visually distinguishes experiments for easy comparison, and the Simulation Descriptions concisely convey key concepts and results for each exercise.

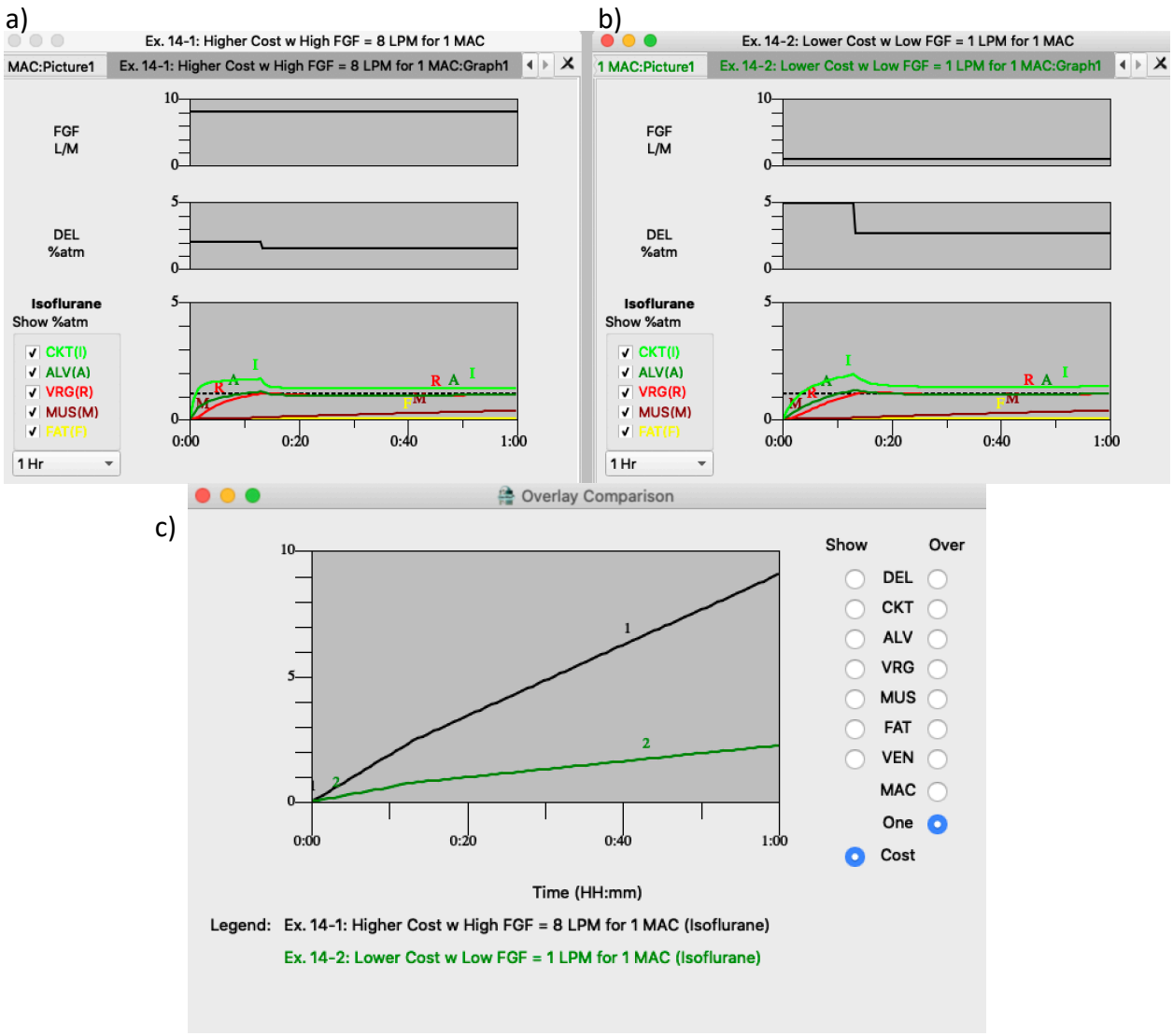

Figure 1. (a) Individual Graph of Exercise 14-1. (b) Individual Graph of Exercise 14-2. (c) Overlay of Gas Man® Exercises 14-1 and 14-2 comparing cost of isoflurane. The colors help differentiate between high FGF (black) and low FGF (green). To achieve and maintain 1 MAC, low FGF is much more cost effective.

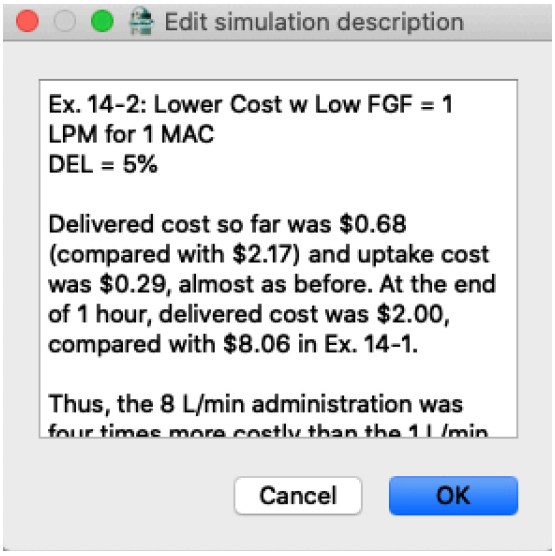

Figure 2. A portion of the Simulation Description for Exercise 14-2.