

ABSTRACT TITLE: INTRODUCING GAS MAN ONLINE

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Introduction: Gas Man is a desktop application which is widely distributed as a simulation software to teach anesthesia residents and students inhalational gas pharmacokinetics [1] and has found clinical application in pharmacology research [2]. Since its initial development in 1982, the application has evolved and is now commercially available for Microsoft Windows and Apple macOS users. In order to perpetuate the use of this application, we are converting the current application to an open web app.

Methods: The original application was written in C++ using the Qt platform to allow for development in both operating systems. The code was first updated to run on a modern Linux/Ubuntu operating system. Qt for Webassembly (Wasm) module was then used in order to run the application directly in the user's browser with minimal changes to the original source code. Wasm enables deployment on the web for client and server applications and is present in all four major web browsers [3].

Results: The Qt Webassembly module allowed for the creation of standard web files such as HTML, JavaScript, and a binary file that is compiled by the host server. These files are stored locally on the server space and are accessible online. The new web app has a similar look and feel to the original desktop application (Figure).

Conclusion: This new non-desktop way of using Gas Man will make the application more accessible to users in tightly controlled hospital environments. Gas Man Online can be viewed on any web-connected device without the need to download or install additional files. The source code for this new application will be publicly released to allow for community-supported improvements.

References:

1. Tapia D, Survey on use of pharmacokinetic simulation software for anesthesia resident education. Montreal Canada, International Anesthesia Research Society (IARS) Annual Meeting, 2014.
2. Bouillon T, Shafer S. Editorial – Hot air or full steam ahead? An empirical pharmacokinetic model of potent inhaled agents. *Brit J. Anaes.* 2000;84:429-431.
3. Webassembly. <https://webassembly.org/>. Accessed: November 10th 2022

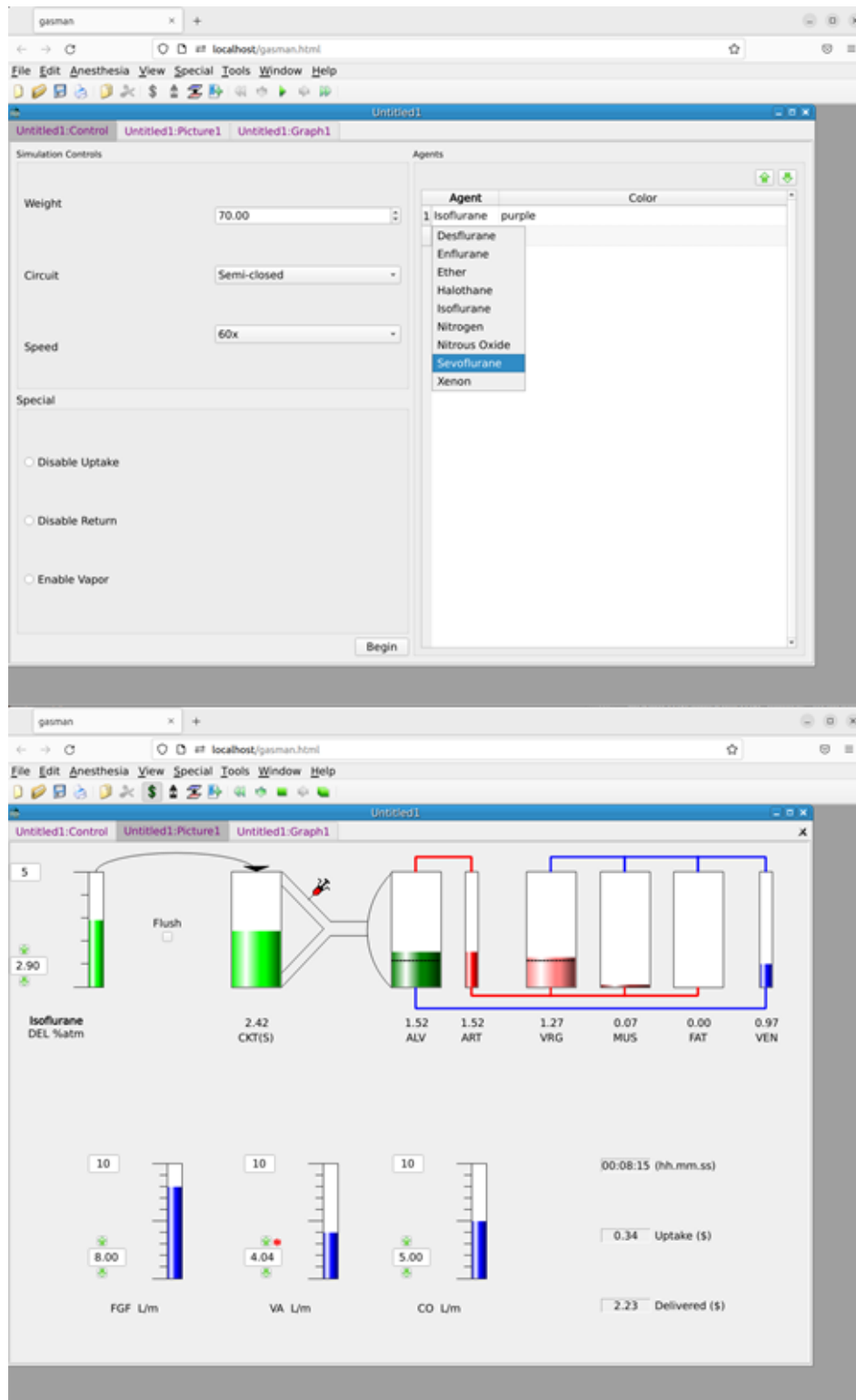


Figure: The following images show the application running in the Firefox web browser. The top figure shows the initial control screen. The bottom figure shows the inhalational gas distribution in the different compartments as a function of the drug delivery, fresh gas flow, alveolar ventilation and cardiac output.