A techno-economic-societal assessment of recovery of waste volatile anaesthetics

For over 150 years, the mainstay of good anaesthesia for surgical procedures has been volatile anaesthetic vapours. Volatile anaesthetics (VAs) are greenhouse gases contributing to global warming. For reasons of cost, environmental concerns, or simply elegance, hospitals aspire to reduce the emission of VAs by minimising the amounts used during anaesthesia. Despite that, considerable VAs are still released to the atmosphere unabated. One possible solution to this problem would be the installation of VA recovery technology to existing anaesthesia systems, capturing VAs before discharging the waste gas into the atmosphere. We used a systematic, hierarchical workflow to identify and assess the technological, economic and societal barriers associated with the implementation of VA recovery technologies in hospitals, and recommend appropriate solutions. The implementation of recovery technologies in hospitals may be justified by detailed economic analysis in conjunction with technological and societal evaluation. As far as a specific VA recovery technology that is being considered, the findings provide insights on the aspects requiring more evaluation. Based on the insights gained, an informed opinion and perspective on the VA recovery technologies and shortcomings when developing practical VA recovery technologies are provided.