

# Clean, Lean, and Green &ndash; Office-Based Wide Awake Local Anesthesia No Tourniquet Surgery: A Systematic Review of Economic and Environmental Impacts

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## INTRODUCTION:

Healthcare costs within the United States (US) have steadily risen year over year. It is estimated that per capita spending is over two times higher than the average for other developed countries.<sup>1</sup> Additionally, the US healthcare system largely contributes to the solid waste production that burdens the rest of the globe; operating rooms (ORs) are estimated to produce 70% of the annual waste in hospitals nationwide.<sup>1</sup> Globally, there have been numerous initiatives to decrease spending and waste in order to create a more sustainable healthcare system, both environmentally and economically. Wide-awake, local anesthetic, no-tourniquet (WALANT) procedures with implementation of minor field sterility have been widely adopted within the practice of hand surgery. Lalonde first formalized WALANT surgery in 2005.<sup>2</sup> Since then, WALANT has gained popularity among patients and surgeons. These procedures can be performed with fewer instruments and disposables—leading to reduced healthcare costs and solid waste—while maintaining patient safety and satisfaction.<sup>3</sup> Most of the current literature consists of single institution experiences, quality improvement projects, and/or retrospective cost analyses within varying settings. Yet none have synthesized this information to advocate for this to become the standard of care. Therefore, we aim to provide a comprehensive literature review and meta-analysis assessing the economic and environmental cost of WALANT procedures on hand surgery practices within the US.

**METHODS:** A comprehensive PubMed search was performed to find literature related to the cost, waste, and outcomes of WALANT procedures. The search included papers written from 2017 to 2023 and included single institution experiences, comprehensive literature reviews, and retrospective studies. Papers were included if they discussed WALANT surgery in addition to cost analysis and/or information about environmental waste or impact.

**RESULTS:** The systematic search returned 58 papers, 26 were included after screening titles and abstracts. Twelve studies were conducted in the US, and only 9 specifically attempted to address cost, waste, and OR time savings. All studies, both domestic and abroad, demonstrated cost savings through limited surgical packs, instrumentation, and a minimized sterile surgical field. In the US, there was a 70-85% cost savings when the case was performed at an in-office procedure room versus a formal OR.<sup>4-7</sup> Countries with socialized healthcare demonstrated lower cost savings but faster time-to-procedure scheduling for other and/or more significant cases that necessitate the OR environment. These economic implications can be paralleled to environmental waste, as procedure room packs have significantly fewer disposables and often use a limited sterile field, reducing the need for several layers of drapes, buckets, sponges, and towels. Van Denmark et al. calculated a 2.8-ton waste reduction by performing WALANT surgery in a procedure room versus an OR.<sup>8</sup> Moving beyond material costs and environmental impacts, non-tangibles such as OR time must also be considered. For instance, when minor procedures are performed in the office, the OR schedule can remain open for more significant cases that may reimburse more while reducing patient wait times. This was affirmed by Starr et al., who noted that by performing 808 simple procedures in-office rather than in an ambulatory surgery center, revenue could increase by \$3.9M annually.<sup>9</sup> The time savings from minor procedures would add up to an ACS savings of 321 hours, equating to an estimated 302 total joint arthroplasties by their calculations. Finally, from a patient perspective, satisfaction with office-based procedures seems exceptional and often compared to that of visiting the dentist. Over 90% of patients would elect to have another WALANT surgery in the future<sup>6</sup>, and there was no statistical difference in postoperative pain<sup>10</sup> or infection rates<sup>11</sup> noted.

## DISCUSSION AND CONCLUSION:

WALANT procedures are conducted worldwide and have been found to decrease costs to patients and produce less waste without compromising patient safety or procedure efficacy. Our review and meta-analysis have demonstrated that regardless of the healthcare system or insurance payer type, everyone benefits by implementing office-based WALANT surgery for minor hand procedures within the office setting. There are significant cost savings to stakeholders, reduced environmental burden, increased profit margins for hospitals, and identical patient outcomes with reduced cost-of-care.

The cost savings for office-based procedure room WALANT surgery is found both for the institution and for patients. It has been established that the use of fewer disposable items in OR packs and fewer instruments in trays decreases the cost of tangible goods as well as intangible items such as staff time, energy expenditures, etc. Furthermore, with OR scheduling often stringent and staff-dependent, transitioning cases to an office-based procedure room has a direct impact on OR time. When minor procedures are performed in the office, the OR schedule can remain open for more extensive cases that may have higher reimbursement.

Beyond the economics, WALANT procedures have shown no statistical difference or slightly better patient outcomes when performed in a procedure room than in a formal OR. Of the data reviewed, all pertinent articles cited infection and complication rates as comparable to traditional surgery performed in ambulatory surgery centers or hospital ORs. In summary, office-based WALANT surgery has outstanding patient satisfaction rates, significant cost savings, and abundant environmental impacts that will affect generations to come. Future consideration can be given to applying these principles to assess the efficacy of universal packs with a limited sterile field, as well as the actual cost savings of anesthesia, antibiotics, and post-anesthesia care unit monitoring.