

Lean and Green Hand Surgery

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Health care in the United States is both expensive and wasteful. The cost of health care in the United States continues to increase every year. Health care spending for 2016 is estimated at \$3.35 trillion. Per capita spending (\$10,345 per person) is more than twice the average of other developed countries. The United States also leads the world in solid waste production (624,700 metric tons of waste in 2011). The health care industry is second only to the food industry in annual waste production. Each year, health care facilities in the United States produce 4 billion pounds of waste (660 tons per day), with as much as 70%, or around 2.8 billion pounds, produced directly by operating rooms. Waste disposal also accounts for up to 20% of a hospital's annual environmental services budget. Since 1992, waste production by hospitals has increased annually by a rate of at least 15%, due in part to the increased usage of disposables. Reduction in operating room waste would decrease both health care costs and potential environmental hazards. In 2015, the American Association for Hand Surgery along with the American Society for Surgery of the Hand, American Society for Peripheral Nerve Surgery, and the American Society of Reconstructive Microsurgery began the "Lean and Green" surgery project to reduce the amount of waste generated by hand surgery. We recently began our own "Lean and Green" project in our institution. Using "minor field sterility" surgical principles and Wide Awake Local Anesthesia No Tourniquet (WALANT), both surgical costs and surgical waste were decreased while maintaining patient safety and satisfaction. As the current reimbursement model changes from quantity to quality, "Lean and Green" surgery will play a role in the future health care system. (*J Hand Surg Am. 2018;43(2):179–181. Copyright © 2018 by the American Society for Surgery of the Hand. All rights reserved.*)

Key words Healthcare expense, Lean and Green hand surgery, lidocaine and epinephrine, minor field sterility, wide awake surgery.

SURGICAL WASTE IN THE US HEALTH SYSTEM

Health care facilities in the United States produce more than 4 billion tons of waste annually (6,600 tons per day). Approximately 70% of that total is generated from operating rooms and labor and delivery suites.^{1,2} Kwakye et al reviewed 43 published articles dealing with green initiatives in health care. Five green recommendations for

surgical practices were identified: operating room waste reduction and segregation, reprocessing of single-use medical devices, environmentally preferable purchasing, energy consumption management, and pharmaceutical waste management.² Of the 5 items, control of operating room waste is one variable that can be modified by the surgical team. Several authors have outlined different strategies for minimizing surgical waste while being environmentally friendly.^{3–5}

Little has been written regarding waste reduction in hand surgery. Sieber et al⁶ made changes in their surgical drapes (decreasing disposal drapes) and realized a savings of \$4,140 per year with no change in the infection rate (0.68% vs 0.71%). Albert and Rothkopf⁷ removed 15 items from the disposable plastic surgery pack and 7 items from the hand surgery pack. They estimated a yearly savings of \$17,381.05.

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Received for publication March 7, 2017; accepted in revised form November 14, 2017.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

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0363-5023/18/4302-0011\$36.00/0
<https://doi.org/10.1016/j.jhsa.2017.11.007>

Baratz et al reviewed their clinical experience comparing the “lean” and “standard” surgical setup using Wide Awake Local Anesthesia No Tourniquet (WALANT) anesthesia. The “lean” setup cost \$105 versus \$230 for the “standard” setup. They found no difference in the amount of waste generated, patient experience, anesthetic experience, or infection rate. The total estimated savings of cases done with the “lean” setup ranged from \$791 to \$1,493 per case. Much of the savings was due to the lack of preoperative lab testing (blood work, chest x-ray, electrocardiogram, and physical examination).⁸

THE LEAN AND GREEN INITIATIVE

We first learned about “Lean and Green” surgery at an annual meeting of the American Association for Hand Surgery (AAHS). Mark Baratz and Don LaLonde have been instrumental in increasing our awareness about green surgery. In 2014, Baratz presented “The Economics of Hand Surgery” at the AAHS Annual meeting. After that meeting, the AAHS, along with the leadership of the American Society for Surgery of the Hand, American Society for Reconstructive Microsurgery, and American Society of Peripheral Nerve, adopted the “Lean and Green” Initiative for Hand Surgery. The goals are to reduce costs, reduce waste, improve safety, and increase patient satisfaction.

Two developments in hand surgery have changed our surgical practice. The first is WALANT. Using lidocaine with epinephrine now allows many cases to be done in an outpatient setting (even an in-office procedure room) with only local anesthesia, with no sedation or tourniquet.^{9–15} WALANT has also shown to be safe, cost-effective, and well received by patients.^{13,16–20}

The second change in our practice has been the concept of “minor field sterility” as described by LeBlanc et al.¹⁰ Minor field sterility consists of a single drape, gloves, mask, and no gown or antibiotics. In doing 1,504 carpal tunnel releases with this technique, the superficial infection rate was 0.4% and the deep infection rate was 0%.¹⁰

In 2014, we visited Don LaLonde in St. John, New Brunswick and had the opportunity to see both WALANT and “minor field sterility.” Returning home, we started using WALANT in our institution. Following a carpal tunnel release procedure, we noticed the surgical technician carrying 3 bags of trash from our case (Fig. 1). That prompted us to look at the back table for the next hand surgery. We were surprised to see the supplies pulled for the case (Fig. 2). As a result, our surgical team started a project to review the supplies in the prepacked surgical packs and our instrument list for our hand cases.



FIGURE 1: Carpal tunnel procedure surgical waste.



FIGURE 2: Standard hand surgery back table setup.

After several months, we were able to make a dramatic change resulting in cost savings and decreasing surgical waste (Fig. 3). The cost savings for the new “green packs” was \$10.64 per case. The surgical waste was decreased by 5.06 pounds per case. The new surgical setup has been adopted by our hand surgeons in our institution along with other surgeons in our health care system.

We recently reviewed our experience with the new surgical packs; 1,099 hand cases were done from October 2014 through December 2016. The overall



FIGURE 3: “Lean and Green” back table setup.

cost savings was \$13,250.42. The amount of waste was decreased by 5,560.9 pounds or 2.8 tons. There was no change in the infection rate. Patient satisfaction was high: 96% of the patients thought that the experience was better than going to the dentist and would also recommend the experience to a friend or family member.

LEAN AND GREEN CHALLENGE

In 2016, the combined membership of both AAHS and American Society for Surgery of the Hand was 5,395 active members with many surgeons belonging to both societies. It is estimated that there are approximately 2,000 active hand surgeons in the United States. If every surgeon would do just 100 “green” cases in a year (for a total of 200,000 cases), that would be a good start for the “Lean and Green” Initiative. Using our savings of \$10.64 per case and 5.06 pounds of saved waste, there would be a cost savings of \$2.13 million and a decrease of 1,012,000 pounds (506 tons) of waste.

The Lean and Green Initiative offers the hand surgery community a wonderful opportunity to make a difference in society. We challenge all hand surgeons to think about “going green” in their surgical practices. Eliminating excess and needless supplies will save both financial and environmental resources while maintaining quality care and patient satisfaction.

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