

# Why Low Flow Anesthesia is Gaining Momentum: Survey Reveals Increased Awareness, Interest among Hospital Leaders

A new survey of 100 C-suite leaders reveals that hospitals are taking a fresh look at low flow anesthesia to improve environmental sustainability and reduce wasted spending. That, combined with new technologies that ease the cognitive burden on clinicians, could help significantly increase low flow utilization over the next few years.



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## Background

While low flow anesthesia has existed for decades, hospitals and health systems in the U.S. have not yet widely adopted the practice. But a new survey of 100 leaders shows the momentum toward low flow anesthesia may be shifting. C-suite executives, in fact, are increasingly acknowledging the benefits provided by low flow anesthesia, including environmental sustainability, reduced anesthetic costs, and optimal patient safety.

The growing awareness of these benefits—as well as new automation technology that helps support safe administration of low flow anesthesia—could significantly increase utilization over the next few years.

This report examines the survey findings, including C-suite perceptions about the benefits of low flow anesthesia, reasons they are reconsidering implementing the practice, and their plans for low flow anesthesia in the next 1-2 years.

## Research Methodology

GE HealthCare commissioned healthcare consultancy Sage Growth Partners to research and develop this report. The double blinded survey was conducted independently by Sage, which surveyed 100 hospital and health system leaders in February and March 2024.

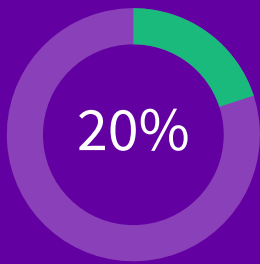
Respondents included chief medical officers, chief nursing officers, chief information officers, chief operating officers, chief financial officers, and other C-suite executives.

The participants represented a range of healthcare provider organizations, including not-for-profit community hospitals, integrated delivery networks, academic medical centers, and for-profit community hospitals. This research also included qualitative interviews with several hospital leaders and practicing clinicians.

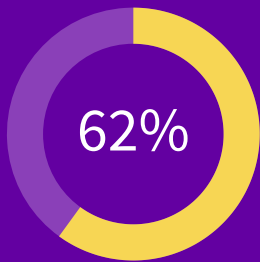
### Defining Low Flow Anesthesia

What is considered low flow anesthesia? Within the survey, low flow anesthesia was defined as reducing gas flow to the lowest level consistent with equipment capabilities and safe and effective patient care (often resulting in mean fresh gas flow rates below 1 liter per minute).

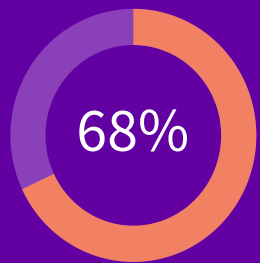
## Key Findings:



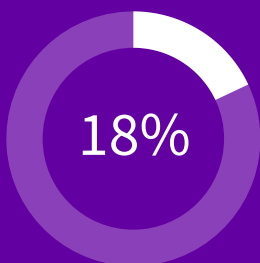
Only 20% of C-suite leaders say their organization currently has “moderate to high adoption” (meaning the approach is utilized in more than 50% of cases) of low flow anesthesia



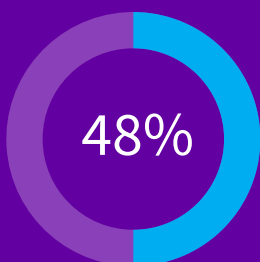
62% say the most significant barrier that slows the adoption of low flow anesthesia is the lack of knowledge surrounding the practice



68% say widespread adoption of low flow would benefit their organization in terms of environmental sustainability, and 68% say it would reduce anesthesia costs



Currently, only 18% of C-suite respondents are exploring low flow anesthesia to reach sustainability goals



Yet nearly half “agree” that low flow may be an initiative their organization will explore to reach sustainability goals the next 1-2 years

# Advancing Environmental Sustainability

Hospitals and health systems can make a significant impact on environmental sustainability by implementing low flow anesthesia because the practice greatly reduces the amount of anesthetic agents (and therefore greenhouse gases) released into the atmosphere. The need is apparent. Operating rooms generate three to six times as much carbon as the rest of health systems[1]. Anesthetic gases alone contribute 51% of direct emissions for any general surgical procedure [2].

On the upside, evidence proves that focusing on lowering greenhouse gas output can make a significant impact, with [one study](#) showing that practicing low flow anesthesia can reduce emissions by as much as 64% [3].

While only 20% of C-suite leaders say their organization currently has “moderate to high adoption” of low flow anesthesia, awareness related to the positive environmental impact is increasing—as are hospitals’ efforts to leverage it to enhance environmental sustainability [4, 5, 6, 7].

A staff anesthesiologist and associate professor at a large academic medical center says that generational shifts are helping to fuel the growing awareness and adoption of low flow anesthesia among clinicians.

**“What has really swung the pendulum [toward broader low flow adoption] is the sustainability piece,” he says. “The current generation is thinking a lot more than my generation did about what [anesthetic gases] mean to our overall global wellbeing” [8].**

As understanding grows related to the positive environmental impact among both the C-suite and clinicians, more hospitals may begin to consider implementing low flow protocols moving forward.

**This survey shows that 68% of leaders say widespread adoption of low flow would benefit their organization in terms of environmental sustainability. Further, 77% of C-suite leaders say their organization is “somewhat” “moderately” or “very likely” to explore initiatives to reduce the greenhouse gas footprint of their anesthesia department.**

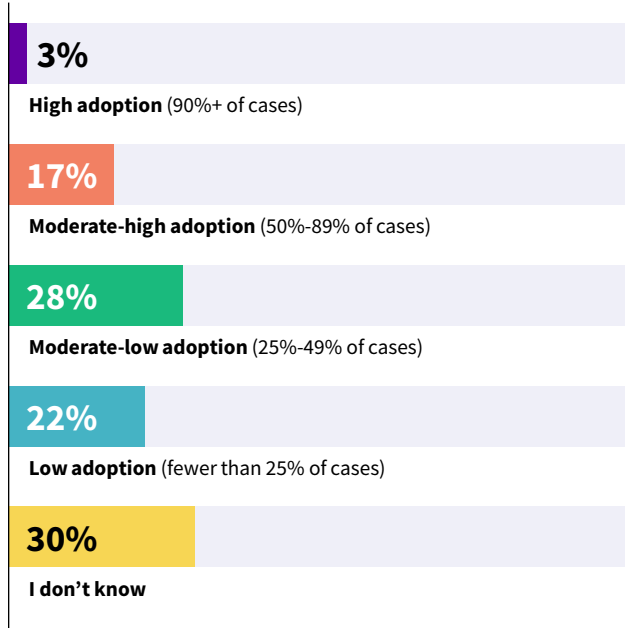
## Understanding the Environmental Impact

While awareness is growing related to the environmental effects of anesthetic gases on the environment, the survey indicates that many C-suite leaders are unaware of the full impact. Eighty-eight percent of survey participants answered incorrectly when asked: inhaled anesthetics account for what percentage of a hospital’s perioperative greenhouse gas footprint, according to the American Society of Anesthesiologists?

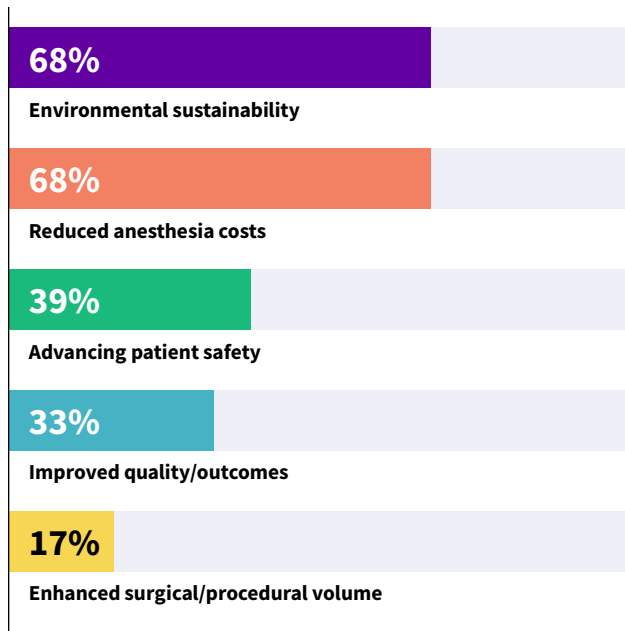
**“A lot of people underestimate the amount of environmental impact that happens within the perioperative environment in general. Inhalational gases are terrible for the ozone layer and they’re vented out into the atmosphere at the end of the day,” says a practicing anesthesiologist and managing partner at an anesthesiology group connected to a hospital system [9].**

That said, after being shown that the correct answer is 50% [10], C-suite leaders immediately saw the value of low flow and more than half indicated that their organization may explore it to advance sustainability.

## Where does your organization stand regarding adoption of low flow anesthesia?



## What benefits do you think widespread adoption of low-flow anesthesia would provide your organization?



# Reducing Wasteful Spending on Anesthetic Agents

Hospital leaders face extraordinary pressure to reduce costs while ensuring optimal patient care. To that end, more C-suite leaders are recognizing that broader administration of low flow anesthesia can help by reducing the amount of anesthetic agents that are purchased, used, and wasted.

Sixty-eight percent of C-suite leaders rank reducing costs overall among their organization's top strategic initiatives for 2024, and nearly two-thirds say reducing costs is the top strategic initiative relative to the perioperative team.

# 68%

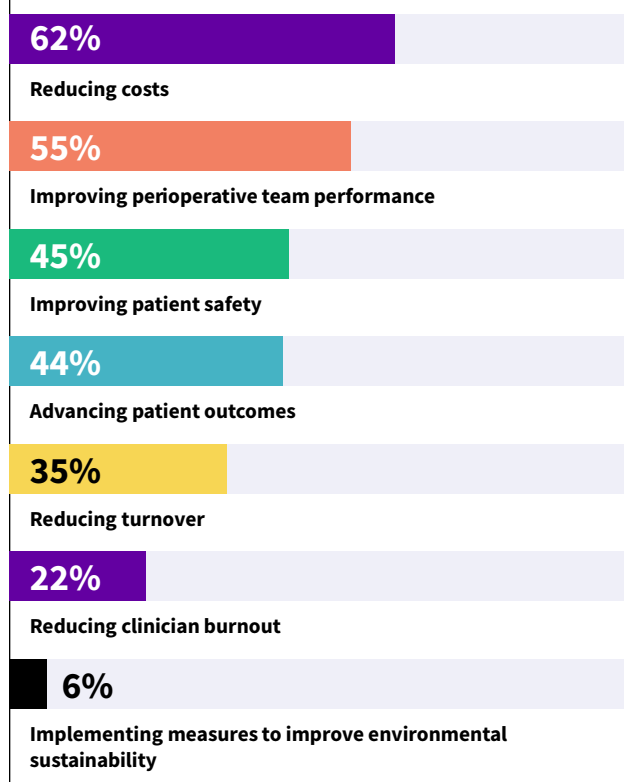
of C-suite leaders say widespread adoption of low flow would reduce anesthesia costs

“As we shift to looking at ways to make healthcare affordable, I think you will see a lot of traction in terms of [identifying] low-hanging fruit. Low flow anesthesia is very low-hanging fruit. If health systems are really looking at ways to make themselves economically viable, low flow anesthesia makes a lot of sense,” says a practicing anesthesiologist and managing partner of an anesthesiology group affiliated with a hospital system [11].

## Which of the following best describes your organization's approach to minimize wasted spend on anesthesia drugs?



## Thinking about the perioperative team specifically, please select your organization's top strategic initiatives for 2024?



Results from organizations that have implemented low flow anesthesia demonstrate significant cost reductions: One evidence-based project using simulated fresh gas flows of 1 liter per minute predicted a 48% reduction in the costs of anesthetics [12].

A staff anesthesiologist and associate professor at a large medical center interviewed for this report says that as awareness grows related to the benefits of low flow anesthesia, including those related to cost reduction, more hospitals are creating associated performance metrics.

“Increasingly, anesthesiologists, like a lot of specialties, get a report card on a variety of different domains. Anything from on time starts for cases, to the cost of drugs that were used,” he says. “One of those metrics is related to low flow anesthesia and the percentage of cases where that wasn’t adhered to. That is very helpful for us” [13].



## Ensuring Optimal Patient Safety

Low flow anesthesia can provide patient safety advantages, notably reduced loss of heat and humidity from the lungs [14].

**“Low-flow anesthesia is one of those things where you can argue that there’s very little downside ... There are all the upsides in terms of lowering costs, better for the environment, all the patient benefits,” says the staff anesthesiologist and associate professor [15].**

## Positive Impacts on Patient Care

Nearly three-quarters of C-suite leaders (72%) believe widespread adoption of low flow anesthesia could, in some way, positively impact patient care: 39% say it could advance patient safety and 33% say it could improve quality and patient outcomes.



# Easing the Cognitive Burden

Another key factor that could spur broader utilization of low anesthesia is the development of technology that supports its safe administration. Without this technology, anesthesia teams must continuously monitor airway gases, as well as make regular adjustments to gas flow, in order to ensure the appropriate mix of anesthesia and oxygen is provided. This is a complex and cumbersome process that adds to the already heavy cognitive burden anesthesiologists face.

The technology alleviates that burden by automating the administration of low fresh gas flows and reducing the need for manual adjustments. Anesthesia providers can use the system to set targets for oxygen and anesthetic gases, and the software maintains those throughout surgery, as guided by the anesthesia professional to meet the needs of the patient.

In April 2022, the [FDA approved](#) that technology, [End-tidal Control\\*](#), which has been used in Europe for more than a decade. End-tidal Control (Et Control) earned [FDA approval](#) through a U.S.-based, multi-center, multi-year clinical trial that included over 200 patients.

\* Et Control is indicated for patients 18 years of age or older in the United States.

In the clinical trial, **over 80% of users said End-tidal Control is easier to use than manual fresh gas control**, and that it required fewer adjustments to obtain the desired result. The trial also found that 98% of the time when using this feature, end tidal anesthetic concentration was within acceptable limits, compared to about 46% when not using End-tidal Control [16].

Other recent technology developments can also [aid in the administration of low flow anesthesia](#).

## This technology includes:

- ✓ Entropy monitoring to measure the state of the brain and reflect different phases of anesthesia
- ✓ Neuromuscular transition monitoring to support clinicians in titrating neuromuscular blocking agents
- ✓ Advanced clinical decision support tools to improve workflow and patient care
- ✓ Analytics that show real-time and historical data measured against performance targets

**“An anesthesia team’s job is to survey threats from the whole of the operating room, listen to the surgeon, and communicate with the nursing teams. It’s not about simply making sure that the appropriate gas concentration is set while administering low flow anesthesia. If you can hand that job to a machine, that allows you to be the human in the room and do things that humans are best at, which is picking up on threats, stress, and warnings.”**

– David Hovord, MB BChir, clinical assistant professor and a lead for University of Michigan’s Green Anesthesia Initiative, who has experience using End-tidal Control in previous roles at health systems in Europe[17]





## Conclusion

The survey findings illustrate that C-suite leaders increasingly recognize the role of low flow anesthesia in reducing greenhouse gas emissions. Additional benefits of low flow anesthesia are clear: reducing medical spending on anesthetic agents and ensuring optimal patient safety. New technology that helps automate low flow anesthesia, therefore easing the cognitive burden traditionally associated with its administration, will further pave the way toward widespread adoption.

**Ultimately, this research shows that approximately half of C-suites say their organization may explore low flow anesthesia in the next 1-2 years, in addition to the 18% already exploring the practice—signaling the potential for many hospitals to implement more low flow anesthesia in the near term.**

## The Case for End-tidal Control Software

Designed to complement the expertise of anesthesia providers in managing complex cases in the operating room, End-tidal Control software for the Aisys CS<sup>2</sup> anesthesia machine allows anesthesia providers to set targets for end-tidal oxygen and anesthetic agent. **End-tidal Control automatically adjusts fresh gas concentrations** to quickly achieve and maintain those targets, regardless of changes in the patient's hemodynamic and metabolic status.

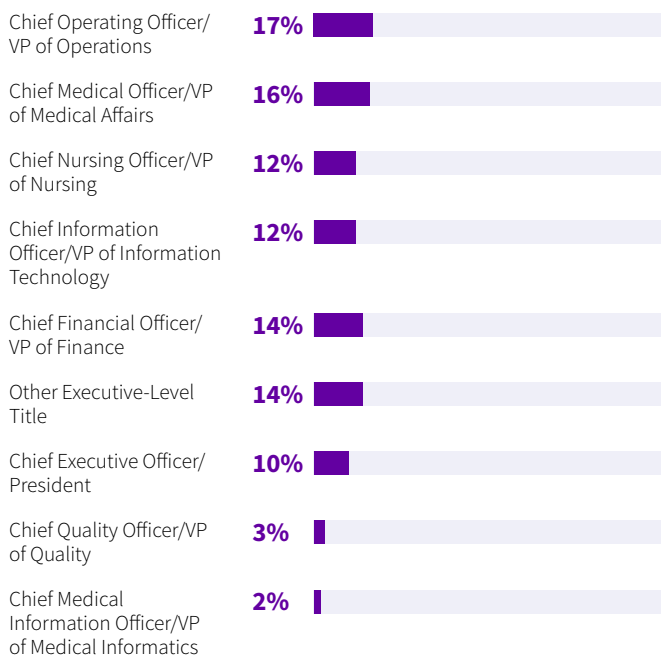
[Learn more](#)

Et Control is approved in the US via P210018 by US FDA.

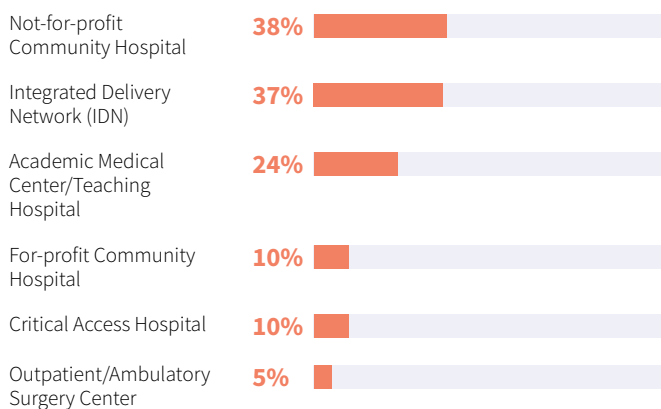
# Research Demographics

All survey respondents were recruited independently by Sage Growth Partners and all research was double blinded.

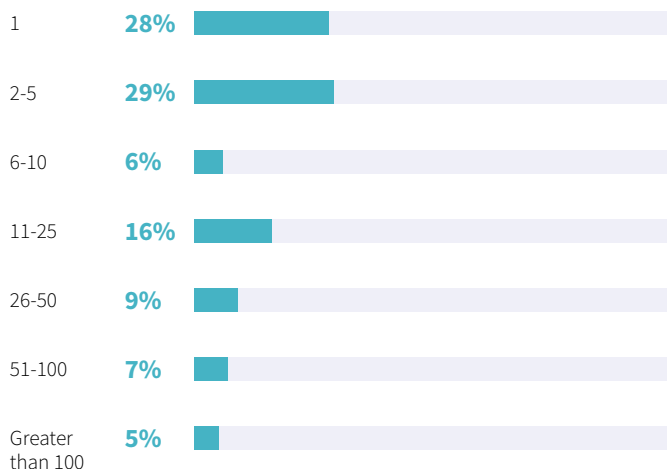
## Role



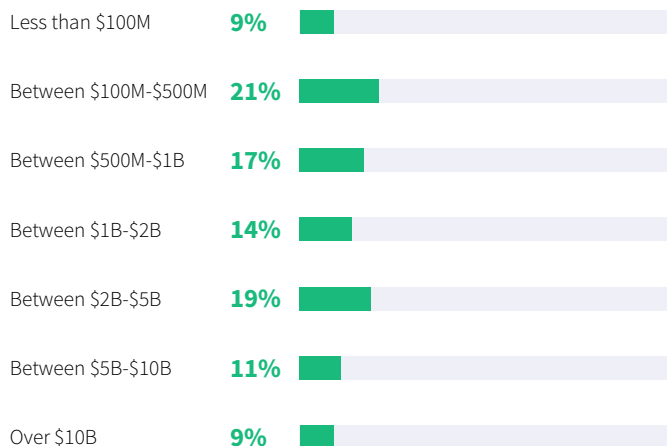
## Hospital type



## Number of hospitals within organization:



## Annual net patient revenue:



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- 13.** Double blinded research interview conducted in February, 2024
- 14.** Patient Safety and Low-Flow Anesthesia, the Anesthesia Patient Safety Foundation: <https://www.apsf.org/article/patient-safety-and-low-flow-anesthesia/>
- 15.** Double blinded research interview conducted in February, 2024
- 16.** Refer to GE HealthCare Et Control Pivotal Study Report DOC2163005. When used as indicated, Et Control is as clinically safe as manual fresh gas control: <https://www.gehealthcare.com/-/jssmedia/gehc/us/images/products/anesthesia-delivery/aisys-cs2/redesign/whitepaper-etcontrol-arc-anesthesia-jb22327xx.pdf?rev=-1&hash=8BC4481E4D2F46747C2418D8AE7707F9>
- 17.** Research interview conducted in February, 2024

## About GE HealthCare Technologies Inc.

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## About Sage Growth Partners

Sage Growth Partners is a healthcare advisory firm with deep expertise in market research, strategy, and communications. Founded in 2005, the company's extensive domain experience ensures that healthcare organizations thrive amid the complexities of a rapidly changing marketplace. For more information, visit <https://sage-growth.com>.

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