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Office of Healthcare Inspections

VETERANS HEALTH ADMINISTRATION

A Select Review of VHA's Implementation of the VA Sustainability Plan

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Executive Summary

The VA Office of Inspector General (OIG) conducted a select review of Veterans Health Administration's (VHA's) implementation of the *2022 United States Department of Veterans Affairs (VA) Sustainability Plan* (VA Sustainability Plan), which describes priority actions for achieving federal environmental sustainability goals as outlined in Executive Order 14057.[1]

VHA is the "largest integrated healthcare system in the United States."[2] Given its significant contribution to health care delivery in the United States, VHA is in a unique position to become a leader in environmental sustainability.

Healthcare Pollution: The Environmental Impact on Public Health

Health care in the United States is highly interconnected with industrial activities that "emit much of the nation's pollution to air, water, and soils."[3] Healthcare activities account for approximately 10 percent of all United States greenhouse gas (GHG) production and generate five million tons of waste each year, making the healthcare industry one of the largest waste-producing sectors in the country.[4] Healthcare pollution has been estimated to lead to a public health "disease burden" similar in magnitude to annual deaths from preventable medical errors.[5] However, the negative health effects attributed to healthcare pollution are "largely unrecognized in health care," which has led to suggestions that the definition of patient safety should include "safeguarding public health from health care pollution."[6]

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[1] VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan,* October 2022; Exec. Order No. 14057, 86 Fed. Reg. 70935 (Dec. 8, 2021).

[2] "Veterans Health Administration, About VHA," VA, accessed November 27, 2023, https://www.va.gov/health/aboutvha.asp#:~:text=The%20Veterans%20Health%20Administration%20(VHA,Veterans%20enrolled%20in%20the%20VA.

[3] Matthew J. Eckleman and Jodi Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health," *PLoS ONE* 11, no. 6 (June 9, 2016), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0157014.

[4] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health;" "Waste," Practice Greenhealth, accessed January 7, 2024, https://practicegreenhealth.org/topics/waste/waste-0; Navami Jain and Desiree LaBeaud, "How Should US Health Care Lead Global Change in Plastic Waste Disposal?" *American Medical Association Journal of Ethics* 24, no. 10 (October 1, 2022): 986–93, https://pubmed.ncbi.nlm.nih.gov/36215191/; GHGs are "gases that trap heat in the atmosphere." "Overview of Greenhouse Gases," United States Environmental Protection Agency, accessed March 6, 2023, https://www.epa.gov/ghgemissions/overview-greenhouse-gases.

[5] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health."

[6] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health"; Matthew J. Eckelman et al., "Health Care Pollution and Public Health Damage in the United States: An Update," *Health Affairs* 39, no. 12 (December 2020), https://www.healthaffairs.org/doi/epdf/10.1377/hlthaff.2020.01247.

Review Objectives and Results

The OIG review consisted of three objectives, ranging in scope from expansive to narrow, to estimate VHA's progress toward environmental sustainability. Objective 1 broadly looked at VHA's approach to implementing the plan, objective 2 focused on a single foundational priority action to help VHA's sustainability efforts, and objective 3 examined several practical sustainability activities.

Objective 1: To identify VHA's Overall Approach to Implementing the VA Sustainability Plan

The OIG found that VHA is in the initial stages of implementing the VA Sustainability Plan and has not established sustainability goals specific to VHA's mission of health care delivery. According to the VA Chief Sustainability Officer, VHA will provide specific goals to meet the targets outlined in the executive order; however, individual medical centers can work toward VA Sustainability Plan targets autonomously.

The VHA Green Environmental Management System (GEMS) is a "systematic management approach to develop and implement an environmental policy and manage its environmental program."[7] VHA utilizes program managers at the national, Veterans Integrated Service Network, and facility levels to help prevent pollution, reduce facilities' environmental footprints, and conduct environmental compliance activities.[8]

According to an OIG-administered questionnaire, respondents most commonly reported facility GEMS program managers as responsible for implementing the VA Sustainability Plan, including understanding, planning, operationalizing, and reporting progress on priority actions. However, VHA Healthcare, Environment, and Facility Program leaders reported that facility GEMS program managers do not have the workload capacity to lead facility-level implementation.[9] The OIG questions whether facilities should rely on GEMS program managers to lead implementation, since these staff have insufficient time to focus on environmental sustainability activities.

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[7] VHA Healthcare Environment and Facilities Programs, *Green Environmental Management System (GEMS) Guidebook*, June 2023.

[8] VHA Healthcare Environment and Facilities Programs, *Green Environmental Management System (GEMS) Guidebook*.

[9] The OIG administered a questionnaire to facility sustainability officers (or the medical center director in the absence of a facility sustainability officer) to determine whether necessary resources, support of facility leaders, and training to implement the VA Sustainability Plan were available to staff. The questionnaire had a 100 percent response rate; The GEMS program is organizationally aligned under Healthcare Environment and Facilities Programs in the VHA Office of Occupational Safety and Health. VHA Healthcare Environment and Facilities Program, "GEMS Program," (PowerPoint presentation), December 8, 2022.

Objective 2: To Determine VHA's Strategy for Implementing the *Climate- and Sustainability-Focused Federal Workforce* Priority Action, Which Aimed to Educate, Engage, and Train VHA's Workforce

The OIG found that VA, inclusive of VHA, implemented the *Climate- and Sustainability-Focused Federal Workforce* priority action as outlined in the VA Sustainability Plan. However, VA did not "incorporate environmental stewardship values," as required by the executive order, in educational content described in the VA Sustainability Plan.[10]

VA implemented training according to the VA Sustainability Plan, focusing on climate change and continuity of VHA operations in the face of extreme weather events. However, the education and engagement efforts VA identified in the plan did not incorporate environmental stewardship values as required by the executive order.

Education on environmental stewardship connects individual employees to their local work environment, "help[ing] them understand how individual behavior impacts the environment," and encourages active roles in protecting resources, such as reduce, reuse, and recycle.

Had the plan incorporated environmental stewardship at the individual staff and organizational levels, the implementation of a *Climate- and Sustainability-Focused Federal Workforce* would have more closely aligned with the executive order.

Objective 3: To Illustrate the Relationship of Select Priority Actions with Existing Environmental Challenges in Health Care Through Targeted VHA Reviews

To illustrate the relationship between existing environmental challenges in healthcare delivery and the VA Sustainability Plan priority actions, the OIG reviewed VHA's

- purchased inhalational anesthetics to determine their contribution to GHG emissions (priority action *Net-Zero Emissions Buildings, Campuses and Installations*),
- waste stream processes and tracking (priority action *Reducing Waste and Pollution*), and
- ethylene oxide use for sterile processing (priority action *Reducing Waste and Pollution*).

[10] Exec. Order No. 14057; "Stewardship definitions," National Oceanic and Atmospheric Administration, accessed March 1, 2023, https://www.noaa.gov/office-education/noaa-education-council/monitoring-resources/common-measure-definitions/stewardship-definitions. Environmental stewardship is defined as safeguarding the environment through an awareness of how one's actions impact the environment and taking steps to preserve natural resources.

Purchased Inhalational Anesthetics and Their Contribution to GHG Emissions

Inhalational anesthetics, typically administered to patients during surgical procedures to achieve unconsciousness and pain relief, are a type of healthcare-specific scope 1 GHG emission that can be mitigated (largely through provider education) without affecting patient safety.[11] The medical use of inhaled forms of anesthesia is responsible for approximately 5 percent of a hospital's GHG emissions and has continued to expand over recent decades, creating an increasing impact on the environment.[12] Inhalational anesthetics, typically unchanged after patient use, are vented from the point of care to the outside air.[13] In this disposal process, unused inhalational anesthetics exhaled by the patient are collectively referred to as waste anesthetic gas or WAG, and have been largely unregulated due to historical beliefs that inhalational anesthetics are medically necessary and the environmental impacts are negligible.[14]

While WAG from inhalational anesthetics is a small contributor to the overall global warming effects of United States health care, achievement of the VA Sustainability Plan target for net-zero GHG emissions from buildings, campuses, and installations by 2045 will require a comprehensive mitigation strategy.[15] Toward that goal, the OIG assessed the quantities of

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[11] "Anesthetic Gas," Practice Greenhealth, accessed September 12, 2023, https://practicegreenhealth.org/topics/greening-operating-room/anesthetic-gas. Scope 1 emissions are those GHGs emitted directly from a facility; Matthew J. Eckelman et al., "Health Care Pollution and Public Health Damage in the United States: An Update."

[12] American Society of Anesthesiologists, *Greening the Operating Room and Perioperative Arena: Environmental Sustainability for Anesthesia Practice*, accessed February 28, 2023, https://www.asahq.org/about-asa/governance-and-committees/asa-committees/environmental-sustainability/greening-the-operating-room#5wsm; Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care*, April 2019, https://practicegreenhealth.org/sites/default/files/2019-04/anesthetic_gas_how-to.pdf.

[13] Shane Varughese and Raza Ahmed, "Environmental and Occupational Considerations of Anesthesia: A Narrative Review and Update," *Anesthesia & Analgesia* 133, no. 4 (October 2021): 826–35, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8415729/.

[14] Jodi Sherman et al., "Life Cycle Greenhouse Gas Emissions of Anesthetic Drugs," *Anesthesia & Analgesia* 114, no. 5 (May 2012): 1086–90, accessed February 15, 2023, https://pubmed.ncbi.nlm.nih.gov/22492186/; "Inhaled Anesthetic 2022 Challenge," American Society of Anesthesiologists, accessed February 28, 2023, https://www.asahq.org/about-asa/governance-and-committees/asa-committees/environmental-sustainability/inhaled-anesthetic-challenge; "Anesthetic Gas," Practice Greenhealth.

[15] Varughese and Ahmed, "Environmental and Occupational Considerations of Anesthesia: A Narrative Review and Update"; Susan M. Ryan and Claus J. Nielsen, "Global Warming Potential of Inhaled Anesthetics: Application to Clinical Use," *Anesthesia & Analgesia*, 111 no. 1 (July 2010): 92–98, https://pubmed.ncbi.nlm.nih.gov/20519425/; Global warming is the effect in which GHGs, released into the air, "warm the Earth by absorbing energy and slowing the rate at which the energy escapes [in]to space . . . act[ing] like a blanket insulating the Earth." "Understanding Global Warming Potentials," United States Environmental Protection Agency, accessed September 22, 2023, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials; VHA's National Anesthesia Program was cited in the 2022 VA Sustainability Plan as an example of progress in the *Net-Zero Emissions Buildings* priority action, prompting further oversight from OIG. VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*.

inhalational anesthetics purchased by VHA facilities as a surrogate for inhalational anesthetic clinical usage, which is consistent with industry-established methodology.[16]

The most-used inhalational anesthetics include the potent anesthetic agents sevoflurane, isoflurane, and desflurane, and the compressed medical gas, nitrous oxide.[17] Desflurane and nitrous oxide have the most adverse GHG effects.

The OIG reviewed VHA's purchased inhalational anesthetics from October 1, 2020, through September 30, 2021, and found that nitrous oxide was, by far, the largest contributor to WAG GHG emissions, although desflurane was also a significant contributor. VHA purchased approximately 72,000 kilograms (kg) of nitrous oxide in fiscal year (FY) 2021, which is equivalent to the GHGs emitted from driving approximately 50 million miles in gas-powered cars.[18]

VHA National Anesthesia Service (NAS) leaders, the OIG learned, are in the early stages of creating initiatives to reduce the GHG emissions from inhalational anesthetics. During interviews, NAS leaders described some examples of facilities implementing strategies to use less inhalational anesthetics, avoid high-impact GHG anesthetics such as desflurane and nitrous oxide, find alternatives to inhalational anesthetics, and employ available technology to trap and prevent release of WAG to the atmosphere.[19]

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[16] Measuring procurement quantities of inhalational anesthetics over a period of time is an established methodology for approximating usage of inhalational anesthetics. Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care*; VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*; "Inhaled Anesthetic 2022 Challenge, Reduce Inhaled Anesthetic Atmospheric Waste," American Society of Anesthesiologists.

[17] Inhalational anesthetics include two distinct categories of medications: potent agents and the compressed medical gas nitrous oxide. Potent agents are liquids whose vapors, when inhaled in very low concentrations, produce sufficient depth of anesthesia for a surgical procedure. Nitrous oxide is considered a weak anesthetic because even when inhaled at very high concentrations, it is insufficient to produce a sufficient level of anesthesia, by itself, for a surgical procedure. However, nitrous oxide is often used, by itself, as a form of sedation for procedures that do not require a patient to be fully unconscious, such as dental procedures. Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care*.

[18] "Greenhouse Gas Equivalencies Calculator," United States Environmental Protection Agency, accessed January 22, 2024, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results; Fiscal years for federal agencies include an annual period of October 1 of one calendar year through September 30 of the following year. Congressional Budget Office, "Common Budgetary Terms Explained," December 2021, accessed November 27, 2023, https://www.cbo.gov/publication/57660.

[19] NAS leaders have discussed policy with the anesthesia field advisory board and Veterans Integrated Service Network anesthesia consultants and are working with pharmacy service leaders to determine how to assess historical and future inhalational anesthetic purchase quantities. NAS utilizes an anesthesia field advisory board–a group of five physician anesthesiologists and five certified registered nurse anesthetists selected from leadership positions across the enterprise-to serve as an advisory body and develop VHA-wide recommendations. NAS leaders acknowledged the need to consult the environmental recommendations from the American Society of Anesthesiologists and the American Association of Nurse Anesthetists, as anesthesia providers at VHA include both physician anesthesiologists and certified registered nurse anesthetists, respectively.

While inhaled anesthetics represent a small contribution to health care's overall effect on climate change, and there is no universal solution to achieve healthcare-related GHG reductions, progress can be made across many contributing areas within VHA. Although NAS has increased their support of VHA medical facilities' efforts to reduce WAG emissions, NAS should consider a comprehensive mitigation strategy to support the VA Sustainability Plan's priority action goal of achieving net-zero GHG emissions by 2045.

Facility Waste Stream Processes

Healthcare operations produce many forms of waste, including solid waste, regulated medical waste, pharmaceutical waste, and recycling. The OIG found that VHA tracks facility waste streams to monitor rates of landfill-bound waste and recycling, as indicated in the VA Sustainability Plan; however, the OIG determined that VHA's ability to reuse is limited. The OIG noted a healthcare industry trend away from reusable medical devices and toward single-use medical devices, which has been applied widely and is unsustainable. Additionally, in the private sector, some single-use devices are being repurposed for Food and Drug Administration-approved use after reprocessing.[20] However, VHA policy prohibits repurposing single-use medical devices from medical centers.[21]

Although VHA considers reusable rather than single-use medical devices when practical, VHA's prohibition of repurposing single-use medical devices impedes its ability to further improve landfill diversion rates.

Use of Ethylene Oxide for Sterile Processing

Ethylene oxide, used for sterilization of reusable medical devices, is carcinogenic; hazardous to reproductive health; and can cause allergic reactions and severe short- and long-term impacts to the respiratory and central nervous systems, liver, and kidneys.[22] The OIG found that while VHA permits the use of ethylene oxide for sterilization of reusable medical devices, as of January 2024, VHA had reportedly eliminated its use in healthcare operations.[23]

The OIG made one recommendation to the Secretary of VA to consider incorporating environmental stewardship values into the goals of the *Climate- and Sustainability-Focused*

[20]Matthew Smith, Hardeep Singh, and Jodi D. Sherman, "Infection Prevention, Planetary Health, and Single-Use Plastics," *JAMA* 330, no. 20 (October 2, 2023): 1947–48.

[21] VHA Directive 1850.06, *Waste Management Program,* July 22, 2022.

[22] Carcinogenic means to produce "or tending to produce cancer." *Merriam-Webster.com Dictionary*, "carcinogenic," accessed October 18, 2023, https://www.merriam-webster.com/dictionary/carcinogenic; VA Medical Center Site Visit Protocol, "VHA Veterans Integrated Service Network (VISN) External GEMS Audit (VEGA) Protocol," December 22, 2022. Of note, the VEGA Protocol reference is VHA Directive 2011-015, *Safe Use of Ethylene Oxide*, March 15, 2011. This was rescinded and replaced by VHA Directive 7713, *Safe Use of Ethylene Oxide*, April 6, 2017, revised May 10, 2017. It contains the same or similar language regarding ethylene oxide.

[23] VHA Directive 7713, *Safe Use of Ethylene Oxide*, April 6, 2017, revised May 10, 2017.

Federal Workforce priority action. The OIG made four recommendations to the Under Secretary for Health related to assessing facility-level GEMS program manager responsibility for VA Sustainability Plan implementation; broadening the scope of training, education, and engagement of VHA's workforce to include and incorporate environmental stewardship values; encouraging continued efforts in reducing GHG emissions from inhalational anesthetics; and evaluating current policy prohibiting the repurposing of single-use medical devices.

VA Comments

The Secretary of VA and the Under Secretary for Health concurred with recommendations 1, 3, and 4 and concurred in principle with recommendations 2 and 5. Acceptable action plans were provided (see appendixes A and B). The OIG will follow up on the planned actions until they are completed.

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Contents

Abbreviations

CO_2e	carbon dioxide equivalent
CO_2e (kg)	kilograms of carbon dioxide equivalent
CO_2e (MT)	metric tons of carbon dioxide equivalent
GEMS	Green Environmental Management System
GHG	greenhouse gas
GWP	global warming potential
HEFP	Healthcare Environment and Facilities Programs
kg	kilogram
NAS	National Anesthesia Service
OIG	Office of Inspector General
VAMC	VA medical center
VHA	Veterans Health Administration
VISN	Veterans Integrated Service Network
WAG	waste anesthetic gas

Introduction

The VA Office of Inspector General (OIG) conducted a select review of Veterans Health Administration's (VHA's) implementation of the *2022 United States Department of Veterans Affairs (VA) Sustainability Plan* (VA Sustainability Plan), which describes priority actions for achieving federal environmental sustainability goals.[1] The OIG assessed whether VHA is prepared to deliver increasingly sustainable health care, given the current resources for implementing the VA Sustainability Plan and the environmental challenges of today's healthcare industry.

Background

Healthcare Pollution: The Environmental Impact on Public Health

Health care in the United States is highly interconnected with industrial activities that "emit much of the nation's pollution to air, water, and soils."[2] Healthcare activities account for approximately 10 percent of all United States greenhouse gas (GHG) production.[3] Health care also generates five million tons of waste each year, making it one of the largest waste-producing sectors in the country.[4] Various forms of healthcare waste are attributed to "potential[ly] harmful effects . . . on public health" and extend beyond the many health effects of climate change.[5]

Healthcare pollution has been estimated to lead to a public health "disease burden" similar in magnitude to the annual deaths from preventable medical errors.[6] However, the negative health effects attributed to healthcare pollution are "largely unrecognized in health care," which has led to suggestions that the definition of patient safety should include "safeguarding public health

[1] VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*, October 2022.

[2] Matthew J. Eckleman and Jodi Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health," *PLoS ONE* 11, no. 6 (June 9, 2016), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0157014.

[3] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health;" GHGs are "[g]ases that trap heat in the atmosphere." GHGs "can remain in the atmosphere for different amounts of time, ranging from a few years to thousands of years" and "[s]ome gases are more effective than others at making the planet warmer and 'thickening the Earth's blanket.'" "Overview of Greenhouse Gases," United States Environmental Protection Agency, accessed March 6, 2023, https://www.epa.gov/ghgemissions/overview-greenhouse-gases.

[4] "Waste," Practice Greenhealth, accessed January 7, 2024, https://practicegreenhealth.org/topics/waste/waste-0; Navami Jain and Desiree LaBeaud, "How Should US Health Care Lead Global Change in Plastic Waste Disposal?" *American Medical Association Journal of Ethics* 24, no. 10 (October 1, 2022): 986–93, https://pubmed.ncbi.nlm.nih.gov/36215191/.

[5] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health."

[6] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health."

from health care pollution."[7] In a 2016 review of the environmental impacts from the United States healthcare industry on public health, healthcare pollution was called a "patient safety issue."[8] The review stated that "[h]ealth care pollution . . . prevention ought to be included in ongoing efforts to improve health care safety and quality."[9] Other reviews by the Centers for Disease Control and Prevention, academic researchers, and a non-governmental organization have identified some of the ways byproducts of the healthcare industry negatively affect public health, such as

- the release of particulate matter and smog that may cause or worsen various respiratory diseases;
- the production and use of ozone-depleting gases, resulting in increased ultraviolet radiation exposure and skin cancers; and
- environmental exposure to toxic and non-biodegradable wastes, leading to cancers and chronic health conditions.[10]

Additionally, the production of GHGs from the healthcare industry (primarily from fossil fuel use) contributes to climate change, resulting in extreme weather events, changes in insect-borne disease patterns, and negative impacts to water and food supplies and safety.[11]

In 2022, the United States established the Health Sector Climate Pledge to mobilize efforts to reduce GHG emissions.[12] Later that year at the United Nations Climate Conference, the White House and the Department of Health and Human Services announced progress on this pledge with a voluntary commitment from 102 organizations to meet climate resilience and GHG

[7] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health"; Matthew J. Eckelman et al., "Health Care Pollution and Public Health Damage in the United States: An Update," *Health Affairs* 39, no. 12 (December 2020), https://www.healthaffairs.org/doi/epdf/10.1377/hlthaff.2020.01247.

[8] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health."

[9] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health."

[10] Eckleman and Sherman, "Environmental Impacts of the U.S. Health Care System and Effects on Public Health"; Health Care Without Harm and Arup, *Health Care's Climate Footprint: How the Health Sector Contributes to the Global Climate Crisis and Opportunities for Action*, September 2019; National Center for Environmental Health, Centers for Disease Control and Prevention, *Preparing for the Regional Health Impacts of Climate Change in the United States*, July 2020.

[11] National Center for Environmental Health, Centers for Disease Control and Prevention, *Preparing for the Regional Health Impacts of Climate Change in the United States*.

[12] "HHS Shares Health Sector Emissions Reduction and Climate Resilience Announcements at COP27," US Department of Health & Human Services, accessed March 2, 2023, https://www.hhs.gov/about/news/2022/11/10/hhs-shares-health-sector-emissions-reduction-climate-resilience-announcements-at-cop27.html.

emissions reduction targets.[13] The organizations represented 837 hospitals as well as healthcare suppliers, insurance companies, pharmaceutical companies, and other stakeholders.[14]

Although large-scale commitments like the Health Sector Climate Pledge have united industry leaders in the cause of sustainability, establishing specific criteria has met resistance. In March 2023, The Joint Commission announced proposed "sustainability metrics" to "minimiz[e] hospitals' greenhouse gas emissions and waste."[15] The metrics would require hospitals to measure emissions from sources such as energy and anesthetic gas use, as well as solid waste disposal.[16] After a period of public comment, however, The Joint Commission reduced the metrics to "optional guidance" rather than enforceable requirements.[17]

VHA's Leadership Role in Sustainable Healthcare Delivery

VHA is the "largest integrated health care system in the United States" and provides care to over nine million enrolled patients at 1,321 healthcare facilities, including 172 medical centers and 1,138 outpatient sites.[18] VHA employs over 371,000 health care professionals and support staff, and has "more than 25,000 active volunteers, 113,000 health professions trainees, and nearly 16,000 affiliated medical faculty."[19]

Given VHA's significant contribution to the delivery of United States health care, it is in a unique position to take a leadership role in addressing the environmental consequences of United States healthcare operations.

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[13] The Health Sector Climate Pledge represents an April 2022 partnership between the Department of Health and Human Services and the White House that calls for hospitals, health systems, pharmaceutical companies, and other healthcare industry stakeholders across the United States "to commit to tackling the climate crisis through a new initiative aimed at reducing emissions across the health care sector." "HHS Launches Pledge Initiative to Mobilize Health Care Sector to Reduce Emissions," US Department of Health and Human Services, accessed December 18, 2023, https://www.hhs.gov/about/news/2022/04/22/hhs-launches-pledge-initiative-mobilize-health-care-sector-reduce-emissions.html.

[14] "HHS Shares Health Sector Emissions Reduction and Climate Resilience Announcements at COP27," US Department of Health and Human Services.

[15] Alexander S. Rabin and Elizabeth G. Pinsky, "Reducing Health Care's Climate Impact – Mission Critical or Extra Credit?" *The New England Journal of Medicine* 389 (August 17, 2023): 583–585, https://www.nejm.org/doi/full/10.1056/NEJMp2305709; "Comment on proposed new requirements to address environmental sustainability," Joint Commission Online, accessed March 4, 2024, https://www.jointcommission.org/resources/news-and-multimedia/newsletters/newsletters/joint-commission-online/march-22-2023.

[16] Rabin and Pinsky, "Reducing Health Care's Climate Impact – Mission Critical or Extra Credit?"

[17] Rabin and Pinsky, "Reducing Health Care's Climate Impact – Mission Critical or Extra Credit?"

[18] "Veterans Health Administration, About VHA," VA, accessed November 27, 2023, https://www.va.gov/health/aboutvha.asp#:~:text=The%20Veterans%20Health%20Administration%20(VHA,Veterans%20enrolled%20in%20the%20VA.

[19] "Veterans Health Administration, About VHA," VA.

The 2022 VA Sustainability Plan and Its Priority Actions

In December 2021, Executive Order 14057 was issued to "reestablish the Federal Government as a leader in [environmental] sustainability."[20] The order's accompanying "Implementing Instructions" set forth "ambitious commitments" requiring "action by each and every agency."[21] Principal agencies, such as the VA, must have a chief sustainability officer and create a sustainability plan that contains targets and tracks annual progress toward those targets.[22]

To meet the commitments of the executive order, the VA Secretary signed the VA Sustainability Plan in October 2022, which outlines the agency's eight priority actions:

1. *One Hundred Percent Carbon Pollution-Free Electricity*
2. *One Hundred Percent Zero-Emission Vehicle Fleet*
3. *Net-Zero Emissions Buildings, Campuses and Installations*
4. *Reducing Waste and Pollution*
5. *Sustainable Procurement*
6. *Climate- and Sustainability-Focused Federal Workforce*
7. *Incorporating Environmental Justice*
8. *Accelerating Progress through Partnerships*

The VA Sustainability Plan states that achieving the goals of the executive order requires "cross-agency buy-in" of determined targets, strategies, and policy changes.[23]

Objectives of the Review

The OIG reviewed VA Sustainability Plan implementation through the healthcare lens of VHA. The review included three objectives, ranging in scope from expansive to narrow, to estimate VHA's progress toward environmental sustainability. Objective 1 broadly looked at VHA's approach to implementing the plan, while objective 2 focused on a single foundational priority action to help VHA's sustainability efforts. Objective 3 drilled down into practical sustainability activities.

Objective 1: To identify VHA's overall approach to implementing the VA Sustainability Plan.

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[20] Exec. Order No. 14057, 86 Fed. Reg. 70935 (Dec. 8, 2021).

[21] The White House Council on Environmental Quality, *Implementing Instructions for Executive Order 14057 Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*, August 2022.

[22] Exec. Order No. 14057; The White House Council on Environmental Quality, *Implementing Instructions for Executive Order 14057 Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*.

[23] VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*.

Objective 2: To determine VHA's strategy for implementing the *Climate- and Sustainability-Focused Federal Workforce* priority action, which aimed to educate and engage VHA's workforce to achieve sustainability practices.

Objective 3: To illustrate the relationship of select priority actions with existing environmental challenges in health care through targeted reviews at VHA. Specifically, the OIG reviewed VHA's

- purchased inhalational anesthetics to determine their contribution to GHG emissions (priority action *Net-Zero Emissions Buildings, Campuses and Installations*);
- waste stream processes and tracking (priority action *Reducing Waste and Pollution*); and
- ethylene oxide use for sterile processing (priority action *Reducing Waste and Pollution*).

Scope and Methodology

The OIG conducted a national questionnaire regarding facility implementation of the VA Sustainability Plan and interviewed key VA and VHA staff involved in the implementation of the plan or familiar with the plan's priority actions. The OIG also reviewed VHA facility data on inhalational anesthetics.

Questionnaire Purpose, Development, and Distribution

The OIG developed a questionnaire to determine whether the resources, support of facility leaders, and training necessary to implement the VA Sustainability Plan were available to staff. The OIG electronically distributed a questionnaire to facility-appointed sustainability officers in May 2023. In the event the facility did not have an appointed sustainability officer, the OIG sent the questionnaire to the facility director. The OIG sent the questionnaire to 139 recipients.[24] By October 2023, the OIG received a 100 percent response rate; approximately 89 percent of the respondents were facility sustainability officers and roughly 11 percent were facility directors.[25]

[24] For the purpose of this report, "facility" and "medical center" are used synonymously. Each of the 139 facilities that contributed questionnaire and inhalational anesthetics purchase data is a medical center with a unique station number. VHA defines a medical center as a facility "that provides at least two categories of care (inpatient, outpatient, residential, or institutional extended care)." "VAST Snapshot 2: VHA Station Listing, Data Definitions," VHA Support Service Center (VSSC), https://vssc.med.va.gov/VSSCMainApp/products.aspx?PgmArea=63&sub_ID=221. (This site is not publicly accessible.)

[25] Of the 139 respondents, 124 identified as facility sustainability officers and 15 did not. Of those 15 who were not facility sustainability officers, 13 identified as medical center directors while 2 did not respond to the question "If your facility does not have a Sustainability Officer, are you the Medical Center Director?"

Respondents were provided with multiple choice or "yes" or "no" response questions regarding how they became familiar with the VA Sustainability Plan and who is primarily responsible for implementation.[26] However, for the questions that focused on those responsible for each priority action of the plan, respondents were asked to select between roles such as the VHA Green Environmental Management System (GEMS) program, facilities, or capital asset managers; Environmental Management Service, Engineering, and Health and Safety chiefs; facility sustainability officer; management at the Veterans Integrated Service Network (VISN) or VA Central Office levels; no one; or other (not listed). The OIG did not independently verify the questionnaire responses for accuracy.

Interviews

The OIG conducted virtual interviews with the VA Chief Sustainability Officer, VHA Healthcare Environment and Facilities Programs (HEFP) executive director, VHA GEMS and Waste and Recycling program managers, and director and assistant director of the VHA National Anesthesia Service (NAS) to assess VHA's structure and means to implement the 2022 VA Sustainability Plan, as well as applicable implementation progress.

Facility Data Requests and Analysis

The OIG requested VHA facilities provide data for inhalational anesthetics purchased from October 1, 2018, through September 30, 2021. To obtain the data, the OIG received two lists of VHA-designated facility points of contact: one group represented facility designee(s) who had access to procurement data for inhalational anesthetic potent agents (Group A) and the other group represents facility designee(s) who had access to procurement data for nitrous oxide (Group B).[27] While Group A represented facility staff who work specifically in pharmacy, Group B represented staff from a larger range of facility services and authority levels. Services included inventory management, acquisition utilization, logistics, and supply chain, and authority levels ranged from program support and administrative staff to an associate medical center director.

Although the OIG did not independently verify VHA data for accuracy or completeness, the OIG found Group B's data from October 1, 2018, through September 30, 2020, was inconsistent: for example, facility-reported amounts of nitrous oxide purchased did not match the amount clinicians reported using. The most complete nitrous oxide purchase data, with the fewest

[26] Of note, respondents were presented with two open text questions to provide (1) the name of the facility sustainability officer if the respondent was misidentified, and (2) more information on how facility waste is tracked.

[27] Inhalational anesthetics include two distinct categories of medications, "potent agents," and the compressed medical gas nitrous oxide. Potent agents are liquids whose vapors, when inhaled in very low concentrations, produce sufficient depth of anesthesia for a surgical procedure. Nitrous oxide is considered a "weak" anesthetic because even when inhaled at very high concentrations, on its own it is not enough to produce a sufficient level of anesthesia for a surgical procedure. However, nitrous oxide is often used as a form of sedation for procedures that do not require a patient to be fully unconscious, such as dental procedures.

inconsistencies, was from October 1, 2020, through September 30, 2021, which is further highlighted in the *Purchased Inhalational Anesthetics and Their Contributions to GHG Emissions* section of the review results.

In the absence of current VA or VHA policy, the OIG considered previous guidance to be in effect until superseded by an updated or recertified directive, handbook, or other policy document on the same or similar issue(s).

Oversight authority to review the programs and operations of VA medical facilities is authorized by the Inspector General Act of 1978, as amended, 5 U.S.C. §§ 401–424. The OIG reviews available evidence within a specified scope and methodology and makes recommendations to VA leaders, if warranted. Findings and recommendations do not define a standard of care or establish legal liability.

The OIG conducted the review in accordance with *Quality Standards for Inspection and Evaluation* published by the Council of the Inspectors General on Integrity and Efficiency.

Overview of VHA GEMS

In December 2005, VHA implemented GEMS as a "systematic management approach to develop and implement . . . [an] environmental policy and manage its environmental program."[28] Additionally, the GEMS program "ensures environmental compliance, prevents pollution, increases environmental performance, and reduces the facility's overall environmental footprint."[29]

VHA utilizes national-level GEMS program managers for the management and operations of agency-wide environmental programs. Responsibilities include the development and implementation of GEMS program national goals and strategic plans, as well as the maintenance

[28] VHA Healthcare Environment and Facilities Programs, *Green Environmental Management System (GEMS) Guidebook*, February 2020; VHA Healthcare Environment and Facilities Programs, *Green Environmental Management System (GEMS) Guidebook*, June 2023; VHA Directive 2005-011, *VHA Green Environmental Management System (GEMS) and Governing Environmental Policy Statement*, March 7, 2005. This directive was rescinded by VHA Directive 7707, *VHA Green Environmental Management System (GEMS) and Governing Environmental Policy Statement*, December 29, 2015; This directive was rescinded and replaced by VHA Directive 7707, *VHA Green Environmental Management System and Governing Environmental Policy*, April 1, 2021.

[29] VHA Healthcare Environment and Facilities Programs, *Green Environmental Management System (GEMS) Guidebook*, June 2023.

of effective communication with VISNs and medical centers on environmental best practices, goals, and regulations.[30]

VHA medical centers must have one full-time GEMS program manager and establish a multi-disciplinary GEMS committee to set and monitor "annual goals for continual improvement of environmental performance."[31] The facility GEMS program manager is responsible for providing guidance on and ensuring compliance with environmental regulatory requirements and the facility director must ensure accomplishment of these responsibilities.[32] Environmental compliance activities include

- developing and updating facility environmental policy,
- setting annual objectives and targets to "pursue continual improvement of environmental performance,"
- developing and providing environmental compliance training,
- completing environmental inspections and ensuring corrections are implemented where indicated, and
- providing consultation on waste management.[33]

Commitment from facility leaders and senior managers is required to ensure an effective GEMS program and make certain that "environmental policy is communicated throughout the facility."[34] Furthermore, VHA requires appointment of a facility-level sustainability officer from "Senior Leadership . . . as the champion for environmental sustainability programs within their organization."[35]

[30] VHA Directive 7707, December 29, 2015; VHA Directive 7707, April 1, 2021. Both directives contain similar language regarding the responsibilities for development and implementation of the GEMS program. VA asserts that an effective environmental management system "requires communication throughout the organization" and should include "clear articulation of environmental roles and responsibilities"; VA Directive 0057, *VA Environmental Management Program*, October 25, 2022. This directive replaced VHA Directive 0057, *VA Environmental Management Program*, January 15, 2010, which did not define an effective environmental management system.

[31] VHA Directive 7707, April 1, 2021. VHA requires a VA medical facility associate director or equivalent to chair the GEMS committee and recommends membership include the facility GEMS program manager and representatives from services including engineering and facilities management, environmental management services (EMS), pharmacy, research and clinical laboratories, nursing, food and nutrition, logistics, ethics, safety and industrial hygiene, the energy engineer, and the recycling coordinator. Additionally, VHA utilizes program managers at the VISN level to "provid[e] guidance, oversight and consultation to VISN VA medical facility GEMS Program Managers and ensur[e] environmental compliance."

[32] VHA Directive 7707, April 1, 2021.

[33] VHA Directive 7707, April 1, 2021.

[34] VHA Healthcare Environment and Facilities Programs, *Green Environmental Management System (GEMS) Guidebook*, June 2023.

[35] VHA Directive 7707.

Review Results

1. VHA's Approach to Implementing the VA Sustainability Plan

The OIG found that VHA is in the initial stages of implementing the VA Sustainability Plan and has not established sustainability goals specific to VHA healthcare delivery. While medical centers commonly assign responsibility for VA Sustainability Plan implementation to GEMS program managers, VHA HEFP leaders reported that facility GEMS program managers do not have the workload capacity to lead facility-level implementation.

In April 2022, VA chartered the Sustainability Task Force to help coordinate the department's implementation of Executive Order 14057.[36] The OIG learned through email correspondence that the next month, the VA Chief Sustainability Officer designated the VHA HEFP executive director as the VHA representative to the task force, responsible for coordinating VHA priorities related to the executive order.[37] The VHA HEFP executive director told the OIG that, in May 2023, the Sustainability Task Force initiated a healthcare working group, co-chaired by the VHA HEFP executive director.[38]

According to the VA Chief Sustainability Officer, VHA will provide specific goals to meet the targets outlined in the executive order; however, individual medical centers can work toward VA Sustainability Plan targets autonomously. Additionally, the OIG learned about the healthcare working group's role in VHA sustainability efforts:

[36] Chief Sustainability Officer, "VA Sustainability Task Force," memorandum to the Under Secretaries, Assistant Secretaries, and other Key Officials, April 1, 2022. The Sustainability Task Force consists of five work groups focused on the EO priority actions of "Carbon Pollution-Free Electricity; Zero-Emission Vehicles; Net-Zero Emissions Buildings; Net-Zero Emissions Procurement; and Climate Adaptation and Resiliency." Prior to initiation of the Sustainability Task Force, VA formed the Climate Change Task Force in response to Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*.

[37] VHA HEFP, "GEMS Program," (PowerPoint presentation), December 8, 2022. The Healthcare Environment and Facilities Programs (HEFP) include Occupational Safety and Health, Environmental Program Services, Enterprise Support Service, Healthcare Engineering, Capital Asset Management, and Special Engineering Projects. The GEMS program is organizationally aligned under HEFP in the Office of Occupational Safety and Health. Chief Sustainability Officer, "VA Sustainability Task Force," memorandum. Prior to appointment on the VA Sustainability Task Force, the VHA HEFP executive director was a member of the VA Climate Change Task Force.

[38] The VHA HEFP executive director reported the VA Sustainability Task force plans to utilize the healthcare working group to establish healthcare specific sustainability goals with the support of VHA Program Offices. The healthcare working group includes representatives from the following VHA Program Offices: Anesthesiology, Procurement and Logistics, Healthcare Technology Management, Emergency Management, Healthcare Environment and Facilities Program, Office of Sterile Processing Service, Research and Development, Nutrition and Food Service, Pharmacy Benefits Management, and Surgery.

- The VA Chief Sustainability Officer reported the group is responsible "for a range of healthcare delivery decarbonization opportunities such as reducing greenhouse emissions from anesthetics" and physical waste reduction.[39]
- The VHA HEFP executive director described that group members will help direct VHA program office standards and policy in support of the VA Sustainability Plan.

According to questionnaire results, respondents became familiar with the VA Sustainability Plan through three primary methods: review of the plan, communication from the facility GEMS program manager, and participation in facility GEMS committee meetings.[40] Respondents most commonly reported facility GEMS program managers as responsible for understanding, planning, operationalizing, and reporting progress on VA Sustainability Plan priority actions (see table 1).

Table 1. Assigned Responsibility for Implementation of the VA Sustainability Plan at Facilities

Implementation Step	Staff Assigned			
	Facility GEMS Program Managers (%)	Non-GEMS Facility Staff (%)	Other* (%)	Not Assigned (%)
Understanding	50	32	4	14
Planning	45	29	6	20
Operationalizing	45	27	6	22
Progress Reporting	49	28	4	19

Source: OIG analysis of questionnaire responses.
Note: The OIG rounded percentages to the nearest whole number.
**Other represents other facility-level VHA staff.*

The OIG learned that facility GEMS program managers have insufficient time to focus on sustainability activities. Specifically, the VHA HEFP executive director told the OIG that the primary responsibility of a facility GEMS program manager is compliance with environmental regulations, and that promoting and communicating sustainability improvement practices becomes secondary. The VHA GEMS program manager further described the complexity of environmental compliance, including

[39] Decarbonization refers to "reducing the greenhouse gas emissions produced by the combustion of fossil fuels" and "absorbing carbon from the atmosphere by capturing emissions and enhancing carbon storage." Renee Cho, "State of the Planet: What is Decarbonization, and How Do We Make It Happen?" Columbia Climate School, April 22, 2022, https://news.climate.columbia.edu/2022/04/22/what-is-decarbonization-and-how-do-we-make-it-happen/.

[40] Respondents were able to select more than one answer, reflecting multiple sources of VA Sustainability Plan awareness.

- evaluation of environmental regulations, which can be unique to each medical center based on their geographic area; and
- determination of which regulations apply to the medical center to ensure regulatory compliance.

The VHA GEMS program manager estimated that facility GEMS program managers spend no more than 10 percent of their time on sustainability due to their workload. The VHA GEMS program manager also reported that facility GEMS program managers are assigned collateral duties such as safety management and coverage for program manager vacancies at other VHA sites. Furthermore, the VHA program manager stated that recruitment, retention, and a 15 percent vacancy rate for facility program managers is a barrier to participation in sustainability activities.

The OIG found that VHA is in the initial stages of implementation and is beginning to determine how healthcare operations can contribute to VA's overall sustainability goals. The OIG learned that facility sustainability officers and medical center directors most commonly assigned responsibility for VA Sustainability Plan implementation to facility GEMS program managers. The OIG questions the effectiveness of the designation and surmises that this reliance on facility GEMS program managers could impede sustainability progress because facility program managers reportedly do not have the workload capacity to lead facility-level implementation.[41]

2. VHA's Strategy to Engage, Educate, and Train a Climate- and Sustainability-Focused Workforce

The OIG found that VA, inclusive of VHA, implemented the *Climate- and Sustainability-Focused Federal Workforce* priority action, as outlined in the VA Sustainability Plan. However, VA did not "incorporate environmental stewardship values," as required by the executive order, in educational content described in the VA Sustainability Plan.[42]

The OIG reviewed the VA Sustainability Plan and found that VA sought to achieve the priority action through a climate literacy campaign to increase awareness of climate change and the

[41] "Reportedly" refers to information gathered from VHA HEFP leaders.

[42] Exec. Order No. 14057; "Stewardship definitions," National Oceanic and Atmospheric Administration, accessed March 1, 2023, https://www.noaa.gov/office-education/noaa-education-council/monitoring-resources/common-measure-definitions/stewardship-definitions. Environmental stewardship is defined as safeguarding the environment through an awareness of how one's actions impact the environment and taking steps to preserve natural resources.

impacts to VA's employees and mission.[43] Specifically, the VA Sustainability Plan outlined employee engagement, education, and training efforts through

- creation of an online VA-wide training to provide a basic knowledge of climate change and its impact on VA operations,
- email communications from the VA Deputy Secretary to introduce the sustainability plan and promote the Sustainability Speaker Series, and
- development of a communication plan and climate adaptation SharePoint site for resource materials.[44]

VA produced an online training through its internal platform, the VA Deputy Secretary sent two outreach emails, and VA staff developed a communication plan and climate adaptation SharePoint site.[45] However, the OIG found that the online training and the communication plan did not incorporate environmental stewardship values. To achieve the goals of the executive order, the federal workforce must have the "knowledge and skills to effectively apply sustainability, climate adaptation, and environmental stewardship across disciplines and functions."[46] Furthermore, the executive order states agencies shall "incorporate environmental stewardship values."[47] Education inclusive of environmental stewardship

- connects individuals to their local environment, "help[ing] them understand how individual behavior impacts the environment," and
- encourages active roles in protecting resources, such as reduce, reuse, and recycle.[48]

The OIG found the online training addressed climate literacy and climate adaptation as intended, including how VA is taking steps to plan for continuity of operations in the setting of extreme

[43] VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*; VA, *VA Climate Literacy Campaign Communication Plan*, February 2022; VA Directive 0065, *Climate Change Adaptation and Resilience Planning*, May 13, 2022. VA utilizes the National Oceanic and Atmospheric Administration's definition of climate literacy as awareness of climate change and how one's actions further effect the climate.

[44] VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*.

[45] The OIG learned of these engagement efforts from an education analyst at VA's Employee Education System. VA's Talent Management System is an internal platform for employees to access on-demand trainings on a variety of subjects; "Sustainability Speaker Series for the Federal Community," Office of the Federal Chief Sustainability Officer, Council on Environmental Quality, accessed November 7, 2023, https://www.sustainability.gov/sustainability-series.html. The OIG found evidence that environmental stewardship values were incorporated in at least one presentation ("Protecting the Planet Wherever You Are with Bill Nye") of the VA Deputy Secretary-promoted Sustainability Speaker Series.

[46] Exec. Order No. 14057.

[47] Exec. Order No. 14057.

[48] "Stewardship definitions," National Oceanic and Atmospheric Administration.

weather events or natural disasters, but did not incorporate environmental stewardship values.[49] When asked about the content of the online training, the VA Chief Sustainability Officer told the OIG that the training is not mandatory and does not broadly cover sustainability. The VA Chief Sustainability Officer defined sustainability as how "our infrastructure and operations support the mission in the face of potential changes to the operating environment," rather than including the impact of an employee's actions or enterprise operations on the environment.[50]

VHA HEFP leaders, however, supported mandatory and more sustainability-focused training.[51] Specifically, the VHA HEFP executive director told the OIG that a mandatory training on environmental sustainability, on a broader scale, would "take [VHA] to the next level" and the VHA GEMS program manager believed VA's training could provide more practical information regarding sustainability. The VHA GEMS program manager added that it was early in the process and anticipated future training would be provided as it applies to the individual employee.

Although VA conducted employee engagement, education, and training, the OIG found facility staff's awareness of national-level efforts as outlined in the VA Sustainability Plan was lacking. Specifically, the OIG asked questionnaire respondents whether a plan for the *Climate- and Sustainability-Focused Federal Workforce* priority action had been developed and, if so, who was responsible:

- Almost half reported having no plan to develop a climate- and sustainability-focused workforce.
- About one-third reported no one was responsible for educating the workforce.

Although VHA requires each facility sustainability officer to spearhead environmental sustainability programs, the VA Chief Sustainability Officer told the OIG that no one within VHA is responsible for employee engagement to promote environmental stewardship values.[52] The VA Chief Sustainability Officer further explained that each facility has the autonomy to operationalize the VA Sustainability Plan, stating,

> [The medical centers] have a lot of autonomy . . . if they wanted to push the envelope to try to meet some of these things, there probably isn't going to be anyone that's going to stop them from doing that . . . if they aren't as enthused about meeting some of these targets . . . there's also nobody pushing them to do so.

[49] VA Talent Management System, *Enhancing VA's Resilience to Climate Change*, online training. An Education Analyst with the VA Employee Education System provided the OIG with the educational content of this training.

[50] The VA Chief Sustainability Officer clarified to the OIG that there is training for specific positions that includes sustainability, but nothing available to all VA employees.

[51] VHA HEFP leaders include the VHA HEFP executive director and the VHA GEMS program manager.

[52] VHA Directive 7707.

The OIG also learned from the VHA GEMS Manager that the facility sustainability officer position is a collateral role and appointees are not usually involved with or consulted on sustainability activities, in contrast to GEMS program managers.

The OIG concluded that VA implemented training according to the VA Sustainability Plan; however, the education and engagement efforts VA outlined in the plan did not incorporate environmental stewardship values as required by the executive order. Had the plan's educational efforts addressed environmental stewardship at the individual staff and organizational level, the implementation of a *Climate- and Sustainability- Focused Federal Workforce* would have more closely aligned with the executive order.

3. Illustrative Reviews of Healthcare-Related Topics at VHA

The OIG reviewed three topics that illustrate the relationship of select VA Sustainability Plan priority actions with existing environmental challenges in VHA healthcare delivery.

Purchased Inhalational Anesthetics and Their Contribution to GHG Emissions

The OIG reviewed VHA's purchased inhalational anesthetics and found that nitrous oxide was, by far, the largest contributor to waste anesthetic gas (WAG) GHG emissions, although desflurane was also a significant contributor. The OIG decided to review the contribution of inhalational anesthetics to VHA GHG emissions because they were mentioned in the VA Sustainability Plan and have also been identified by other healthcare organizations, including The Joint Commission, as contributors to healthcare GHG emissions. Additionally, inhalational anesthetics are directly related to health care, and are a source of GHG emissions that can be mitigated largely through provider education and without affecting patient safety.

Inhalational anesthetics, typically administered to patients during surgical procedures to achieve unconsciousness and pain relief, are a type of healthcare-specific scope 1 GHG emission.[53] The medical use of inhaled forms of anesthesia is responsible for approximately 5 percent of a hospital's GHG emissions and has continued to expand over recent decades, creating an increasing impact on the environment.[54] Inhalational anesthetics, typically unchanged after

[53] "Anesthetic Gas," Practice Greenhealth, accessed September 12, 2023, https://practicegreenhealth.org/topics/greening-operating-room/anesthetic-gas. Scope 1 emissions are those GHGs emitted directly from a facility. Matthew J. Eckelman et al., "Health Care Pollution and Public Health Damage in the United States: An Update."

[54] American Society of Anesthesiologists, *Greening the Operating Room and Perioperative Arena: Environmental Sustainability for Anesthesia Practice*, accessed February 28, 2023, https://www.asahq.org/about-asa/governance-and-committees/asa-committees/environmental-sustainability/greening-the-operating-room#5wsm; Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care*, April 2019, https://practicegreenhealth.org/sites/default/files/2019-04/anesthetic_gas_how-to.pdf.

patient use, are vented from the point of care to the outside air.[55] In this disposal process, unused inhalational anesthetics exhaled by the patient are collectively referred to as WAG. They have been largely unregulated due to historical beliefs that inhalational anesthetics are indispensable and their environmental impacts medically necessary and negligible.[56]

The most-used inhalational anesthetics are the potent anesthetic agents sevoflurane, isoflurane, and desflurane; and the compressed medical gas, nitrous oxide.[57] Desflurane and nitrous oxide have the most adverse GHG effects. Although desflurane accounts for a relatively small portion of purchased potent inhalational anesthetics, it represents the majority of GHG emissions attributed to these anesthetic vapors due to its high Global Warming Potential (GWP).[58] As a result, the University of Pittsburgh Medical Center, a major non-profit United States health system comprised of 40 hospitals, has phased out the use of desflurane.[59] Additionally, while nitrous oxide has a relatively low GWP in comparison to isoflurane and desflurane, it remains in the atmosphere for greater than 100 years after use and, therefore, exerts its GHG effects far longer than the other inhaled anesthetics. In light of this, one of the largest hospitals in the

[55] Shane Varughese and Raza Ahmed, "Environmental and Occupational Considerations of Anesthesia: A Narrative Review and Update," *Anesthesia & Analgesia* 133, no. 4 (October 2021): 826–35, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8415729/.

[56] Jodi Sherman et al., "Life Cycle Greenhouse Gas Emissions of Anesthetic Drugs," *Anesthesia & Analgesia* 114, no. 5 (May 2012): 1086–90, accessed February 15, 2023, https://pubmed.ncbi.nlm.nih.gov/22492186/; "Inhaled Anesthetic 2022 Challenge," American Society of Anesthesiologists, accessed February 28, 2023, https://www.asahq.org/about-asa/governance-and-committees/asa-committees/environmental-sustainability/inhaled-anesthetic-challenge.

[57] As previously noted, inhalational anesthetics include two distinct categories of medications, potent agents and the compressed medical gas nitrous oxide. Potent agents are liquids whose vapors, when inhaled in very low concentrations, produce sufficient depth of anesthesia for a surgical procedure. Nitrous oxide is considered a weak anesthetic because even when inhaled at very high concentrations, it is insufficient to produce a sufficient level of anesthesia, by itself, for a surgical procedure. However, nitrous oxide is often used, by itself, as a form of sedation for procedures that do not require a patient to be fully unconscious, such as dental procedures.

[58] GWP is a relative scale used to compare the global warming impacts of different GHGs. American Society of Anesthesiologists, *Greening the Operating Room and Perioperative Arena: Environmental Sustainability for Anesthesia Practice*; The larger the GWP, the more that a specific quantity of a GHG warms the earth relative to the same amount of CO_2, over a specified time. The period typically used when comparing the GWP of GHGs is 100 years. "Understanding Global Warming Potentials," United States Environmental Protection Agency, accessed September 22, 2023, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials; The 100-year GWPs of inhalational anesthetics are: sevoflurane (130), nitrous oxide (298), isoflurane (510), and desflurane (2540). Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care*. To illustrate the significance of a higher GWP, using desflurane for one hour has the same GHG effect as driving a car 235 to 470 miles. Whereas using sevoflurane or isoflurane, alternative anesthetic vapors, for an hour is approximately equal to the GHG effect of driving 18 to 40 miles. Susan M. Ryan and Claus J. Nielsen, "Global Warming Potential of Inhaled Anesthetics: Application to Clinical Use," *Anesthesia & Analgesia* 111 (July 2010), No. 1, 92–98, https://pubmed.ncbi.nlm.nih.gov/20519425/.

[59] Reid Frazier, "Health care has a massive carbon footprint. These doctors are trying to change that," National Public Radio, October 2, 2023, https://www.npr.org/2023/10/02/1202389187/hospitals-climate-change?ft=nprml&f=1199537689.

United States, Massachusetts General Hospital, has asked their anesthesia providers to consider limiting the use of nitrous oxide.[60]

While WAG from inhalational anesthetics is a small contributor to the overall global warming effects of United States health care, achievement of the VA Sustainability Plan target for net-zero GHG emissions from buildings, campuses, and installations by 2045 will require a comprehensive mitigation strategy.[61] Practice Greenhealth is a leading sustainable healthcare organization, partnering with more than 1,500 hospitals and health systems across the United States and Canada, including VHA, to provide environmental guidance, resources, and best practices. Practice Greenhealth identifies establishing a baseline of procurement data as an essential early step for GHG emission reduction from inhalational anesthetics.[62]

Toward that goal, the OIG assessed the quantities of inhalational anesthetics purchased by VHA facilities as a surrogate for inhalational anesthetic clinical usage, which is consistent with industry-established methodology. This data illustrates a distinct category of VHA's contribution to GHG emissions and provides a glimpse into the agency's "starting point" on the journey toward the VA Sustainability Plan target of net-zero GHG emissions.[63]

The OIG reviewed inhalational anesthetic purchase data from each VHA facility from October 1, 2020, through September 30, 2021. The OIG found that VHA purchased (by volume) the following potent agents in order of percentage: sevoflurane (77.4 percent), desflurane (14.0 percent), and isoflurane (8.6 percent). Although desflurane accounted for only 14 percent of purchased potent agents by volume, its contribution to GHG emissions (by carbon dioxide equivalent, CO_2e) was the most significant of the potent agents, representing approximately 74

[60] Martha Bebinger, "Mass General tries performance reports to cut greenhouse gas use in anesthesia," *WBUR*, accessed January 30, 2023, https://www.wbur.org/news/2023/01/10/mass-general-hospital-report-cards-climate-change-anesthesia.

[61] Varughese and Ahmed, "Environmental and Occupational Considerations of Anesthesia: A Narrative Review and Update"; Ryan and Nielsen, "Global Warming Potential of Inhaled Anesthetics: Application to Clinical Use"; VHA's National Anesthesia Program was cited in the 2022 VA Sustainability Plan as an example of progress in the *Net-Zero Emissions Buildings* priority action, prompting further oversight from OIG. VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*; Global warming is the effect in which GHGs, released into the air, "warm the Earth by absorbing energy and slowing the rate at which the energy escapes [in]to space . . . act[ing] like a blanket insulating the Earth." "Understanding Global Warming Potentials," United States Environmental Protection Agency.

[62] Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care*.

[63] Measuring procurement quantities of inhalational anesthetics over a period of time is an established methodology for approximating usage of inhalational anesthetics. Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care*; VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*; "Inhaled Anesthetic 2022 Challenge, Reduce Inhaled Anesthetic Atmospheric Waste," American Society of Anesthesiologists.

percent of the estimated GHG emissions (see figure 1).[64] (See appendix D for individual facility data on the volume of purchased inhalational anesthetics and their carbon dioxide equivalent.)

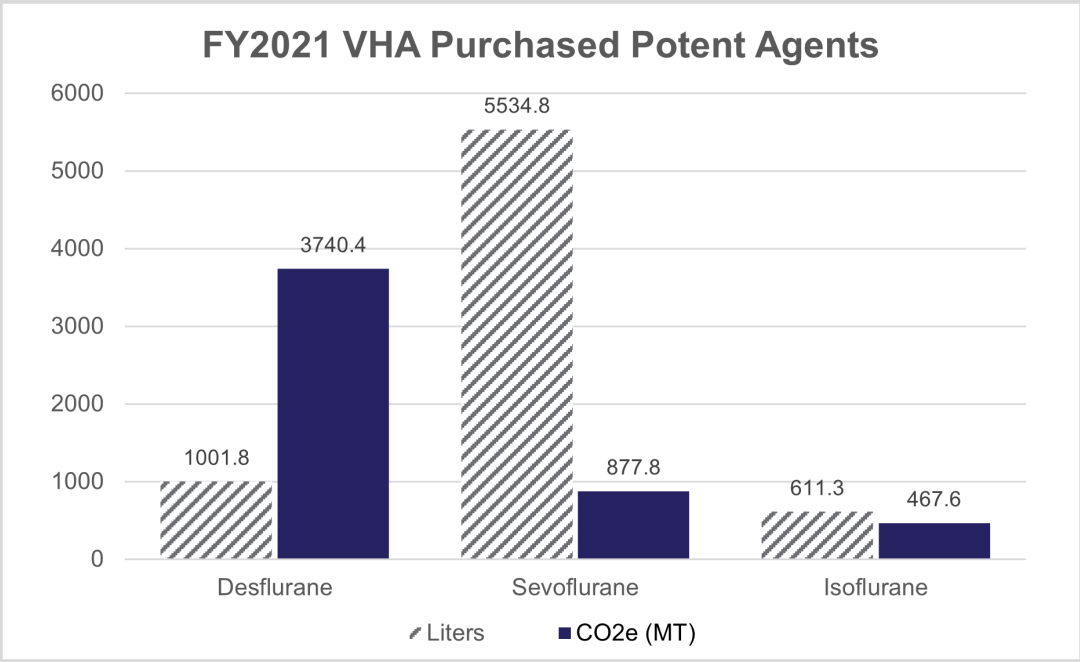

Figure 1. *VHA purchased potent agents by volume (liters) and their carbon dioxide equivalent for FY 2021.*
Source: VA OIG analysis and conversion of VHA inhalational anesthetic purchase data.
Notes: 1,000 kilograms (kg) equals 1 metric ton (MT). Fiscal years for federal agencies include an annual period of October 1 of one calendar year through September 30 of the following year.

The OIG also found that VHA collectively purchased approximately 72,000 kg of nitrous oxide in FY 2021. This is equivalent to the GHG emissions from driving nearly 50 million miles in gas-powered cars.[65] When converted to the common GHG unit, CO_2e, nitrous oxide accounted for approximately 81 percent of the total CO_2e emissions from all purchased inhalational anesthetics, greater than four times the global warming impact of all the potent anesthetic agents combined (see figure 2).

[64] The OIG converted VHA's reported purchase quantities of inhalational anesthetics in kilograms (kg) to carbon dioxide equivalent (CO_2e) in kg, a common way to compare the global warming impact of different GHGs (see appendix C).

[65] "Greenhouse Gas Equivalencies Calculator," United States Environmental Protection Agency, accessed January 22, 2024, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results.

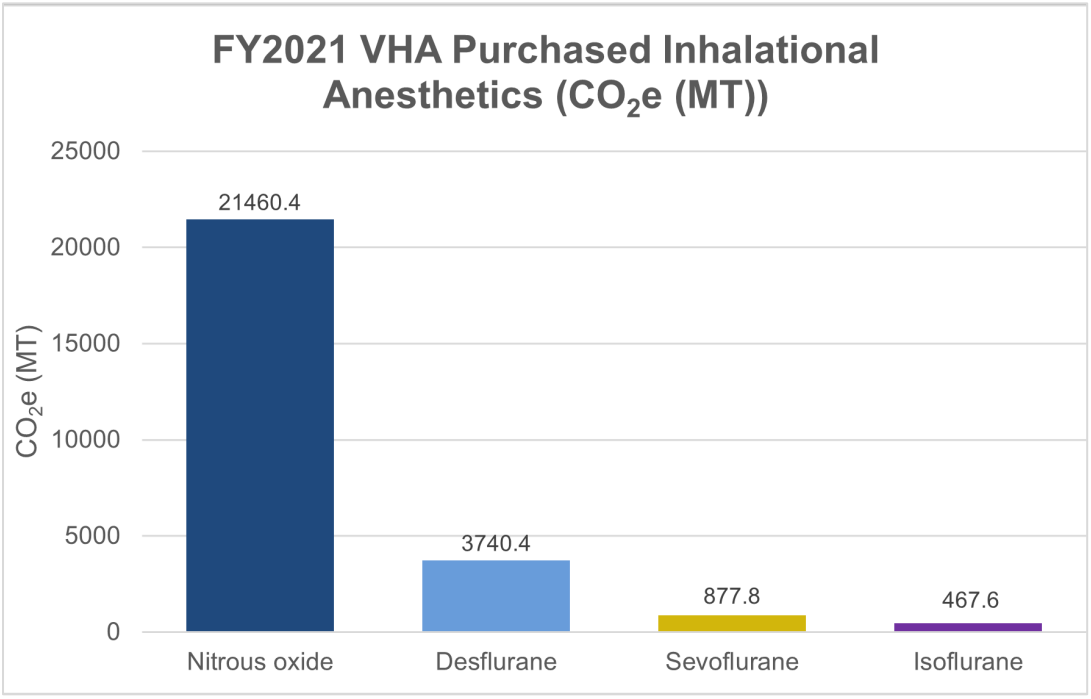

Figure 2. *CO_2e (MT) for VHA purchased inhalational anesthetics (FY 2021).*
Source: VA OIG analysis and conversion of VHA inhalational anesthetic purchase data.

During an interview, VHA National Anesthesia Service (NAS) leaders acknowledged the environmental consequences of WAG emissions, stating that "anesthesia is a relatively small component of healthcare, but it has an outsized footprint . . . just some small changes we could make, like directing people away from desflurane . . . and the elimination of nitrous oxide . . . would have a big positive effect." NAS leaders, however, cited no requirement for VHA facilities to track inhalational anesthetics and stated that the program office does not provide national oversight of procurement or usage.

NAS leaders acknowledged a need to educate providers that, for example, there are clinical alternatives to desflurane "that are just as good." The NAS leaders reported being in the early stages of creating initiatives to reduce the use of desflurane and nitrous oxide, through policy discussions with the anesthesia field advisory board and VISN anesthesia consultants.[66]

In an interview with the OIG seven months later, NAS leaders reiterated that no specific guidance was conveyed to them about VHA anesthesia-specific sustainability or environmental stewardship goals related to the VA Sustainability Plan, other than to broadly incorporate those

[66] NAS leaders acknowledged the need to consult the environmental recommendations of the American Society of Anesthesiologists and the American Association of Nurse Anesthetists, as anesthesia providers at VHA include both physician anesthesiologists and certified registered nurse anesthetists, respectively. NAS utilizes an anesthesia field advisory board, a group of five physician anesthesiologists and five certified registered nurse anesthetists selected from leadership positions across the enterprise, to serve as an advisory body and develop VHA-wide recommendations.

themes into "long-term [anesthesia] program office plans." According to NAS leaders, a WAG educational initiative was started in early 2023 with an initial focus on reaching VISN anesthesia leadership across VHA through regularly scheduled calls, PowerPoint presentations, and in-person meetings to communicate NAS recommendations for the reduction of WAG. Initial steps of WAG reduction focused on "high impact," "easiest to implement," and "lowest cost" recommendations, while still providing safe patient care. NAS also initiated discussions with VHA stakeholders, such as pharmacy service leaders, to determine how to assess historical and future inhalational anesthetic purchase quantities; however, data procurement processes had not been clarified as of October 2023.

NAS has increased its attention to the environmental impacts of inhalational anesthetics in 2023. It continues to provide guidance to VISN leadership on strategies to accomplish GHG reduction from inhalational anesthetic use, particularly nitrous oxide and desflurane. It is exploring ways to measure purchasing data to track and trend the effects of VHA-wide mitigation strategies, but this data acquisition process has not been clarified yet.

Established Mitigation Strategies for Inhalational Anesthetic Contributions to GHG Emissions

The American Society of Anesthesiologists and Practice Greenhealth published evidenced-based strategies to help hospitals reduce GHG emissions from inhalational anesthetics.[67] These approaches include using less inhalational anesthetic, avoiding high-impact GHG anesthetics such as desflurane and nitrous oxide, using alternatives to inhalational anesthetics such as regional or intravenous forms of anesthesia, decommissioning centralized nitrous oxide piping, and using available WAG trapping technology to prevent release of WAG to the atmosphere.

Some facilities are further along in their journey to reduce GHG emissions from inhalational anesthetics than others. According to the VA Sustainability Plan, the Jesse Brown VA Medical Center (VAMC) is piloting technology added to anesthesia machines to capture WAG rather than release it into the atmosphere. The captured anesthetics can be cleaned and recycled. Additionally, an anesthesia leader at the Jesse Brown VAMC told the OIG that making desflurane less accessible dramatically reduced its use.

In fall 2023, NAS leaders reported that a group of facilities, including the Jesse Brown VAMC in Chicago, Lieutenant Colonel Charles S. Kettles VAMC in Ann Arbor, and the VA Boston Healthcare System, continue to pilot the WAG trapping technology. The leaders indicated that the approach had "worked pretty well" and may be an "excellent solution." The leaders reported continued support for making desflurane less convenient to use, without taking it away from

[67] American Society of Anesthesiologists, *Greening the Operating Room and Perioperative Arena: Environmental Sustainability for Anesthesia Practice*. The American Society of Anesthesiologists provides recommendations for reducing the environmental impact of inhalational anesthetics on climate change; Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care*.

anesthesia providers entirely, which continues to be a successful strategy. Practice Greenhealth illustrated the success of this strategy by reporting that, in 2019, 22 percent of Practice Greenhealth hospitals made desflurane available "only by clinician request" to limit its use, and 27 percent have eliminated desflurane from their pharmacy formularies.[68] Additionally, the OIG found that some VHA facilities, such as those in Beckley and Huntington, West Virginia and Jackson, Mississippi, responded to anesthesia providers' reduced use of nitrous oxide by discontinuing purchase altogether.

The OIG concluded that nitrous oxide was the largest contributor to GHG emissions from VHA's purchased inhalational anesthetics, although desflurane was also a significant contributor. NAS has increased their support of VHA medical facilities' efforts to reduce WAG and is developing methods to track enterprise-wide purchasing of inhalational anesthetics. With no universal solution to achieve healthcare-related GHG reductions, progress will need to be made across many contributing areas within VHA. While inhaled anesthetics represent a small contribution to health care's overall effect on climate change, their long-term cumulative impact as GHGs warrants consideration of a comprehensive mitigation strategy in pursuit of the VA Sustainability Plan's priority action goal of achieving net-zero GHG emissions by 2045.

Facility Waste Stream Processes

The OIG found that VHA tracks facility waste streams through an enterprise-wide database and has implemented strategies to reduce waste and recycle, as indicated in the VA Sustainability Plan. However, the OIG determined that VHA's reuse is limited. The OIG noted an industry trend of organizations shifting away from reusable medical devices and a VHA policy that prohibits repurposing single-use medical devices at facilities.[69]

The Environmental Protection Agency identifies reduction, reuse, and recycling as preferred methods of waste management and key factors of environmental sustainability.[70] The VA Sustainability Plan outlines that "VA policy is to reduce, reuse and recycle materials and waste . . . to the maximum extent practicable."[71] The VHA Waste and Recycling program manager told the OIG that VHA has no ability to track waste from individual service lines at the facility level or enterprise-wide, such as the amounts of waste generated specifically by operating rooms. However, VHA does require each facility to submit waste data quarterly and annually through the VHA Waste Tracker, a database used "to collect waste data from all VA medical

[68] Practice Greenhealth, *Anesthetic gas how-to guide: A guide to climate-smart anesthesia care.*

[69] VHA Directive 1850.06, *Waste Management Program,* July 22, 2022.

[70] "Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy," United States Environmental Protection Agency, accessed November 6, 2023, https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy.

[71] VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*.

facilities."[72] Reported data must include all waste generated by a facility, such as solid waste, regulated medical waste, pharmaceutical waste, and recycling.[73]

The VHA Waste and Recycling program manager also reported that VHA tracks waste data to monitor progress in an "annual VA sustainability practice, waste management and electronics report." The program manager explained that determining how waste is diverted (from landfills) and minimized is directly influenced by

- a facility's local economy,
- which materials are recycled locally and the location of recycling centers, and
- whether the cost, logistics, and environmental impact required to recycle the material is feasible.

Regarding sustainability goals, the program manager told the OIG that

- VHA's waste diversion rates have improved from 35 to 41 percent since 2018, and
- Environmental Management Services and GEMS staff received training to improve recycling, which has consistently increased since 2020.[74]

To further clarify and improve its processes, VHA contracted with a specialized consulting firm to assess the waste system at the Richmond VAMC in Virginia.[75] The assessment, completed in October 2021 and published March 2022, sought to identify "realistic" diversion rates, improve waste tracking and recycling, and modify facility recycling practices. The assessment reviewed facility waste collection, transport, processing, and diversion, and found several opportunities for improvement, such as clear displays and labels for recycling and pairing waste bins with recycling bins.[76] The VHA Waste and Recycling program manager told the OIG that to better assess realistic goals for waste diversion and recycling, two more facility waste diversion studies are pending.

The VHA Waste and Recycling program manager also told the OIG there has been "an increase in disposable items in healthcare." An October 2023 review of the healthcare industry's transition from reusable medical devices to single-use plastic devices and the related environmental and health impacts acknowledged that "single-use disposability" may be necessary in some situations, but "broad-scale, unfettered, and irrational adoption of disposable

[72] VHA Directive 1850.06. The VHA Waste and Recycling program manager told the OIG that the Waste Tracker was implemented in the fall of 2019.

[73] VHA Directive 1850.06.

[74] The Executive Order requires each agency to annually divert at least 50 percent of non-hazardous solid waste, from landfills, by October 1, 2024. Exec. Order No. 14057.

[75] VA, *Final Report: HHMMC Waste System Assessment*, March 2022. (This report is not publicly accessible.)

[76] VA, *Final Report: HHMMC Waste System Assessment.*

items . . . is harmful [and] unsustainable . . . " [77] "The single-use label is self-designated by manufacturers, not the [Food and Drug Administration]," for many reasons, including the choice not to conduct the studies to demonstrate reusability. However, the private sector repurposes single-use devices by cleaning and sterilizing them "for reuse as [Food and Drug Administration]-approved 'reprocessed' medical devices."[78]

Practice Greenhealth reported that, in 2017, the repurposing of single-use medical devices was estimated to have diverted 786 tons of landfill waste for one healthcare system.[79] The OIG determined that although VHA reported making progress to reduce waste and recycle, single-use medical devices, such as pulse oximetry sensors and blood pressure cuffs, may only be recycled. VHA prohibits reprocessing single-use devices, which is a barrier to reuse "to the maximum extent practicable."[80] According to the VHA Waste and Recycling program manager, VHA prohibits reuse of single-use medical devices, "and it's a shame because this is probably hundreds, hundreds and probably thousands of pounds [of waste] every year at all of our facilities."

The OIG concluded that VHA tracks waste streams and diversion from landfill and, through diversion studies, seeks to increase recycling and reuse efforts. However, the OIG determined that if VHA considered reusable rather than single-use medical devices when practical and permitted the selective repurposing of single-use devices, VHA landfill diversion rates could further improve.

[77] Matthew Smith, Hardeep Singh, and Jodi D. Sherman, "Infection Prevention, Planetary Health, and Single-Use Plastics," JAMA 330, no. 20 (October 2, 2023): 1947–48.

[78] Smith, Singh, and Sherman, "Infection Prevention, Planetary Health, and Single-Use Plastics."

[79] "Reprocessed Medical Devices," Practice Greenhealth, accessed October 25, 2023, https://practicegreenhealth.org/topics/greening-operating-room/reprocessed-medical-devices.

[80] VA, *2022 United States Department of Veterans Affairs (VA) Sustainability Plan*; *Practice Greenhealth, Greening the OR, 2011-2013*; VHA Directive 1116(2), *Sterile Processing Services (SPS),* March 23, 2016. This directive was in place during this initial review of items in this report. It was rescinded and replaced by VHA Directive 1116, *Management of Critical and Semi-Critical Reusable Medical Devices*, July 17, 2023. Both versions of this VHA policy prohibit reprocessing of single-use devices; however, the 2016 directive defined single-use devices as disposable, with intended use for one patient and one procedure, and the 2023 directive no longer contains this definition of single-use devices.

Use of Ethylene Oxide for Sterile Processing

Ethylene oxide is a gas used to sterilize medical devices that cannot be sterilized with heat or radiation.[81] The Food and Drug Administration reports that approximately 50 percent of all medical devices in the United States are sterilized with ethylene oxide.[82] Ethylene oxide is carcinogenic; hazardous to reproductive health; and can cause allergic reactions and severe short- and long-term impacts to the respiratory and central nervous systems, liver, and kidneys.[83] The odor is not easily detectable before it becomes harmful.[84] Those primarily exposed to ethylene oxide live near or work at a facility that releases the gas into the air.[85]

The OIG found that VHA reportedly eliminated the use of ethylene oxide in healthcare operations. VHA program offices accomplished this through collaboration and oversight efforts.

VHA permits the use of ethylene oxide for sterilization of reusable medical devices provided the use is minimized "as much as possible, with the ultimate goal of eliminating EtO [ethylene oxide] entirely within VHA."[86] When reusable medical devices requires sterilization with ethylene oxide, facility staff must determine whether an alternate option exists.[87]

During an interview, the VHA HEFP executive director reported VHA was working toward elimination of ethylene oxide prior to the development of the 2022 VA Sustainability Plan. The executive director told the OIG that in fall 2022, 4 of the 172 VHA medical centers reported continued use of ethylene oxide. As of January 2024, all medical centers eliminated the use of

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[81] "Sterilization of Medical Devices," US Food and Drug Administration, accessed March 1, 2023, https://www.fda.gov/medical-devices/general-hospital-devices-and-supplies/sterilization-medical-devices; "Infection Control: Sterilization Guideline for Disinfection and Sterilization in Healthcare Facilities (2008)," Centers for Disease Control and Prevention Website, accessed September 19, 2023," https://www.cdc.gov/infectioncontrol/guidelines/disinfection/sterilization/index.html#print. Sterilization of medical devices "destroys all microorganisms on the surface of an article or in a fluid to prevent disease transmission associated with the use of that item.

[82] "Sterilization of Medical Devices," US Food and Drug Administration.

[83] Carcinogenic means to produce "or tending to produce cancer." *Merriam-Webster.com Dictionary*, "carcinogenic," accessed October 18, 2023, https://www.merriam-webster.com/dictionary/carcinogenic; VAMC Site Visit Protocol, "VHA Veterans Integrated Service Network (VISN) External GEMS Audit (VEGA) Protocol," December 22, 2022. Of note, the VEGA Protocol reference is VHA Directive 2011-015, *Safe Use of Ethylene Oxide*, March 15, 2011. This was rescinded and replaced by VHA Directive 7713, *Safe Use of Ethylene Oxide*, April 6, 2017, revised May 10, 2017. The newer directive contains the same or similar language regarding ethylene oxide.

[84] VAMC Site Visit Protocol, "VHA Veterans Integrated Service Network (VISN) External GEMS Audit (VEGA) Protocol."

[85] "Our Current Understanding of the Human Health and Environmental Risk of Ethylene Oxide," United States Environmental Protection Agency, accessed March 1, 2023, https://www.epa.gov/hazardous-air-pollutants-ethylene-oxide/our-current-understanding-human-health-and-environmental; "Additional Questions about Ethylene Oxide (EtO)," United States Environmental Protection Agency, accessed September 28, 2023, https://www.epa.gov/hazardous-air-polluntants-ethylene-oxide/additional-questions-about-ethylene-oxide-eto.

[86] VHA Directive 7713.

[87] VHA Directive 7713.

ethylene oxide in healthcare operations.[88] The executive director reported that HEFP collaborated with the Office of Sterile Processing to provide facility-level oversight to ensure policy compliance regarding ethylene oxide use. Specifically, the executive director believed facilities that eliminated use of ethylene oxide transitioned to reusable medical devices and tools that could be sterilized with hydrogen peroxide.

The OIG concluded that VHA's reported elimination of ethylene oxide, a toxic environmental pollutant, in healthcare operations is progress toward the priority action of *Reducing Waste and Pollution*.

Conclusion

VHA is in the initial stages of implementing the VA Sustainability Plan, is beginning to determine how healthcare operations can contribute to VA's overall sustainability goals and has not established goals specific to VHA healthcare delivery. Facility GEMS program managers were most commonly assigned to lead facility-level implementation of the VA Sustainability Plan. Responsibilities included understanding, planning, operationalizing, and reporting priority action progress. Facility GEMS program managers, however, do not have the workload capacity for such responsibilities; thus, the OIG questions the effectiveness of this approach to meet sustainability goals.

VA, inclusive of VHA, implemented a training for employees focusing on climate change and continuity of VHA operations during extreme weather events, according to the VA Sustainability Plan. However, VA did not "incorporate environmental stewardship values," as required by the executive order, in the plan. Had VA incorporated the environmental stewardship element at the individual staff and organizational levels in the plan, the goals of the *Climate- and Sustainability-Focused Federal Workforce* priority action would have more closely aligned with the intent of the executive order.

The review of select practical sustainability activities related to existing environmental challenges in health care demonstrated that VHA is making progress toward sustainability in healthcare operations.

Of VHA's purchased inhalational anesthetics, nitrous oxide was, by far, the largest contributor to GHG emissions, although desflurane was also a significant contributor. NAS increased its attention to the environmental impacts of inhalational anesthetics by exploring ways to measure purchasing data to track and trend the effects of VHA-wide mitigation strategies. While inhaled anesthetics are relatively small contributors to health care's overall effect on climate change, their long-term cumulative impact as GHGs warrants consideration of a comprehensive

[88] During an interview, the VHA HEFP executive director did not know how many VA medical centers were using ethylene oxide prior to the initiation of VHA reduction efforts.

mitigation strategy in pursuit of the VA Sustainability Plan's priority action goal of achieving net-zero GHG emissions by 2045.

To increase recycling and reuse efforts, VHA tracks waste streams and diversion rates from landfill. VHA considers reusable rather than single-use medical devices when practicable. Additionally, VHA's prohibition of repurposing single-use medical devices impedes its ability to further improve landfill diversion rates.

VHA's reported elimination of ethylene oxide usage in sterile processing as of January 2024, from efforts that began prior to the 2022 VA Sustainability Plan, is progress toward the *Reducing Waste and Pollution* priority action.

Although the OIG is encouraged to see that VHA is beginning to plan and implement environmental sustainability actions, much more work needs to be done. VHA has the opportunity to serve as a model for other healthcare organizations that are looking to reduce their environmental footprint and create sustainable, long-term change.

Recommendations 1–5

1. The Secretary of Veterans Affairs considers incorporating environmental stewardship values into the goals of the *Climate- and Sustainability-Focused Federal Workforce* priority action in the VA Sustainability Plan to align with Executive Order 14057.
2. The Under Secretary for Health evaluates the facility-level Green Environmental Management System program manager position, and determines the position's responsibilities, if any, in the implementation of the VA Sustainability Plan.
3. The Under Secretary for Health considers broadening the scope of training, education, and engagement of Veterans Health Administration's workforce to include and incorporate environmental stewardship values.
4. The Under Secretary for Health encourages continued efforts by the Veterans Health Administration National Anesthesia Service to track and reduce greenhouse gas emissions from inhalational anesthetics and considers evaluation and implementation of a comprehensive waste anesthetic gas mitigation strategy, in pursuit of the VA Sustainability Plan's priority action goal of achieving net-zero greenhouse gas emissions by 2045.
5. The Under Secretary for Health considers the relative merits of single-use versus reusable medical devices and evaluates current Veterans Health Administration policy that prohibits the repurposing of single-use medical devices by VA medical centers to increase landfill waste diversion.

Appendix A: Office of the Secretary Memorandum

Department of Veterans Affairs Memorandum

Date: July 17, 2024

From: Office of the Secretary (00)

Subj: Healthcare Inspection—A Select Review of VHA's Implementation of the VA Sustainability Plan

To: Assistant Inspector General for Healthcare Inspections (54)

1. Thank you for the opportunity to review the Office of Inspector General (OIG) draft report on: *"A Select Review of VHA's Implementation of the VA Sustainability Plan."* OIG assigned one recommendation to the Secretary of the VA, which will be addressed by the Office of Management, Office of Asset Enterprise Management (OAEM). I concur with the recommendation and have attached an action plan.
2. The point of contact for this review is, Executive Director, OAEM.

(Original signed by:)

Margaret B. Kabat, LCSW-C, CCM

[OIG comment: The OIG received the above memorandum from VHA on July 18, 2024.]

Office of the Secretary

The following comments are submitted in response to the recommendations in the OIG draft report:

Recommendation 1: The Secretary of Veterans Affairs considers incorporating environmental stewardship values into the goals of the Climate- and Sustainability-Focused Federal Workforce priority action in the Veterans Affairs Sustainability Plan to align with the Executive Order 14057.

Response: VA concurs with the recommendation. The White House Council on Environmental Quality issues the template that guides agencies' development and submission of Strategic Sustainability Plans (SSP). The most recent SSP template for Fiscal Year 2025 no longer contains the referenced section related to environmental stewardship, and therefore is no longer a priority action. However, the Chief Sustainability Officer will work to incorporate environmental stewardship values into sustainability and climate-related trainings and outreach to satisfy the intent of the underlying Executive Order 14057. This will be implemented in relevant communications from VA's Chief Sustainability Officer, training, and outreach, as well as training collaborations with other VA organizations.

Target Completion Date: June 2025

Appendix B: Office of the Under Secretary for Health Memorandum

Department of Veterans Affairs Memorandum

Date: July 15, 2024

From: Under Secretary for Health (10)

Subj: Office of Inspector General (OIG) Draft Report, A Select Review of the Veterans Health Administration's (VHA) Implementation of the VA Sustainability Plan

To: Assistant Inspector General for Healthcare Inspections (54)

1. Thank you for the opportunity to review and comment on the OIG draft report regarding VHA's Implementation of the Sustainability Plan. VHA concurs in principle with recommendations two and five and concurs with recommendations three and four.

2. VHA is making progress in support of the VA Sustainability Plan's priority action goal to achieve net-zero greenhouse gas emissions by 2045.

3. Comments regarding the contents of this memorandum may be directed to the Office of Integrity and Compliance at vacovha10oicoig@va.gov.

(Original signed by:)

Shereef Elnahal, M.D., MBA

[OIG comment: The OIG received the above memorandum from VHA on July 15, 2024.]

Office of the Under Secretary for Health Response

VETERANS HEALTH ADMINISTRATION (VHA)

Action Plan

A Select Review of VHA's Implementation of the VA Sustainability Plan (Project No. 2023-00539-HI-1346)

Recommendation 2. The Under Secretary for Health evaluates the facility-level Green Environmental Management System program manager position, and determines the position's responsibilities, if any, in the implementation of the VA Sustainability Plan.

VHA Comments: Concur in Principle

The Veterans Health Administration (VHA) recognizes the importance of having dedicated personnel to manage environmental sustainability initiatives. Currently, several VHA medical centers have appointed Green Environmental Management System (GEMS) program managers who play a crucial role in overseeing and implementing environmental policies and compliance. These positions have proven beneficial to these facilities by promoting sustainable practices and ensuring regulatory adherence.

Nevertheless, there are considerable obstacles to implementing this role across all VHA medical centers. One primary issue is the current workload of GEMS program managers, who often have multiple responsibilities, such as environmental compliance, safety management, and covering for vacancies at other sites. This multifaceted role limits their capacity to focus solely on sustainability activities.

Furthermore, the recruitment and retention of qualified personnel for these positions are challenging due to a high vacancy rate. The complexity of environmental regulations, which vary by geographic location, adds another layer of difficulty in uniformly applying this role across all facilities. Therefore, while acknowledging the value of GEMS program managers, there are limitations to establishing such positions at every VA medical center.

Status: Complete Target Completion Date: July 2024

OIG Comment: The OIG considers this recommendation open to allow time for the submission of documentation to support closure.

Recommendation 3. The Under Secretary for Health considers broadening the scope of training, education, and engagement of Veterans Health Administration's workforce to include and incorporate environmental stewardship values.

VHA Comments: Concur

VHA fully supports the recommendation to expand training and education on environmental stewardship across its workforce. Incorporating these values aligns with the broader goals of the VA Sustainability Plan and Executive Order 14057, which emphasizes creating a climate- and sustainability-focused federal workforce.
To implement this recommendation, the VHA proposes the following strategies:

1. **Communication Campaigns**:
    - Launch communication campaigns to raise awareness about sustainability initiatives and their importance. This will include emails from senior leadership, promotional materials, and a dedicated SharePoint site with resources and updates on sustainability efforts.
2. **Integration into Existing Programs**:
    - Integrate environmental stewardship values into existing training programs for new hires and ongoing professional development. This ensures that all employees, regardless of their role, understand the significance of sustainability and are equipped with the knowledge to contribute positively.
3. **Engagement Activities**:
    - Organize engagement activities such as sustainability workshops, seminars, and speaker series to foster a culture of environmental consciousness. Encourage employees to participate in green initiatives and recognize those who make significant contributions to sustainability efforts.

Status: In Progress Target Completion Date: December 2024

Recommendation 4. The Under Secretary for Health encourages continued efforts by the Veterans Health Administration National Anesthesia Service to track and reduce greenhouse gas emissions from inhalational anesthetics and considers evaluation and implementation of a comprehensive waste anesthetic gas mitigation strategy, in pursuit of the VA Sustainability Plan's priority action goal of achieving net-zero greenhouse gas emissions by 2045.

VHA Comments: Concur

VHA's National Anesthesia Program issued an informational memorandum: *Reductions in Anesthesia Carbon Footprint*, published on May 17, 2024. This memo provided recommendations to VHA Medical Centers to reduce the use of inhalational anesthetic agents desflurane and nitrous oxide in anesthesia perioperative care.

The National Anesthesia Program collaborated with Pharmacy Benefits Management Services to implement the removal of desflurane from the National VA formulary enterprise-wide. The announcement to the field for this change will take effect by September 30, 2024.

Status: In Progress Target Completion Date: April 2025

Recommendation 5. The Under Secretary for Health considers the relative merits of single-use versus reusable medical devices and evaluates current Veterans Health Administration policy that prohibits the repurposing of single-use medical devices by VA medical centers to increase landfill waste diversion.

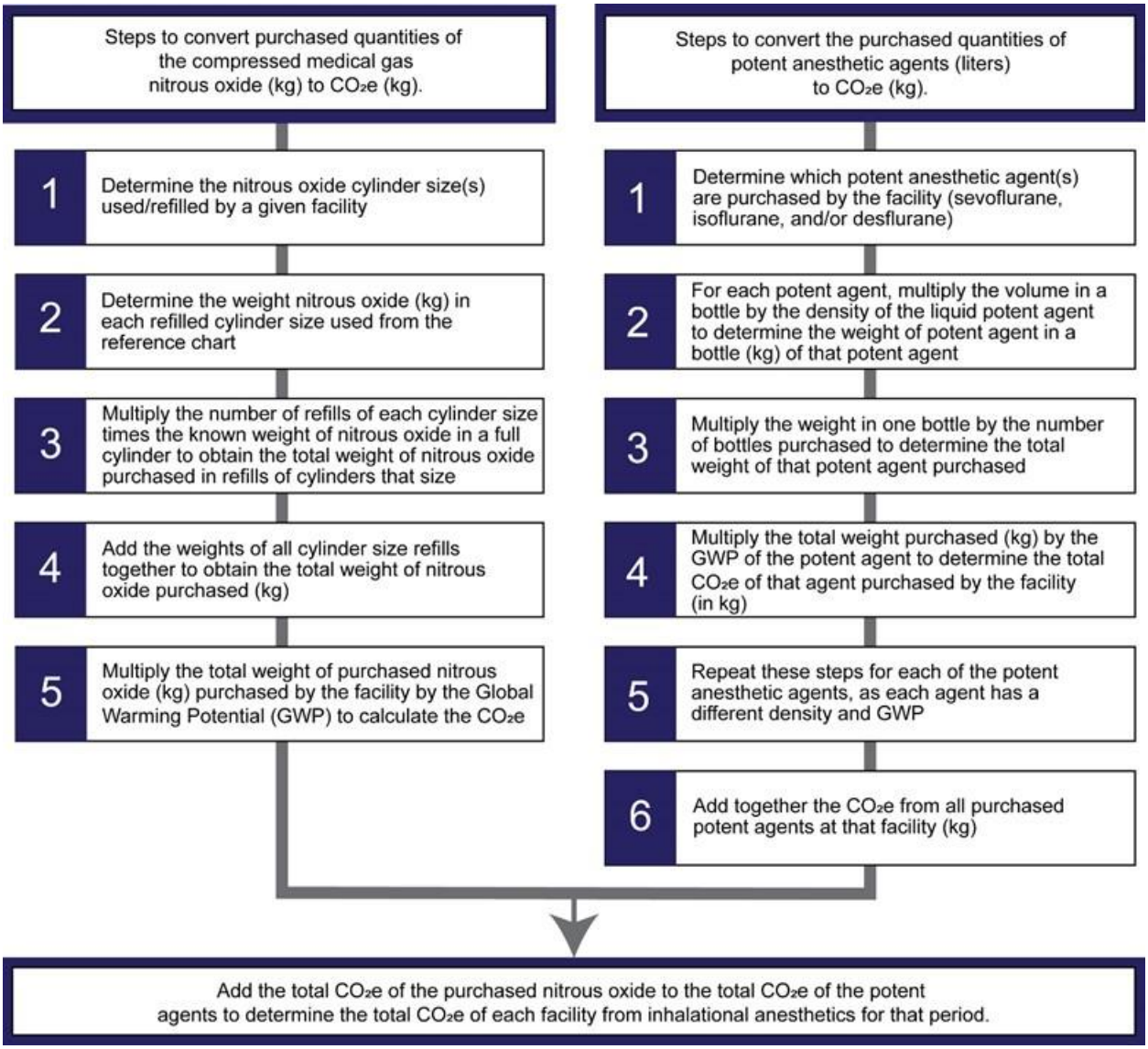
VHA Comments: Concur in Principle

VHA has not historically reprocessed or utilized reprocessed single use medical devices in Veteran care. Reasons include manufacturers of single use medical devices do not create reprocessing instructions for use; reprocessed single use medical devices cannot be fully traced to the Veteran. VHA will consider the merits of reprocessing single use medical devices against the potential risks to Veteran safety.

VHA will evaluate the current policy and evidence through an already established interdisciplinary workgroup chaired by the Office of Sterile Processing and includes representatives from other VHA offices as needed. The workgroup will share their findings with VHA leadership, to include any recommendations for policy revisions, if applicable.

Status: In Process Target Completion December 2024

Appendix C: Conversion Methodology of VHA Purchased Inhalational Anesthetics to CO_2e Emissions



Source: S. Nini Malayaman et al., "Medical Gases: Storage and Supply," chap 1 in Anesthesia Equipment, 3rd ed., *eds. Jan Ehrenwerth, James B. Eisenkraft, James M. Berry (Elsevier Inc., 2020), 3–24; Mads P. Sulbaek Andersen et al., "Assessing the Impact on Global Climate from General Anesthetic Gases,"* Anesthesia & Analgesia *114 no. 5 (May 2012): 1081–1085, accessed May 17, 2023, https://journals.lww.com/anesthesia-analgesia/fulltext/2012/05000/Assessing_the_Impact_on_Global_Climate_from.24.aspx; Jodi Sherman et al., "Life Cycle Greenhouse Gas Emissions of Anesthetic Drugs,"* Anesthesia & Analgesia *114, no. 5 (May 2012): 1086–90, accessed February 15, 2023, https://pubmed.ncbi.nlm.nih.gov/22492186/; and OIG analysis.*
Note: The OIG used 298 as the Co2 GWP for nitrous oxide but acknowledges this number changes with continued scientific research on global warming. "Global Warming Potential Values," Greenhouse Gas Protocol, accessed April 15, 2024, https://ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf.

Appendix D: Inhalational Anesthetic Procurement Data

Table D.1. Inhalational Anesthetic Procurement Data by VA Medical Center

Station Number (Complexity Level)	Sevoflurane			Isoflurane			Desflurane			Nitrous Oxide	
	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY21 (kg)	FY21 [CO_2e (kg)]
VISN 1											
402 (2)	23	22	3,450	0	0	0	0	0	0	29	8,672
405 (2)	30	27	4,282	0	0	0	6	1	5,377	29	8,672
518 (3)	0	0	0	0	0	0	0	0	0	29	8,672
523 (1a)	44	3	476	14	19	14,688	42	3	10,753	972	289,680
608 (3)	3	2	357	0	0	0	0	0	0	0	0
631 (3)	0	0	0	0	0	0	0	0	0	0	0
650 (1c)	13	3	397	2	2	1,148	5	0	0	200	59,600
689 (1a)	48	60	9,516	8	7	5,508	0	0	0	899	267,985
VISN 2											
526 (1b)	43	42	6,661	5	4	2,678	2	2	7,169	3,622	1,079,445
528 (1b)	60	62	9,794	0	0	0	19	6	21,507	320	95,390
528A6 (3)	0	0	0	0	0	0	0	0	0	0	0
528A7 (1c)	66	62	9,833	8	8	6,426	15	17	64,520	175	52,031
528A8 (1c)	29	32	4,996	2	0	0	18	9	32,260	300	89,311
561 (1c)	11	15	2,379	1	1	1,071	1	0	0	291	86,718
620 (3)	0	0	0	0	0	0	0	0	0	0	0
630 (1a)	81	72	11,419	2	1	918	4	6	21,507	495	147,421
632 (1c)	6	14	2,181	1	0	153	2	0	0	233	69,374
VISN 4											
460 (2)	10	11	1,665	0	0	0	0	0	0	364	108,412
503 (3)	1	3	515	1	4	2,754	0	0	0	0	0
529 (3)	0	0	0	0	0	0	0	0	0	0	0
542 (3)	0	0	0	0	0	0	0	0	0	0	0
562 (3)	2	0	0	2	2	1,339	0	0	0	0	0
595 (2)	19	18	2,855	2	2	1,377	6	7	26,883	119	35,557
642 (1b)	68	74	11,697	7	5	4,131	14	1	5,377	221	65,977

Station Number (Complexity Level)	Sevoflurane			Isoflurane			Desflurane			Nitrous Oxide	
	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY21 (kg)	FY21 [CO_2e (kg)]
646 (1a)	48	56	8,802	22	26	20,196	0	0	0	407	121,405
693 (2)	0	0	0	18	21	16,065	6	9	32,260	87	26,015
VISN 5											
512 (1b)	22	17	2,617	0	0	0	0	0	0	582	173,436
517 (2)	5	3	436	0	1	459	0	0	0	0	0
540 (1c)	12	11	1,705	4	2	1,836	0	0	0	47	13,923
581 (1c)	13	17	2,696	0	1	459	36	30	112,910	0	0
613 (1c)	14	8	1,269	2	3	2,295	24	23	86,027	657	195,667
688 (1b)	61	71	11,181	0	0	153	2	0	0	185	55,264
VISN 6											
558 (1a)	66	67	10,587	3	4	2,678	16	0	0	381	113,538
565 (1c)	10	13	2,101	0	0	0	0	0	0	349	104,062
590 (1c)	23	28	4,480	0	0	0	12	16	59,143	708	210,984
637 (1c)	6	7	1,110	1	0	306	10	8	30,468	4,189	1,248,313
652 (1a)	180	199	31,601	20	17	12,852	3	0	0	6	1,740
658 (1c)	28	38	5,948	0	0	0	2	5	17,922	424	126,328
659 (1b)	50	52	8,168	1	0	77	4	4	13,442	148	44,229
VISN 7											
508 (1a)	91	102	16,177	5	8	5,967	13	20	75,273	508	151,384
509 (1b)	38	18	2,855	1	1	383	3	2	8,961	1,057	314,950
521 (1a)	87	61	9,714	5	10	7,803	12	10	37,637	200	59,600
534 (1a)	19	18	2,855	6	6	4,590	0	0	0	367	109,283
544 (1b)	33	39	6,146	4	1	459	22	17	64,520	0	0
557 (2)	0	1	159	0	0	0	0	0	0	0	0
619 (2)	8	4	634	1	2	1,377	0	0	0	9	2,610
679 (3)	0	0	0	0	0	0	0	0	0	0	0
VISN 8											
516 (1a)	131	132	20,935	1	1	918	7	3	10,753	480	143,100
546 (1a)	56	58	9,199	31	25	18,819	13	7	26,883	786	234,139
548 (1c)	69	56	8,882	0	0	0	3	3	9,857	2,515	749,351
573 (1a)	102	117	18,477	37	36	27,540	6	1	5,377	6,286	1,873,275
672 (1a)	33	45	7,137	1	2	1,377	0	0	0	466	138,749

Station Number (Complexity Level)	Sevoflurane			Isoflurane			Desflurane			Nitrous Oxide	
	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY21 (kg)	FY21 [CO_2e (kg)]
673 (1a)	163	165	26,129	25	23	17,901	0	0	0	602	179,527
675 (1a)	66	79	12,490	1	1	383	4	3	11,649	51	15,138
VISN 9											
596 (1b)	18	19	2,934	0	0	0	69	55	204,314	309	91,963
603 (1b)	28	25	3,965	3	5	3,672	22	7	26,883	0	0
614 (1a)	47	45	7,137	5	7	5,508	18	20	75,273	889	264,922
621 (1c)	48	38	6,027	0	0	0	8	7	25,987	82	24,448
626 (1a)	101	108	17,089	13	10	7,803	42	36	134,417	1,395	415,650
VISN 10											
506 (1b)	117	125	19,865	12	11	8,262	0	0	0	263	78,302
515 (3)	0	0	0	0	0	0	0	0	0	0	0
538 (2)	0	0	0	0	0	0	0	0	0	0	0
539 (1b)	61	52	8,287	2	1	918	28	22	80,650	746	222,219
541 (1a)	122	117	18,596	22	20	15,606	1	0	0	1,099	327,538
552 (1c)	25	26	4,124	1	0	0	31	23	86,027	408	121,578
553 (1c)	30	26	4,044	10	14	11,016	42	49	182,807	0	0
583 (1a)	159	152	24,147	3	4	3,213	1	4	16,130	1,078	321,387
610 (2)‡	12	9	1,388	0	0	0	0	0	0	336	100,140
655 (3)	2	2	317	0	0	0	0	0	0	0	0
757 (2)	9	9	1,427	0	0	0	0	0	0	0	0
VISN 12											
537 (1b)	54	58	9,238	2	4	2,754	7	6	21,507	500	149,012
550 (3)	5	3	397	0	0	0	0	0	0	175	52,031
556 (excl)*	34	30	4,758	0	0	0	1	4	15,234	87	26,015
578 (1a)	103	99	15,701	9	8	6,426	6	0	0	5,267	1,569,596
585 (3)	0	1	159	0	0	0	0	0	0	87	26,015
607 (1b)	7	7	1,110	1	1	1,071	0	0	1,792	116	34,687
676 (3)	0	0	0	0	0	0	0	0	0	0	0
695 (1a)	86	84	13,322	27	24	18,360	20	4	16,130	705	209,983
VISN 15											
589 (1b)	71	61	9,635	3	2	1,836	0	0	0	244	72,855
589A4 (1c)	57	61	9,714	18	14	10,328	32	9	32,260	113	33,614

Station Number (Complexity Level)	Sevoflurane			Isoflurane			Desflurane			Nitrous Oxide	
	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY21 (kg)	FY21 [CO_2e (kg)]
589A5 (2)§	7	9	1,348	0	0	0	0	0	896	242	72,044
589A7 (2)	49	42	6,582	0	0	0	0	0	0	303	90,258
657 (1a)	91	94	14,948	5	2	1,836	4	3	10,753	457	136,246
657A4 (3)	0	0	0	0	0	0	0	0	0	0	0
657A5 (2)	6	4	634	0	0	77	2	2	8,961	12	3,481
VISN 16											
502 (3)	8	6	952	0	0	0	1	0	0	0	0
520 (1c)	10	8	1,190	1	0	0	13	26	96,780	575	171,320
564 (2)	7	7	1,110	0	0	0	0	0	0	0	0
580 (1a)	175	192	30,491	22	21	16,065	104	68	252,704	388	115,749
586 (1c)	16	17	2,736	1	0	0	37	30	112,910	0	0
598 (1a)	106	108	17,129	0	1	536	2	3	10,753	562	167,393
629 (1b)	60	64	10,071	0	1	459	1	1	5,377	54	16,009
667 (1c)	20	24	3,806	1	2	1,224	3	1	5,377	1,016	302,899
VISN 17											
504 (2)	14	5	714	1	0	0	10	29	107,533	291	86,718
519 (3)	0	0	0	0	0	0	0	0	0	0	0
549 (1a)	158	157	24,940	2	2	1,454	7	6	20,611	5,466	1,628,749
671 (1a)	122	123	19,468	6	5	4,131	25	20	75,273	635	189,230
674 (1a)	63	41	6,542	0	0	0	38	16	59,143	116	34,687
740 (2)	1	1	159	0	0	0	1	3	10,753	466	138,749
756 (3)	1	0	0	0	0	0	0	0	0	0	0
VISN 19											
436 (3)	3	3	436	1	0	0	16	3	10,753	102	30,277
442 (3)	10	5	714	0	0	0	16	7	26,883	127	37,846
554 (1a)	105	115	18,199	7	7	5,355	8	13	48,390	621	185,058
575 (3)	13	12	1,824	0	0	0	9	10	37,637	0	0
623 (2)	15	15	2,300	1	0	0	21	32	118,287	178	52,984
635 (1b)	57	49	7,732	7	4	3,213	13	9	32,260	152	45,415
660 (1a)	28	37	5,829	15	12	9,180	90	60	225,820	339	101,010
666 (3)	0	0	0	0	0	0	0	0	0	0	0
VISN 20											

Station Number (Complexity Level)	Sevoflurane			Isoflurane			Desflurane			Nitrous Oxide	
	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY21 (kg)	FY21 [CO_2e (kg)]
463 (3)	0	0	0	0	0	0	0	0	0	0	0
531 (2)	33	37	5,908	1	1	918	1	0	0	0	0
648 (1a)	84	78	12,371	19	15	11,475	0	0	0	893	266,245
653 (3)	3	4	634	0	0	0	0	0	0	175	5,2031
663 (1a)	79	44	6,899	76	99	75,735	0	0	0	106	31,612
668‖ (3)	8	-8	-1,269	0	0	0	1	-1	-2,688	175	52,031
687 (3)	0	0	0	0	0	0	0	0	0	0	0
692 (3)	0	0	0	0	0	0	0	0	0	0	0
VISN 21											
459 (3)	0	0	0	0	0	0	0	0	0	0	0
570 (1c)	35	36	5,630	1	0	0	0	0	0	0	0
593 (1b)	32	38	5,948	0	0	0	62	50	188,184	175	52,031
612A4 (1b)	22	27	4,322	0	0	0	9	8	29,572	5,054	1,505,973
640 (1a)	76	83	13,085	3	2	1,836	19	13	48,390	1,257	374,657
654 (2)	16	28	4,362	0	0	0	50	22	80,650	358	106,702
662 (1a)	90	81	12,807	31	34	26,163	4	6	21,507	279	83,261
VISN 22											
501 (1b)	68	62	9,794	1	0	0	35	17	64,520	0	0
600 (1a)	60	64	10,111	3	0	0	20	13	48,390	495	147,421
605 (1a)	120	118	18,675	1	1	765	2	2	8,961	3,212	957,200
644 (1a)	86	78	12,371	2	2	1,836	4	0	0	305	90,830
649 (3)	0	0	0	0	0	0	0	0	0	0	0
664 (1a)	93	94	14,869	1	1	689	1	1	2,688	0	0
678 (1b)	81	81	12,767	1	1	842	5	3	10,753	241	71,812
691 (1a)	93	98	15,464	6	2	1,836	8	3	10,753	1,688	503,035
VISN 23											
437 (2)	14	13	1,983	0	0	0	1	0	0	102	30,277
438 (2)	4	4	555	0	0	306	5	4	13,442	58	17,344
568 (3)	4	4	595	0	0	0	1	1	4,481	466	138,749
618 (1a)	50	123	19,508	23	23	17,442	33	10	37,637	481	143,201
636 (1c)#	44	53	8,366	0	0	0	66	33	123,663	349	104,062

Station Number (Complexity Level)	Sevoflurane			Isoflurane			Desflurane			Nitrous Oxide	
	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY19–21 Average (L)	FY21 (L)	FY21 [CO_2e (kg)]	FY21 (kg)	FY21 [CO_2e (kg)]
636A6 (2)	8	6	912	0	0	0	19	14	53,767	116	34,687
636A8 (1c)	8	0	0	1	1	383	6	0	0	233	69,374
656 (3)	10	6	952	0	0	0	0	0	0	3	870

Source: OIG analysis of data received from each VA medical facility.
Note: Follow station number links to table D.2, "Station Numbers and Facility Name." To return, press the "alt" and "left arrow" keys.
CO_2e (kg) – kilograms of carbon dioxide equivalent and L – liters.
Fiscal years for federal agencies include an annual period of October 1 of one calendar year through September 30 of the following year. Congressional Budget Office, "Common Budgetary Terms Explained," December 2021, accessed November 27, 2023, https://www.cbo.gov/publication/57660.
Zeros mean the corresponding facility reported no gas purchased or the amount reported by the facility may have been rounded down to zero.
The VHA Facility Complexity Model categorizes each medical facility by complexity level based on patient population, clinical services offered, educational and research missions, and administrative complexity. Complexity Levels include 1a, 1b, 1c, 2, or 3. Level 1a facilities are considered the most complex; Level 3 facilities are the least complex. VHA Office of Productivity, Efficiency, and Staffing, "Facility Complexity Model Fact Sheet," January 28, 2021.
**Station 556 is excluded (excl) from the facility complexity model categorization.*
‡Inhalational anesthetic procurement data provided by station 610A4 (Fort Wayne VAMC) is accounted for in station 610's data.
§Inhalational anesthetic procurement data provided by station 589A6 (Dwight D. Eisenhower VAMC) is accounted for in station 589A5's data.
||The negative numbers indicate that inhalational anesthetic was returned during the reported timeframe. The return timeframe is independent of the purchase timeframe.
#Inhalational anesthetic procurement data provided by station 636A4 (Grand Island VAMC) is accounted for in station 636's data.

Table D.2. Station Numbers and Facility Name

Station Number	Facility Name
VISN 1	
402	Togus VA Medical Center
405	White River Junction VA Medical Center
518	Edith Nourse Rogers Memorial Veterans' Hospital
523	Jamaica Plain VA Medical Center
608	Manchester VA Medical Center
631	Edward P. Boland Department of Veterans Affairs Medical Center
650	Providence VA Medical Center
689	West Haven VA Medical Center
VISN 2	
526	James J. Peters Department of Veterans Affairs Medical Center
528	Buffalo VA Medical Center
528A6	Bath VA Medical Center
528A7	Syracuse VA Medical Center
528A8	Samuel S. Stratton Department of Veterans Affairs Medical Center
561	East Orange VA Medical Center
620	Franklin Delano Roosevelt Hospital
630	Margaret Cochran Corbin VA Campus
632	Northport VA Medical Center
VISN 4	
460	Wilmington VA Medical Center
503	James E. Van Zandt Veterans' Administration Medical Center
529	Abie Abraham VA Clinic
542	Coatesville VA Medical Center
562	Erie VA Medical Center
595	Lebanon VA Medical Center
642	Corporal Michael J. Crescenz Department of Veterans Affairs Medical Center
646	Pittsburgh VA Medical Center-University Drive
693	Wilkes-Barre VA Medical Center
VISN 5	
512	Baltimore VA Medical Center
517	Beckley VA Medical Center

Station Number	Facility Name
540	Louis A. Johnson Veterans' Administration Medical Center
581	Hershel "Woody" Williams VA Medical Center
613	Martinsburg VA Medical Center
688	Washington VA Medical Center
VISN 6	
558	Durham VA Medical Center
565	Fayetteville VA Medical Center
590	Hampton VA Medical Center
637	Charles George Department of Veterans Affairs Medical Center
652	Richmond VA Medical Center
658	Salem VA Medical Center
659	W.G. (Bill) Hefner Salisbury Department of Veterans Affairs Medical Center
VISN 7	
508	Joseph Maxwell Cleland Atlanta VA Medical Center
509	Charlie Norwood Department of Veterans Affairs Medical Center
521	Birmingham VA Medical Center
534	Ralph H. Johnson Department of Veterans Affairs Medical Center
544	Wm. Jennings Bryan Dorn Department of Veterans Affairs Medical Center
557	Carl Vinson Veterans' Administration Medical Center
619	Central Alabama VA Medical Center-Montgomery
679	Tuscaloosa VA Medical Center
VISN 8	
516	C.W. Bill Young Department of Veterans Affairs Medical Center
546	Bruce W. Carter Department of Veterans Affairs Medical Center
548	West Palm Beach VA Medical Center
573	Malcom Randall Department of Veterans Affairs Medical Center
672	San Juan VA Medical Center
673	James A. Haley Veterans' Hospital
675	Orlando VA Medical Center
VISN 9	
596	Franklin R. Sousley Campus
603	Robley Rex Department of Veterans Affairs Medical Center
614	Lt. Col. Luke Weathers, Jr. VA Medical Center
621	James H. Quillen Department of Veterans Affairs Medical Center

Station Number	Facility Name
626	Nashville VA Medical Center
VISN 10	
506	Lieutenant Colonel Charles S. Kettles VA Medical Center
515	Battle Creek VA Medical Center
538	Chillicothe VA Medical Center
539	Cincinnati VA Medical Center
541	Louis Stokes Cleveland Department of Veterans Affairs Medical Center
552	Dayton VA Medical Center
553	John D. Dingell Department of Veterans Affairs Medical Center
583	Richard L. Roudebush Veterans' Administration Medical Center
610	Marion VA Medical Center
655	Aleda E. Lutz Department of Veterans Affairs Medical Center
757	Chalmers P. Wylie Veterans Outpatient Clinic
VISN 12	
537	Jesse Brown Department of Veterans Affairs Medical Center
550	Danville VA Medical Center
556	Captain James A. Lovell Federal Health Care Center
578	Edward Hines Junior Hospital
585	Oscar G. Johnson Department of Veterans Affairs Medical Facility
607	William S. Middleton Memorial Veterans' Hospital
676	Tomah VA Medical Center
695	Clement J. Zablocki Veterans' Administration Medical Center
VISN 15	
589	Kansas City VA Medical Center
589A4	Harry S. Truman Memorial Veterans' Hospital
589A5	Colmery-O'Neil Veterans' Administration Medical Center
589A7	Robert J. Dole Department of Veterans Affairs Medical and Regional Office Center
657	John J. Cochran Veterans Hospital
657A4	John J. Pershing Veterans' Administration Medical Center
657A5	Marion VA Medical Center
VISN 16	
502	Alexandria VA Medical Center
520	Biloxi VA Medical Center
564	Fayetteville VA Medical Center

Station Number	Facility Name
580	Michael E. DeBakey Department of Veterans Affairs Medical Center
586	G.V. (Sonny) Montgomery Department of Veterans Affairs Medical Center
598	John L. McClellan Memorial Veterans' Hospital
629	New Orleans VA Medical Center
667	Overton Brooks Veterans' Administration Medical Center
VISN 17	
504	Thomas E. Creek Department of Veterans Affairs Medical Center
519	George H. O'Brien, Jr., Department of Veterans Affairs Medical Center
549	Dallas VA Medical Center
671	Audie L. Murphy Memorial Veterans' Hospital
674	Olin E. Teague Veterans' Center
740	Harlingen VA Clinic
756	El Paso VA Clinic
VISN 19	
436	Fort Harrison VA Medical Center
442	Cheyenne VA Medical Center
554	Rocky Mountain Regional VA Medical Center
575	Grand Junction VA Medical Center
623	Jack C. Montgomery Department of Veterans Affairs Medical Center
635	Oklahoma City VA Medical Center
660	George E. Wahlen Department of Veterans Affairs Medical Center
666	Sheridan VA Medical Center
VISN 20	
463	Colonel Mary Louise Rasmuson Campus of the Alaska VA Healthcare System
531	Boise VA Medical Center
648	Portland VA Medical Center
653	Roseburg VA Medical Center
663	Seattle VA Medical Center
668	Mann-Grandstaff Department of Veterans Affairs Medical Center
687	Jonathan M. Wainwright Memorial VA Medical Center
692	White City VA Medical Center
VISN 21	
459	Spark M. Matsunaga Department of Veterans Affairs Medical Center
570	Fresno VA Medical Center

Station Number	Facility Name
593	North Las Vegas VA Medical Center
612A4	Sacramento VA Medical Center
640	Palo Alto VA Medical Center
654	Ioannis A. Lougaris Veterans' Administration Medical Center
662	San Francisco VA Medical Center
VISN 22	
501	Raymond G. Murphy Department of Veterans Affairs Medical Center
600	Tibor Rubin VA Medical Center
605	Jerry L. Pettis Memorial Veterans' Hospital
644	Carl T. Hayden Veterans' Administration Medical Center
649	Bob Stump Department of Veterans Affairs Medical Center
664	Jennifer Moreno Department of Veterans Affairs Medical Center
678	Tucson VA Medical Center
691	West Los Angeles VA Medical Center
VISN 23	
437	Fargo VA Medical Center
438	Royal C. Johnson Veterans' Memorial Hospital
568	Fort Meade VA Medical Center
618	Minneapolis VA Medical Center
636	Omaha VA Medical Center
636A6	Des Moines VA Medical Center
636A8	Iowa City VA Medical Center
656	St. Cloud VA Medical Center

Source: VHA Support Service Center Station Listing Report.

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