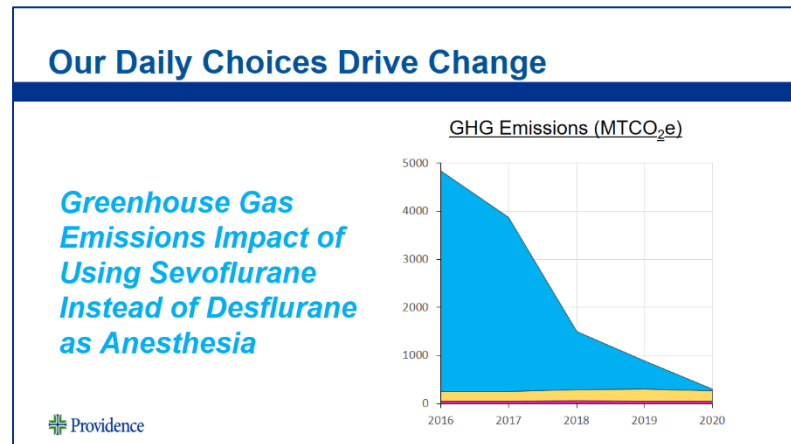


Clinical Environmental Stewardship Update

System and Regional Efforts

Efforts led by Dr. Brian Chesebro, Anesthesiologist and Medical Director of Environmental Stewardship

- A system effort to reduce greenhouse gas emissions from anesthesia. In the Oregon region, this effort has reduced greenhouse gas emissions by 95 percent by switching from desflurane to sevoflurane, a lower-emission, lower-cost, alternative anesthetic, that delivers quality clinical outcomes.



Additional clinical efforts in OR

- An effort at Providence St. Vincent in Portland, Oregon to optimize the use of surgical supplies and reduce unnecessary sterile reprocessing of unused, durable equipment trays. By reducing wasted supplies and processing about 75,000 fewer opened but unused surgical equipment trays, the hospital was able to reduce associated greenhouse gas emissions by nearly **1000 metric tons of carbon dioxide equivalent**, and cut water consumption by nearly **a million gallons per year**.
- An assessment of laundry and linen service in the Portland area found that **laundering a single blanket consumes nearly two and a half gallons of water and emits two thirds a kilo of carbon dioxide equivalent**. And our clinical use and consumption of linens is a direct driver of these of these downstream impacts. So every time a clinician grabs three blankets, when really one would do the trick, we generate a tremendous amount of unnecessary and unintended environmental impacts.

“Team 298” co-led by Geoff Glass, Senior Technical Program Manager-Energy, RESO

- Nitrous oxide has a very high global warming potential and some nitrous oxide delivery systems are prone to leaks and wastage, so across the organization, a work group was formed to better understand the issue, opportunity, and increase awareness throughout the organization.
- In fact, our nitrous oxide emissions are more than twice our emissions from volatile anesthetics and exceed our 2019 (and 2020) emission from organizational business travel.
- By examining available data, we have been able to compare the amount of nitrous oxide that is delivered to patients and how much was purchased to better understand how much nitrous oxide may be wasted.
- We are evaluating our anesthesia equipment and upgrading where possible to allow for flow measurement to automatically populate medical records. This allows us to record how much anesthetic gas we deliver to a patient through the anesthesia machines.

- Although it is early and we are still learning a lot, we have assessed:
 - In-wall piped delivery systems are prone to leakage.
 - The use of large liquid Dewars is especially inefficient – fortunately, these are only used at four sites in the health system.
 - Where possible, the use of portable cylinders may be preferable to in-wall systems.
 - Working with our anesthesia colleagues, we are identifying best practices for assessing leaks and ensuring careful monitoring of nitrous use and flow.
 - Additionally, while nitrous oxide is not particularly expensive, from an emissions perspective, it is immensely impactful.
- Where are we going with this effort?
 - Once we synthesize our learnings, which are also informed through discussions with vendor partners and manufacturers, we intend to write a white paper or Playbook on best practices for management of nitrous oxide systems.
 - We will apply these best practices across all our sites that use nitrous oxide to eliminate waste of this potent greenhouse gas.

“We call ourselves ‘Team 298’ with 298 being the global warming potential of nitrous oxide versus carbon dioxide. This name keeps that in front of us at all times because it’s a very, very, high pollutant chemical, and this reminds us of the importance of our work.”

-Geoff Glass, Senior Technical Program Manager-Energy, RESO

Efforts advanced by Providence St. Patrick Hospital, Missoula MT

- You cannot manage what you do not measure, so the St. Patrick Hospital team has focused on data collection for usage, cost, and greenhouse gas emissions of anesthetic gases and nitrous oxide.
- *Anesthetics.*
 - By comparing our greenhouse gas emissions to other hospitals in our region, we saw that we were using more (and causing more pollution) than the regional average.
 - We knew that shifting away from our most polluting inhaled anesthetic agent (desflurane) would be more cost effective and release significantly lower GHG emissions, with equal clinical outcomes, so our anesthesia leader (Dr. Greg Lind) began to educate his peers.
 - We established a method requiring anesthesia providers to make an intentional decision to use desflurane, rather than by default. We required anesthesia providers to make a special request for desflurane vaporizers, if they had a specific reason to use it; just adding this step significantly reduced the number of requests.
- *Nitrous Oxide.*
 - Similarly, by comparing our nitrous usage to other sites in our region, we saw we had room for improvement.
 - First, we discovered a leak in an OR that was allowing nitrous oxide to escape. This potentially exposed caregivers to nitrous in the room and emitted unnecessary greenhouse gases into the atmosphere.

- Turning off nitrous delivery to the ORs helped, but we still used a large amount of nitrous. Our facilities team painstakingly explored other branches of the in-wall piping. This led to our transition to the use of portable nitrous oxide tanks - we turned off the entire piped system, which stopped the leakages, and now we have the lowest use of nitrous in our region.
- With older equipment, pipeline leaks are not uncommon, but we did not know this until we embarked on this effort. **This is an opportunity at every ministry ... and our responsibility to protect our caregivers and our environment.**
- During COVID-19, when revenues have been down across the healthcare sector, and pressures have mounted to find sources of cost savings while maintaining a high quality of care, this is a **great opportunity since it is a win-win for clinical care, cost savings on wasted product, and a win to prevent occupational exposures.**
- This discovery process was a team effort, including facilities staff, respiratory therapy, anesthesiology, and environmental stewardship. It took the expertise of all of us to find a feasible, safe, environmentally preferred solution.

Efforts led by Brandi Gustafson, Manager RN-Clinical Ops Surgical Services, Providence Seaside Hospital, Washington

- To “green” the OR, one significant change you can make is to utilize standalone suction devices instead of wall suction with plastic disposable canisters.
 - By making this change, you eliminate massive amounts of waste and chemicals from the waste stream and reduce hazardous risks to caregivers. It also eliminates the transportation and disposal of the plastic canisters to incineration.
 - While the standalone suction devices are more costly upfront, they carry less downstream disposal and incineration costs, making them an impactful opportunity that dramatically reduces waste.
 - When I calculated the return on investment (ROI) for Hood River, it was roughly three years.
- Another important strategy to green the OR is to implement comingled recycling in the operating room.
 - The first step to adoption is to confirm that this type of recycling is a locally offered service.

“I read an article that said, ‘the business of environmental stewardship should be the business of healthcare.’ And that’s the kind of impactful mindset we need in healthcare to connect the dots and realize how important it is to human health that we address this head-on.”

**-Brandi Gustafson, manager RN – Clinical Ops Surgical Services,
Providence Seaside Hospital**

- The second step (if the service is available locally) is to prepare the infrastructure internally for recycling including education, signage, and instruction, essentially implementing change management.
 - Significant waste reduction is possible when comingled recycling is put into place.
- The final strategy that I consider critical is to purchase reusable rigid containers for surgical instrument trays rather than single use blue wrap.
 - Reusable rigid containers allow for years of continuous use without replacement.
 - Though sterile blue wrap is generally less expensive, it is a single-use product whereas rigid containers are reusable, providing years of savings that outweigh the initial product price.
 - Because the rigid containers are reusable, they significantly reduce waste. On the other hand, blue wrap accounts for 19% of operating room waste and 5% of all hospital waste. Markedly reducing blue wrap therefore reduces overall OR and hospital waste.
- To successfully implement these three key strategies, having buy in and support from executive leadership is imperative to success. Then, you can build your green team or your environmental stewardship platform.
- As we succeed, we plan to publish our stories to increase the amount of evidence-based practice out there to share lessons learned and help others replicate our success.