Safety and Health Investment Projects
FINAL REPORT REQUIREMENTS

The purpose of the final report of your SHIP project is to:

1. Evaluate and document the achievements, challenges, and shortcomings of the project for the constructive benefit of others interested in learning from SHIP projects; and
2. Provide the Division of Occupational Safety and Health with information that shows:
   a. The outcomes specified in the project application were met; and
   b. The grant was used for the purpose(s) for which it was approved and in accordance with relevant WAC rules and any special conditions or requirements; and
   c. The outputs of the project have been disseminated as specified in the application.

The report format has four sections:

1. Cover Sheet
2. Narrative Report (part I)
3. Financial Information (part II)
4. Attachments (part III)

Please provide complete and detailed information in the final report. If you have questions, please call your SHIP grant manager.

REMINDER!!: All products produced, whether by the grantee or a subcontractor to the grantee, as a result of a SHIP grant are in the public domain and can not be copyrighted, patented, claimed as trade secrets, or otherwise restricted in any way.

SAFETY AND HEALTH INVESTMENT PROJECTS
FINAL REPORT

DoG the WAGs: An Innovative Solution to Reduce Exposure to Waste Anesthetic Gases
2013YC00219
07/01/2013-10/31/2014

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Salmon Creek Hospital Foundation

11/05/2014

Nicole Hermanns, Grants Manager

Funding and support for this project has been provided by the State of Washington, Department of Labor & Industries, Safety & Health Investment Projects.

PART I

Narrative Report

Organization Profile:

For awarded organizations, to include partners and collaborators, provide a brief description of each organization. Mission, vision, and purpose for each of the organizations who applied (this includes partners and collaborators) for the grant.

Legacy Health: Legacy Health is a not-for-profit, community-owned health system located in the Portland/Vancouver area. Formed in 1989, Legacy Health is comprised of an integrated network of five full-service hospitals, a children's hospital, a Level 1 trauma and burn center, a clinical research facility, and more than 50 clinics. It is a leader in the provision of acute and critical care, inpatient and outpatient treatment, primary care, community health education, and a variety of specialty services. Legacy is also the regional leader in the provision of charity care, delivering medical care to tens of thousands of people who have limited ability to pay.

Legacy Salmon Creek Medical Center (SCMC) was opened in 2005. Located in Vancouver, it is currently SW Washington's most modern hospital, offering a wide range of services for adults and children of all ages. SCMC currently has 220 beds, has over 1,100 employees, and provides approximately 50,000 emergency department visits and 11,000 hospital visits each year. Approximately 5,000 procedures that use anesthetic gases are performed at SCMC every year.

Salmon Creek Hospital Foundation is a 501c3 not-for-profit organization that supports the work of SCMC by seeking grant funding and fostering charitable giving and involvement. The Foundation is also charged with the management and oversight of all grant funding for Legacy Health, and has a strong track record of successful grant management. This service is provided at no cost to the program or the grant.

Association of periOperative Registered Nurses (AORN): AORN is a non-profit membership association that represents the interests of more than 160,000 perioperative nurses nationwide by providing nursing education, standards, and clinical practice resources to enable optimal outcomes for patients undergoing operative and other invasive procedures. AORN currently has four active chapters within the state of Washington.

Alder Creek Veterinary Clinic: The Alder Creek Veterinary Clinic is located in Battle Ground, Washington. The dedicated team of veterinary professionals uses the latest advances in medical practices to care for animals, from routine preventive medicine to complex, specialized procedures. Services include acupuncture, dentistry, general surgery, laser therapy, radiology, reproduction, and stem cell therapy.

Abstract:

Present a short overview of the nature and scope of the project and major findings (less than half a page).

Waste anesthetic gas (WAG) consists of the anesthetic gases and vapors that leak into the air during medical procedures. The Occupational Safety and Health Administration (OSHA) estimates that more than 250,000 health care professionals who work in hospitals, operating rooms, dental offices, and veterinary clinics are potentially exposed to waste anesthetic gases every year (OSHA.gov). Research has shown that over-exposure to these gases may produce health effects and hazards to operating room personnel (Asefzadeh, Raeisi & Mousavi, 2012). However, little work has been done to revise monitoring standards for currently used anesthetic gases or to reduce staff exposure to these gases. Legacy Health worked with experts in several fields to create an updated gas monitoring plan, assess WAG exposure levels during routine operating procedures, and test the efficacy of an innovative, low-cost, medical device, the DoG (Disposal of Gas) device. An independent evaluation of WAG exposure and the DoG device showed high levels of WAG exposure, great variation in exposure levels based on the different techniques of anesthesiologists, and significant reductions in exposure when the DoG device was used. As a result of these findings, Legacy Health developed new training modules for managers and staff and an instructional presentation on how to build and use a DoG device. Coupled with the newly developed gas monitoring schedule, the easily replicable products developed through this project have the potential to significantly impact the health and well-being of health care professionals through Washington and the nation.

Purpose of Project:

Describe what the project was intended to accomplish.

The proposed project had three distinct purposes: 1) To create a robust categorization system for anesthetic gases to ensure appropriate levels of gas monitoring and employee training; 2) To create new training programs for at-risk employees and managers on how to reduce the risks of Waste Anesthetic Gases (WAG); and 3) To evaluate the effectiveness of a gas disposal device innovation, the DoG (Disposal of Gas) Device. If shown to be effective through an independent analysis, project staff would create and distribute detailed instructions on how to reproduce the device for use in hospitals and other locations throughout the state and beyond.

Statement and Evidence of the Results:

Provide a clear statement of the results of the project include major findings and outcomes and provide evidence of how well the results met or fulfilled the intended objectives of the project.

The project has achieved all of the stated purposes and objectives outlined in the original proposal. Legacy Health has created a robust categorization system for anesthetic gases to ensure appropriate levels of gas monitoring and employee training; has created new training modules for at-risk employees and managers on how to reduce the risks of Waste Anesthetic Gases (WAG); has verified the efficacy of an innovative medical device, the DoG device, through an independent evaluator; and has developed instructional materials on how to build and use the device. All of the products are highly replicable and have the potential to significantly improve the health and well-being of health care professionals.

Measures to Judge Success:

If relevant, state what measures or procedures were taken to judge whether/ how well the objectives were met and whether the project or some other qualified outside specialist conducted an evaluation.

Project staff relied on process measures as outlined in the project timeline to determine if the objectives were met. In addition to these measures, project staff relied on a robust independent evaluation of WAG exposure levels and the efficacy of the DoG device (the final report from the contractor is included with this report) and obtained approval through the SHIP Technical Review process for all project deliverables.

Relevant Processes and Lessons Learned:

Specify all relevant processes, impact or other evaluation information which would be useful to others seeking to replicate, implement, or build on previous work

AND

Provide information on lessons learned through the implementation of your project. Include both positive and negative lessons. This may be helpful to other organizations interested in implementing a similar project.

The processes that were particularly relevant to this project include: 1) The identification and involvement of experts in the subject matter. Having these content experts on the project team, as team members and consultants, enabled us to bring the best knowledge, clinical practice standards, and research protocols to the project. These individuals were also critical in providing feedback on the deliverables, both in terms of content and format. 2) The use on an external consultant to conduct the evaluation of WAG exposure and the efficacy of the DoG device. This ensured that the data was unbiased and conducted using the most appropriate technology. Review of the methodology used by the project contractor would be extremely useful to anyone seeking to replicate or build on this work.

During the course of the project, staff has learned the following lessons: 1) Ensure your project team is adequately staffed to include all of the content expertise and administrative support needed and if possible, make the team deep enough to absorb staffing changes. A robust project team will help the project run smoothly, enhance the final products, and help prevent significant delays if one key content expert transitions off of the team. 2) Make sure you build in enough time for relationship building and product development. We found it took much longer than expected to bring clinical staff on board with the project and much longer to write, review/edit, and publish deliverables. 3) Be flexible with your anticipated projects. Initially, project staff thought printed materials would be the most useful form for our final products, but after input from several stakeholders, decided to produce products in electronic formats that could be easily updated or modified to meet the unique needs of the organizations who hope to use them. 4) Partner with groups that have a vested interest in the outcomes of the project. They will be much more engaged in the work and will help strengthen your final products.

Product Dissemination:

Outline of how the products of the project have been shared or made transferrable.

The products have been designed in an electronic format that can be easily modified to meet the unique needs of any health care organization that wishes to use them. Products are available on CD and will also be available by request via email and through the Legacy Health website. To increase awareness of the products, Legacy Health staff has and will continue to present the project findings at conferences and other professional events throughout the pacific northwest and the nation. The project manager will also look for additional opportunities to publish the project findings in appropriate venues.

Feedback:

Provide feedback from relevant professionals, stakeholder groups, participants, and/ or independent evaluator on the project.

All of the medical professionals involved in the project have been both astounded by the levels of exposure to WAG during their daily work and excited about the efficacy of the DoG device in reducing this exposure. Several anesthesiologists that were involved in the project have already become champions for use of the DoG device and we expect the device will be widely adopted.

Hospital administrators are excited to have an updated gas monitoring chart that includes the anesthetic gases currently used in medical procedures. This tool will improve monitoring, reduce risk, and potentially lower administrative costs.

Though release of the project findings has just begun and products have just been published, project staff has already received numerous requests for the products as soon as they are available. Overall, the response to the project has been extremely positive.

Project's Promotion of Prevention:

Explain how the results or outcomes of this project promote the prevention of workplace injuries, illnesses, and fatalities?

Waste anesthetic gas (WAG) consists of the anesthetic gases and vapors that leak into the air during medical procedures. They include both nitrous oxide and halogenated anesthetics (halothane, enflurane, isoflurane, desflurane, sevoflurane, and methoxyflurane). The Occupational Safety and Health Administration (OSHA) estimates that more than 250,000 health care professionals who work in hospitals, operating rooms, dental offices, and veterinary clinics are potentially exposed to waste anesthetic gases every year (OSHA.gov). Research has shown that over-exposure to these gases may produce health effects and hazards to operating room personnel (Asefzadeh, Raeisi & Mousavi, 2012). Short-term symptoms of WAG exposure include drowsiness, headache, irritability, fatigue, nausea, poor judgment and loss of coordination. Long-term or chronic symptoms of over-exposure can include kidney and liver diseases, and reproductive effects such as miscarriage and birth defects.

The results of this project provide three concrete mechanisms to reduce exposure to WAG: improved monitoring, increased awareness and training, and a technical innovation to reduce WAG in the work place. Combined, these three mechanisms greatly enhance our ability to prevent workplace injury, illness and fatalities.

Uses:

How might the products of your project be used within the target industry at the end of your project?

Is there potential for the product of the project to be used in other industries or with different target audiences?

The products developed through this project will be used to improve the monitoring of waste anesthetic gases (WAG), improve training to identify risks and exposure to WAG, and to reduce exposure to WAG through use of the DoG device.

These products can be used in any industry that utilizes anesthetic gases.

Additional Information

Project Type

- ☐ Best Practice
- ☒ Technical Innovation
- ☐ Training and Education Development
- ☐ Event
- ☐ Intervention
- ☐ Research
- ☐ Other (Explain):

Target Audience: All organizations that utilize anesthetic gases and their employees.

Languages: English

Industry Classification (check industry(s) this project reached directly)

- ☐ 11 Agriculture, Forestry, Fishing and Hunting
- ☐ 21 Mining
- ☐ 22 Utilities
- ☐ 23 Construction
- ☐ 31-33 Manufacturing
- ☐ 42 Wholesale Trade
- ☐ 44-45 Retail Trade
- ☐ 48-49 Transportation and Warehousing
- ☐ 51 Information
- ☐ 52 Finance and Insurance
- ☐ 53 Real Estate and Rental and Leasing
- ☒ 54 Professional, Scientific, and Technical Services
- ☐ 55 Management of Companies and Enterprises
- ☐ 56 Administrative and Support and Waste Management and Remediation Services
- ☐ 61 Educational Services
- ☒ 62 Health Care and Social Assistance
- ☐ 71 Arts, Entertainment, and Recreation
- ☐ 72 Accommodation and Food Services
- ☒ 81 Other Services (except Public Administration)
- ☐ 92 Public Administration

Please provide the following information - - *(information may not apply to all projects)*

# classes/events:	
# hours trained	
# companies participating in project	5
# students under 18	
# workers	
# companies represented	
# reached (if awareness activities)	
Total reached	5

List, by number above, industries that project products could potentially be applied to.
54, 62, 81

Potential impact (in number of persons or companies) after life of project?
1,000s of companies and 100,000s of employees

Have there been requests for project products from external sources? Yes

If Yes, please indicate sources of requests: Project staff have presented the project and its results at Association of Occupational Health Providers (AOHP) conference and have already received numerous requests for project deliverables. We expect these requests to continue as the project results are disemminated more broadly.

PART II

Financial Information
Budget Summary

Project Title:	DoG the WAGs: An Innovative Solution to Reduce Exposure to Waste Anesthetic Gases		
Project #:	2013YC00219	**Report Date:**	11/5/14
Contact Person:	Bryan Goodin	**Contact #:**	503-415-5078
Start Date:	07/01/2013	**Completion Date:**	10/31/14

1.	**Total original budget for the project**	$ 197,659
2.	**Total original SHIP Grant Award**	$ 131,450
3.	**Total of SHIP Funds Used**	$ 131,450
4.	**Budget Modifications (= or - if applicable)**	$ 0
5.	**Total In-kind contributions**	$ $54,049.80
6.	**Total Expenditures (lines 2+4+5)**	$ 185,499.77

Instructions:

- Complete the Supplemental Schedule (Budget) form first (on the next page).
- The final report must include all expenditures from date of completion of interim report through termination date of grant.
- Indicate period covered by report by specifying the inclusive dates.
- Report and itemize all expenditures during specified reporting period per the attached supplemental schedule.
- Forms must be signed by authorized person (see last page).
- Forward one copy of the report to **Jenifer Jellison, SHIP Project Manager** at **PO Box 44612, Olympia, WA 98504-4612**

PART II *(Continued)*

Financial Information
Supplemental Schedules (Budget)

Project Title:	DoG the WAGs: An Innovative Solution to Reduce Exposure to Waste Anesthetic Gases		
Project #:	2013YC00219	**Report Date:**	11/5/14
Contact Person:	Bryan Goodin	**Contact #:**	503-415-5078
Total Awarded:	$131,450		

ITEMIZED BUDGET: How were SHIP award funds used to achieve the purpose of your project?

	Budgeted for Project	Amount Paid Out	Difference
A. PERSONNEL	$26,300	$30,147.50	$3,847.50
Explanation for Difference and other relevant information: As approved through budget modifications, funds from Publications were moved to personnel to support the development of the training modules.			

	Budgeted for Project	Amount Paid Out	Difference
B. SUBCONTRACTOR	$78,500	$88,089.70	$9,589.70
Explanation for Difference and other relevant information: The subcontractor provided additional services than originally budgeted for, included a second assessment of the DoG device during mock surgeries to eliminate variation in device users and illustrative footage for the training modules to clearly show people how much anesthetic gas is being released into the air during medical procedures.			

	Budgeted for Project	Amount Paid Out	Difference
C. TRAVEL	$0	$0	$0
Explanation for Difference and other relevant information: N/A			

	Budgeted for Project	Amount Paid Out	Difference
D. SUPPLIES	$2,500	$3113.95	$613.95
Explanation for Difference and other relevant information: The computer we were required to purchase was slightly more expensive then we had originally estimated.			

	Budgeted for Project	Amount Paid Out	Difference
E. PUBLICATIONS	$16,150	$2,149.62	$14,000.38
Explanation for Difference and other relevant information: As a result of input from project stakeholders, it was decided to produce our deliverables in an electronic format so that they could be easily updated and/or modified to meet the unique needs of any organization wanting to implement this. This significantly reduced the Publication costs. As approved in requested budget modifications, these funds were re-allocated to the subcontractor and personnel line items.			

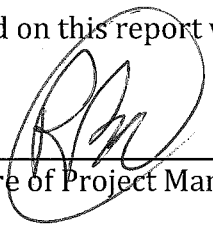
	Budgeted for Project	Amount Paid Out	Difference
F. OTHER	$8,000	$8,000	$0
Explanation for Difference and other relevant information: N/A			

	Budgeted for Project	Amount Paid Out	Difference
TOTAL DIRECT COSTS	$131,450	$131,500.77	$50.77 (provided as in-kind by Legacy Health)
	Budgeted for Project	Amount Paid Out	Difference
TOTAL INDIRECT COSTS	0	0	0
	Budgeted for Project	Amount Paid Out	Difference
TOTAL SHIP BUDGET	$131,450	$131,500.77	$50.77 (provided as in-kind by Legacy Health)

	Budgeted for Project	Amount Paid Out	Difference
G. IN-KIND	$66,209	$54,049.80	$12,159.20
Explanation for Difference and other relevant information: Some hours of staff time that were originally budgeted as in-kind were moved to budgeted line-items to ensure the highest quality training materials possible. Only recorded in-kind hours by staff listed in the original budget were counted, as a result, this line-item is under-valued as there have been numerous staff that have supported the project. They include staff in the surgical department to support the scheduling and implementation of the independent evaluation; content reviewers; and grant management staff.			

I hereby certify that the expenditures listed on this report were made with my approval:

11-7-2014
Date



Signature of Project Manager

PART III
Attachments:

Provide resources such as written material, training packages, or video/ audio tapes, curriculum information, etc. produced under the grant.

Also include copies of publications, papers given at conferences, etc.

This information should also be provided on a **CD** or **DVD** for inclusion in the file.

REMINDER!!: All products produced, whether by the grantee or a subcontractor to the grantee, as a result of a SHIP grant are in the public domain and can not be copyrighted, patented, claimed as trade secrets, or otherwise restricted in any way.

The following products have been included as an attachment to this report. When CDs are received, a CD and a hard copy of this report will be mailed to the SHIP office.

- AOHP 2014 WAG Poster
- SHIP Grant – WAG Literature Review
- Field Sampling Strategy
- WAG DoG Evaluation Report
- DoG Instructional PowerPoint
- DoG Device Instruction Poster
- Template Policy – Waste Anesthetic Gases
- Template Waste Anesthetic Gas SBAR
- Template Training – WAG monitoring – Managers
- Template Training – WAG monitoring - Employees