

From the Chief Engineer Officer

Engineers,

It has been my honor and pleasure to serve as your Chief Engineer. The U.S. Public Health Service has faced challenges on multiple fronts in recent years. Thank you all who have deployed as part of the COVID-19 response, Unaccompanied Children Mission, Operation Allies Welcome, Headquarters support, etc. and to everyone who has remained steadfast and vigilant in your duties and roles. In these times, it is important to keep ourselves grounded in mind, body, and soul. Focus on mission, family, friends, and colleagues and always remember our work is important.

As PHS Officers we must continue to focus on our mission to protect, promote, and advance

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Edward M. Dieser, P.E.
Rear Admiral, USPHS
Assistant Surgeon General

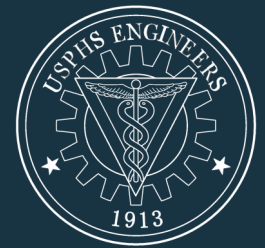
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the health and safety of our Nation. We each have things that we can control and things that are beyond our control. I encourage you all to focus on the things that you do have control over. Maintain a positive attitude. When things are most challenging, reflect on the reasons WHY you choose to serve. This focus will help you continue to make a contributing impact on your daily mission, a positive impact on the people around you, and in turn advance your career as a USPHS Engineer Officer.

It is often said that life is a Journey, not a Destination. My charge to you is to strive for the incremental changes in yourself and use your talents to not only improve yourself, but others around you – whether they are wearing the uniform or not. Propel their incremental changes, guide their career progression, and enhance their impact. Seek your balance, your jazz, and your inspiration as together, our impact is greater.

As I prepare to turn over the reigns of Chief Engineer to my successor, I want to thank you all for your continued dedication to our service and our important mission. I know times are especially challenging right now given the pandemic and our historic low promotion rates. Remember WHY you chose to serve our Nation as a USPHS Engineer Officer and that your work is vitally important to our public health. You make a difference!

Machinatores Vitae: Paratus, Volens, Peritus!

RADM Edward M. Dieser, P.E.

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2021 EPAC Chair Update

CDR Deborah P. Cox, P.E.

How do **YOU** define success?

2021 has presented us all with numerous challenges including keeping our families safe with the ongoing pandemic, deployment operational tempo, changing requirements, historic low promotion rates, and the continued pressure to do more with less.

I am incredibly proud of how the Engineer Category has risen to face these challenges and do our part to help protect our country during this time of great need. On top of numerous other deployments, engineers led the Navajo Water Mission and were recognized with the SAME Cumming Award – well done!



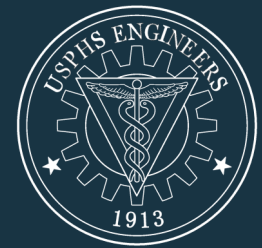
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U.S. PUBLIC HEALTH SERVICE COMMISSIONED CORPS

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The Career Development Subcommittee led by CAPT Eric Hanssen and LCDR Michael Simpson worked with the Council of Captains to implement quarterly Senior Officer Panels. I want to thank the Council of Captains for these outstanding presentations and LCDRs David Dar, Will Chang, Mary Millner, and Monica Murie for moderating these sessions. In August, the Recruitment and Retention Subcommittee led by LCDR Fred Kelly and CDR Stacey Yonce hosted engineer listening sessions to provide an opportunity to voice engineer issues and concerns. You brought important issues to light. Thank you everyone who made the time to participate, CDR Chris Fehrman for serving as moderator, and LTs Andrew Lean, Bijay Tamang, and Colin Tack for serving as scribes. On August 31st the CPO provided the O6 Engineers with an overview of the questions received as well as feedback from the O2/O3, O4, and O5 listening sessions. The CPO and O6 Engineers discussed additional ways to help officers beyond formal mentoring and award nominations to include esprit de corps events such as monthly lunches or virtual coffee hours or athletic events with officers in their local areas, book circles focusing on leadership development, and expanding upon the 2021 Senior Officer Panels. The listening sessions not only provided an opportunity to hear issues from all engineers, but they also reopened our lines of communication and renewed our leadership's commitment to help engineers navigate the changes the USPHS is currently undergoing. John C. Maxwell stated, **"Change is inevitable. Growth is optional."** I encourage all engineers to continue to choose growth.

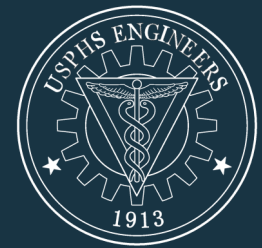
Recently, as I was reading the preface of the *National Society of Professional Engineers Ethics Reference Guide*, Dr. William E. Wickenden's description of the **"second mile"** made me think of how our work as USPHS engineer officers, in the service of health, is focused on this second mile.

Every calling has its mile of compulsion. Its round of tasks and duties, its prescribed man-to-man relationships, which one must traverse daily if one is to survive. Beyond that is the mile of voluntary effort where one strives for special excellence, seeks self-expression more than material gain, and gives that **unrequited margin of service to the common good which invests work with a wide and enduring significance. The best fun of life and most of its durable satisfaction lies in this second mile and it is only here that a calling can attain the dignity and distinction of a profession.**

As each of us is weathering the changes the USPHS is undergoing, I invite you to reflect on Dr. Wickenden's statement and find comfort in that fact that your work matters and is helping the vulnerable and underserved populations of our Nation who need our help the most.

It has been an honor and my pleasure to serve as your EPAC Chair since September

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2020. I want to thank LCDR Melissa de Vera for her outstanding service as the 2021 EPAC Executive Secretary. As I look to 2022, I am excited for the initiatives EPAC will tackle with LCDR Praveen K.C. as incoming EPAC Chair, a new Chair-Elect, six new EPAC voting members, and a new CPO. In my Spring Chair Update, I invited you to reflect on what small and simple changes would help you do your job better and make our category stronger. In this update, I am asking you to continue to get involved, choose to grow with our service, and help each other. Together we will get through these difficult times. I charge you with recognizing everyone brings value and different perspectives to issues and remind you of Matthew Woodring Stover's warning, "If you take out the team in teamwork, it's just work. Now who wants that?" Go Engineers!

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Remodel of an Existing Inpatient Pharmacy: Challenges and Lessons Learned

CAPT Ashley Schaber, PharmD; CDR Shad Schoppert, P.E.; Roy Reiss, EIT

Edited by: CAPT Kara King, PharmD

Background

Serving as the tertiary care center for over 180,000 American Indian and Alaska Native (AI/AN) people, the Alaska Native Medical Center (ANMC), located in Anchorage, Alaska, operates the largest inpatient pharmacy within the Indian Health Service. Annually compounding over 210,000 products, dispensing nearly 1 million total doses, and verifying over 500,000 orders, the ANMC Inpatient Pharmacy has occupied the same square footage since the opening of the new hospital building in 1997. A minor remodel in 2012 increased storage capacity and made workspace more efficient. Even with these adjustments, pharmacy storage needs increased and operational efficiency decreased over the subsequent years, as the patient population and acuity grew.

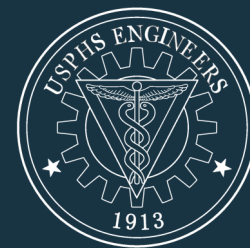
The recent changes to United States Pharmacopeia (USP) Chapters 797 (Pharmaceutical Compounding: Sterile Preparations) and 800 (Hazardous Drugs: Handling in Healthcare Settings) required reconfiguration of the pharmacy's sterile compounding area. The USP updates helped to minimize employee exposure to hazardous medications and provide safely compounded sterile products. In addition, USP 797 allows for increased operational flexibility by utilizing the beyond use dating (BUD) for sterile compounded products if the product is compounded in a cleanroom that was designed and maintained appropriately. A facility with only a segregated compounding area is allowed less expiration dating, and a facility that meets neither must utilize immediate use BUD per USP 797.

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Multiple avenues for USP 797 and 800 compliance are available. ANMC compared options including:

- 1) Pre-fabricated cleanroom modules (these would have resulted in losing space);
- 2) Remodeling the existing Inpatient Pharmacy space to create a cleanroom;
- 3) Remodeling a different space to create a cleanroom (cost was higher; time-line could not be met; would impact clinic operations); and
- 4) Using shorter BUD to meet segregated compounding area requirements (would not have met Pharmacy business needs).

The four potential options were compared using a business plan and risk assessment. Aspects evaluated included construction changes needed, drug shortage impact (with reduced dating), operational impact to other departments (moving location), pharmacy efficiencies, space requirements (ability to fit within the existing Inpatient Pharmacy footprint), and the ability to meet the USP implementation timeline. A cost-benefit analysis was completed and presented to hospital leadership in the capital budget cycle.

In early 2018, hospital leadership gave approval to remodel the existing Inpatient Pharmacy space. Upon project approval, the Facilities and Pharmacy Departments partnered to operationalize the project. The planning and design process started in August 2018 and official project construction kick-off occurred in August 2019. Completion of the cleanroom and hazardous compounding areas occurred in November 2019, with full completion of the project occurring in late 2020.

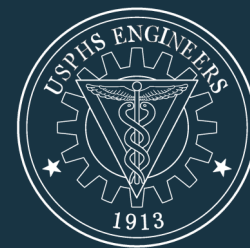
Multiple departments designated a lead project manager to collaborate on the Inpatient Pharmacy Remodel project, with the Inpatient Pharmacy Manager and Facilities Project Manager functioning as project leads. The Biomedical Engineering department installed and certified the new equipment and new compounding hoods and worked with an outside company to certify the new cleanroom space. The IT department ensured seamless transfer of technology including workstations, printers, and IV room compounding technology. The Environmental Services department played an important role in rapid cleaning of areas to maintain environmental standards. The Inpatient Pharmacy maintained operations during challenging phases and confined workspaces. All departments worked together to ensure safety standards were met during the ten-month long project.

Description of project timeline/phases

Phase 1 - Description (Project Planning)

Phase 2 - Cleanroom preparation: office space and locker areas temporarily relocated. Existing high-density shelving relocated to accommodate IV room staging area.

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Phase 3 - Liquid unit dose area remodel including casework and new shelving and space for tabletop non-sterile compounding hood.

Phase 4 - Tablet unit dose area including new shelving and workspaces.

Phase 5 - Pharmacists' office space, ordering technician desk, and internal pharmacy storage space finalized.

Phase 6 - New pharmacy receiving room space finalized including addition of high-density shelving.

Phase 7 - Break room finalized including new lockers and casework.

Design/Construction/Commission

The design of the Inpatient Pharmacy remodel itself was challenging. The initial constraints included:

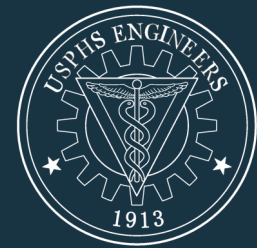
- 1) The ventilation system had to meet the very stringent USP air quality requirements (air changes, pressure relationships, humidity, and temperature).
- 2) The ventilation system had to be very flexible, easily controllable, and have built in redundancies.
- 3) The clean, ante, and hazardous rooms had to be easy to operate, clean, and maintain with little to no interruptions.
- 4) The Inpatient Pharmacy had to remain operational throughout the construction.

The project took a multi-pronged approach to address the ventilation challenges. To address the air quality requirements and maximize the reuse of existing infrastructure, the current single large fans in the supply and return air handling system were replaced with fanwalls (arrays of smaller fans). These fanwall arrays were oversized to achieve the room air changes required and provided greatly expanded reliability of the system. With several small fans there is no single point of failure, ensuring air quality measures are always met. An additional dedicated exhaust vent with increased capacity was added to ensure adequate exhaust from the hazardous compounding room and storage room.



Variable frequency drives (VFDs), devices that modulate the speed of the ventilation fans, were incorporated to allow for far-ranging and precise control of the entire ventilation system. The new Inpatient Pharmacy ventilation system, including the clean,

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ante, and hazardous rooms, is connected to the hospital's ventilation control system. The ventilation control self-modulates based on the USP air quality requirements and is programmed to send automated email notifications to both the Facilities and Pharmacy teams when the system is outside of control limits.

Throughout the design, both the Pharmacy and Facilities teams gave extra thought and consideration to clean, ante, and hazardous room details that would allow for more efficient operation, cleaning, and maintenance, with an emphasis on limiting the interruption to future operations. Examples included:

- Eliminating ledges by using a cleanable flat panel recessed wall phone instead of a regular corded wall phone, flat recessed clocks, and simple shelves for ease of cleaning.
- Relocating features in the ceiling space that have the potential to leak over their service life, such as valves, water piping, and other mechanical components.
- Considering materials for walls, floors, and ceilings to ensure they would withstand more aggressive cleaning products. This project used a thick, solid surface seamless material for the walls that had welded joints which was beyond requirements, but helped ensure ease of cleaning for the future.
- This project utilized sealed LED lights with sufficient lumens and a high color rendering index to provide clear, crisp color definition for the workspace, similar to what would be found in an operating room setting.
- Selecting chairs and shelves that were simple, durable, and easy to clean.
- Incorporating cameras among other ceiling items and consider surface vs. in-ceiling mounted cameras.

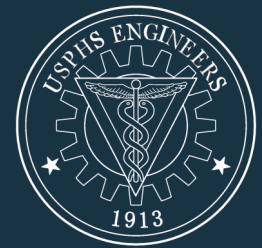
When selecting materials and planning the design, it remained important to consider and balance cost savings now against time spent operating and maintaining the space over the next several years.

Discussion/Conclusion

Our site chose to manage and execute this project using internal resources whenever tasks allowed. As with any renovation, our team experienced unexpected variables, which were easier for us to work through because we had an in-house construction crew and partnerships between the Facilities and Pharmacy teams were previously established. If a site determines the use of an external contractor works better for them, our team recommends frequent and open communication to ensure a good partnership, since details and requirements for this type of space are so intricate.

During the planning and implementation of a pharmacy remodel, being flexible, resilient, and having excellent communication throughout the process are key to success. Some of our team's challenges included staffing, logistical, and structural considerations. Some of our "lessons learned" are describe below. These obstacles were opportunities to develop better working relationships between departments, contractors, and engage Pharmacy and Facilities staff.

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Lessons Learned during Inpatient Pharmacy Remodel

Topic/Area

- 1) Lead times: Several critical items have long lead times to be considered to ensure timelines are met. Include any site-specific shipping challenges (for example, barge schedule for Alaska).

Lessons Learned

- Pharmaceutical hoods (16-20 week lead time)
- HEPA filtered ceiling hoods (12 week lead time)
- Critical furniture (6 week lead time average)

- 2) Effective Communication

Lessons Learned

- Coordination between Facilities Project Manager and Pharmacy Manager before construction began to determine phasing and workflow for both teams.
- Constant daily communication between Facilities Project Manager and Pharmacy Manager was key while actively constructing in the same space as pharmacy operations.

- 3) Inaccuracies in design and drawings

Lessons Learned

- Dimensions and features shown on the as-built/record drawings should be checked for accuracy. One dimension error associated with the wall with the pass-through between the positive and negative pressure rooms caused significant construction delays and rework in that area. This highlighted the value of accurate as-built drawings and appropriate levels of discovery time in the planning phases of the project.

- 4) Equipment

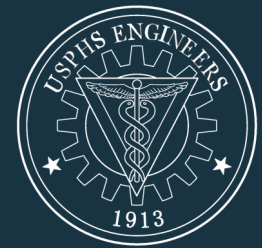
Lessons Learned

- The contractor originally wanted to substitute an alternative HEPA filter supply diffuser due to lead times. The engineer reviewed the differences and determined the specified product was superior, and the substitution request was ultimately rejected, despite longer lead times.
- We suffered a mechanical (vibrational) failure of one of the new exhaust fans. The design engineer had not incorporated a way to isolate the redundant fans in case one needed to be replaced. Since the pharmacy had not moved into the new space yet, we were able to do a shut-down and install isolation slide-plates, so a replacement fan could be installed without disrupting workflow.

References:

- <https://www.usp.org/> accessed 9/12/2021
 - Chapter <800> Hazardous Drugs- Handling in Healthcare Settings. In: 2016 USP Compounding Compendium. Rockville, MD: USP Convention: 2016:85-103.
 - Chapter <797> Pharmaceutical Compounding- Sterile Preparations. In: USP, 42-NF 37. Rockville, MD: USP Convention: 2019.

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EPAC Subcommittees Update

LCDR Melissa DeVera

It is hard not to be inspired by the leadership and dedication that our EPAC Subcommittees have shown during these unprecedented times. What I have seen first-hand during my tenure as Executive Secretary were engineers collaborating to rise to every challenge to ensure that our category stayed informed and heard. It was truly an honor to witness our subcommittees step up to accomplish so much in such a short amount of time. The updates below are just some, not all, of the accomplishments that were brought to fruition since the last newsletter update.

Rules – The Rules Subcommittee held a selection board for new EPAC Voting Members for the 2022 to 2024 term. The slate of new Voting Members has been finalized, and all applicants have been notified. The subcommittee plans to review and recommend updates to EPAC By-Laws to provide clarity on existing language and to align it with the EPAC Charter.

Awards – The Awards Subcommittee continues to make incremental updates to nomination forms for 11 award categories. The subcommittee developed training materials and a presentation for award write-ups. The subcommittee also updated award recognition letters to ease the process of uploading agency/category award documentation to the electronic Officer Personnel File (eOPF). Both the Awards Chair and Vice Chair presented at Category Day on tips for successful award write-ups.

Career Development – The Career Development Subcommittee (CDS) hosted the Senior Officer Panels with the CPO's Council of Captains in March on Officer & Leadership Development in July on Promotion Administration, and recently in November on the topic of Developing Your Professional Network. CDS continues to draft guidance and an engineer-specific CV template that aligns with the recently updated standardized CV and benchmarks. In addition, they are conducting a survey of promotion data analytics to present to the engineer category.

Events – The Events Subcommittee provided engineers with valuable information and continuing education opportunities while hosting the CPO Town Halls and Category Day events. They pivoted in May to give 121 CPO Town Hall attendees each a 1-hour PDH on Health Facilities Assessment Training. In June, the second Virtual Engineer Category Day was completed. Officers from all ranks attended the daylong event that included presentations, an awards ceremony, a mid-day social, and words from our Chief Engineer. A total of 117 engineers registered for the event and 4.25 PDHs were delivered to each verified attendee.

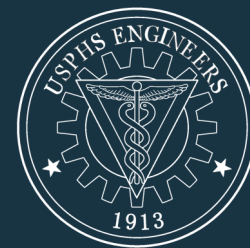
Information – The Information Subcommittee is tirelessly catching up on updates to the EPAC website after a Corps-wide IT system shutdown that began unexpectedly in April and resolved in August. The Subcommittee assembled stories for the Fall Newsletter and will work on a website and newsletter development playbook. The playbook will educate EPAC members who are not familiar with website and newsletter editing to learn and participate in the building of the newsletter and website.

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Public Health and Engineering Practice – The Public Health and Engineering Practice (PHEP) Subcommittee is continuing to further the development of a database with reference standards and manuals that will be accessible to USPHS engineers anytime through portable electronics such as during a deployment. PHEP is also working on assisting in advancement of the engineer skills and core competencies database and continuing to print 3D items including face shields and masks.

Readiness – The Readiness Subcommittee finalized and posted the 2020 Engineer Deployment Booklet. They issued a readiness survey to all engineer officers and identified action items to improve our category’s overall readiness status. They also audited a selection of training courses, most offered at no cost, to develop training recommendations for officers deploying in traditional disaster/emergency response as well as non-typical roles.

Recruitment & Retention – The Recruitment & Retention Subcommittee organized, developed, and hosted four different listening sessions tailored to specific career points for all ranks. The sessions provided each group a forum of non-attribution to speak with the CPO about issues and concerns that are unique to their grade and career. The subcommittee continues to work on compiling a list of universities that engineer applicants have graduated from to determine if the information can be useful in strengthening recruitment efforts at those specific universities.

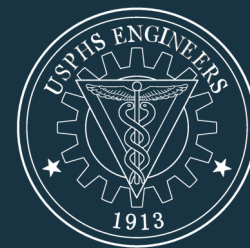
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Tell Your Story!



Tell your story and show the rest of the U.S. Public Health Service Commissioned Corps the true value and strength of the Engineer Category. Submit your photos and stories today for inclusion into USPHS Commissioned Corps social media platforms. Submit your photos and stories to LCDR Travis Sorum at travis.sorum@ihs.gov.

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COVID-19 Reflection & Gratitude

LT Bijay Tamang, P.E.

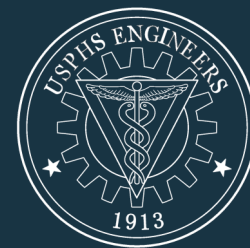
In January 2020, I had the opportunity to graduate from the USPHS Officer Basic Course (OBC) with 22 outstanding officers as part of Class 115 in Bethesda, MD. After OBC, I reported to the Spokane District Office within the Portland Area Indian Health Service (IHS) to begin my career as a Sanitation Facilities Construction (SFC) engineer. A year later, I found myself on an Agency deployment to provide COVID-19 related support on a remote and beautiful American Indian Reservation nestled in the Inland Pacific Northwest. The reservation was surrounded by hills covered in beautiful pine trees powdered with fresh snow. It was a crisp and peaceful morning. Inside the Reservation's Correctional Facility, however, was a slightly different story.



I was fully gowned over my relatively new ODUs, with a face shield over my N-95 mask and with my gloved hand, I held a 6-inch nasopharyngeal cotton swab. The other end of the swab was deep inside a nostril of a gentleman dressed in an orange jumpsuit who appeared to be uncomfortable and slightly annoyed with me. This gentleman was one of the several inmates at this Tribal correctional facility whom I screened for COVID-19 that day. Amidst the silence of the swabbing, in mere seconds, my brain had managed to ping through questions, potential problems, and their solutions such as, "wow, this is different than my day job," and "does the swab really need to be this long and thick?" Also thoughts like, "hmm...where is the nearest exit if this thing 'goes south', and I need to make a hasty exit?" I also thought if evasion is not an option, perhaps I may have to implement Jujitsu grappling techniques I have been watching on YouTube. In my defense, the latter thoughts of contingency planning was a learned mindset from my time as a collateral duty Army Safety Officer in my previous career and not of a paranoid person, I think.

Humor aside, the story above was a memorable event that came to mind as I reflected on my deployment experiences providing COVID-19 support almost a year ago now. Besides nasal swab testing, I also had the opportunity to perform infection con-

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trol inspections, assist with medical charting, present COVID refresher training to clinic staff, and provide facility maintenance support.

On most days, I felt I was helping, but there were also moments when I felt I couldn't do much for the patients. However, the medical staff I worked alongside demonstrated firsthand the power of being present and seeking to genuinely empathize with the patients. I realized these simple acts of kindness made a big difference in easing patient concerns and had big effects in validating my reasons for joining the USPHS. It reassured me that I was doing what mattered. The opportunity I had to deploy and assist during the pandemic was certainly not unique, nor was it rare. The engineer category has a long-standing history of dedicated service members who have gone above the call of duty to advance our nation's health and safety. This speaks volumes about the character of officers in our organization, and I am grateful to be associated with them. I am also thankful for the medical providers and staff who are still tirelessly working on the frontlines of the pandemic. Finally, I am grateful for the support from my supervisor and the Portland Area IHS leadership. They were instrumental in our office being able to provide assistance, whether it was to complete my portion of the SFC workload in my absence, help shovel snow to prepare the COVID testing site, or even help screen patients at the clinic. It truly was a team effort, and I am grateful for the opportunity to "do a bit of good."

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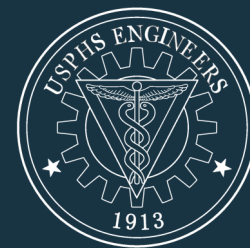
Making An Impact in the Fight Against the Pandemic

*RADM Edward M. Dieser, P.E., CDR James Coburn, CDR Patric Klotzbuecher-Cruz,
LCDR Praveen K.C., P.E., and LT Kevin Remley, P.E.*

Engineering was the second profession added to the U.S. Public Health Service (PHS) over 100 years ago, and the importance of public health engineering continues to grow. PHS Engineers are stationed across the country within various federal agencies and Native American tribes. While our client population is the public, with a focus on the underserved populations, we are also an integral part of the PHS as the nation's health responders.

The year 2020 brought many unexpected challenges to our nation. However, through those challenges came opportunities for all eleven professional categories within the U.S. PHS Commissioned Corps to step up and respond. Instead of focusing on the ongoing impact our engineers are having in their day-to-day duties, let us highlight some of the amazing impacts PHS Engineers had in response to the COVID-19 pandemic.

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Navajo Water Access Mission

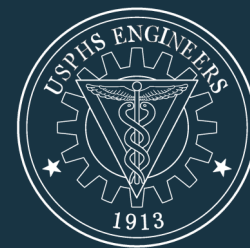
At the beginning of the pandemic, COVID-19 was spreading much faster among the Navajo Nation residents than among the neighboring states of New Mexico, Arizona, and Utah. Primary prevention guidance to perform hand washing to prevent the spread of COVID-19 requires water. On April 22, 2020, the President and Vice President of the Navajo Nation requested support from the Center for Disease Control and Prevention (CDC) to participate with the Indian Health Service (IHS) to “advise actions and aid in overseeing community-based interventions led by IHS or the Navajo Nation.” IHS was able to identify approximately 9,600 homes on the Navajo Nation with no access to piped water supply. These homes likely relied on hauled water as their primary source for water and the average distance to safe water sources for many of these homes was 25 miles. The need to improve accessibility to safe water sources for these homes led to an official agreement between IHS and the Navajo Nation to allocate over \$5 million from the IHS appropriated Coronavirus Aid, Relief, and Economic Security (CARES) Act funding to support increasing access to safe water across the Navajo Nation.



From April 2020 to February 2021, 75 PHS Engineers deployed to support the Navajo Nation. For the Navajo Water Access Mission, the engineers led the design and construction of 59 transitional water points, the provision of 37,000 water storage containers and 3.5 million doses of disinfection tablets, and public outreach to increase public knowledge about the new water services available. These efforts resulted in increased access to water for over 37,000 people by reducing the round-trip travel distance from 52 miles to 17 miles.

During the Water Access Mission, an additional request from the Navajo Nation was received by the IHS for assistance to identify homes that could benefit from the installation of water cisterns and on-site wastewater disposal systems. In response, the IHS requested the support of PHS Engineers and Environmental Health Officers to support field data collection and design efforts to develop site plans for the construction of these facilities. This resulted in a second mission (Cistern & On-site Wastewater Mission) where the PHS Engineers and Environmental Health Officers assessed over 600 homes from October 2020 to December 2020 resulting in the

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completed cistern and on-site wastewater system design at over 400 homes. These efforts included 79 homes with completed construction packages that are now ready to fund when project resources become available.

Javits New York Medical Station

As COVID-19 cases spiked in New York City in March 2020, there was an immediate need for surge space and the establishment of alternate care sites. Our engineers were deployed to a joint services mission cooperating with other federal, state, and local agencies to maintain 500-hospital beds as part of the Javits New York Medical Station (JNYMS). The JNYMS started as a bare convention center and transformed into a facility with over one thousand clinical and support personnel from over forty different command structures.

The roles of our engineers included serving as Chief of Patient Administration/ Medical Records, which oversaw enlisted personnel and officers from the Army and Navy as they maintained paper records and entered data into the New York City electronic medical records system. PHS Engineers also coordinated medical supplies with the Army's 44th Hospital Brigade Logistics and developed a live occupancy tracker and bed board which was monitored by senior staff for FEMA, Army, Public Health Service, New York State, and New York City. The facility treated over 1,000 patients in one month with a smooth transition to State control.

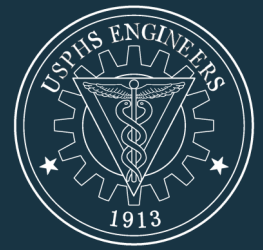
Community Based Testing Sites in New Orleans, Louisiana

From March-August 2020, Department of Health and Human Services (HHS) and FEMA led a joint White House Task Force to create the Community Based Testing Site (CBTS) program. This initiative engaged federal, state, and local public health agencies, healthcare systems, and commercial partners to develop COVID-19 drive-through testing sites across the nation. In direct support of the Louisiana Governor's Office of Homeland Security and Emergency Preparedness in New Orleans and Jefferson Parishes, PHS Engineers, alongside federal, state, and local partners, adapted the CBTS concept of operations and initiated drive-thru COVID-19 testing at three sites of opportunity in less than 24 hours.



PHS Engineers advised and assisted with CBTS operations conducted by multiple battalions and wings of the Louisiana Army and Air National Guard (LANG), ensuring

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that all soldiers, airmen, civilian staff, and volunteers maintained proper social distancing during operations. They also ensured that all staff wore appropriate personal protective equipment and acted in accordance with established biosafety and infection control protocols. Our engineers mentored and trained more than 75 LANG, New Orleans Health Department staff, and volunteers on procedures to ensure the quality, viability, and chain of custody of COVID-19 test samples that were collected from over 2,500 first responders, healthcare workers, and community members.

Northern Navajo Medical Center in Shiprock, New Mexico

The Navajo Commission on Emergency Management declared a public health state of emergency in March 2020 for the Navajo Nation due to the rapid and uncontrolled transmission of COVID-19. In response to the public health emergency,



HHS resources were requested to assist FEMA in establishing alternate care sites (ACS) for COVID-19 patients. A team of PHS officers, including engineers, deployed to assist the Northern Navajo Medical Center (NNMC) in Shiprock, NM in response to the request.

PHS Engineers served as the Planning Chief and Deputy Logistics Chief, establishing the ACS operations while coordinating with numerous departments within the NNMC. The team developed pivot and contingency plans, managed the resources and staffing needs to meet multiple objectives, and assured the quality of operational information flowing from the tactical to strategic emergency management levels. Our engineers facilitated approximately 1,340 hours of medical services, 2,490 hours of nursing services, 60 hours of pharmacy services, 1,000 hours of general clinical services, and 500 hours of behavioral health services to the Navajo Nation, thus enhancing the quality of both COVID-19 and non-COVID-19 patient care.

Phoenix Indian Medical Center in Phoenix, Arizona

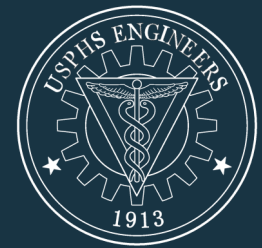
In July 2020, two PHS Engineers joined a 16-member team deployed to Phoenix Indian Medical Center (PIMC) in Phoenix, AZ. The team deployed to supplement the PIMC's staff, as they were overwhelmed with high numbers of COVID-19 cases. By

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the time they arrived more than 90 PIMC staff members had already tested positive for COVID-19 and the Intensive Care Unit and the Emergency Department were operating at full capacity.

Our engineers assisted PIMC's engineering department by conducting airflow assessment in the Emergency Department and Operating Room suite and inspecting airborne infection isolation rooms for health and safety. This included evaluating PIMC's heating, ventilation, and air conditioning and building automation system. They were able to identify areas with deficiencies and provide solutions to correct the deficiencies. Among the solutions was the creation of a contaminant flush time diagram, which provided information to the housekeeping staff on how long they should wait before entering to clean the COVID-19 patient treatment rooms.

PHS Engineers also evaluated and inventoried over 2,000 medical devices throughout PIMC and reviewed 76 operating manuals. This included providing training to the department equipment managers about the importance of tracking, storing, maintaining, and repairing the medical devices. These efforts ensured medical providers had access to accurate and reliable devices to better treat, diagnose, and care for their patients.

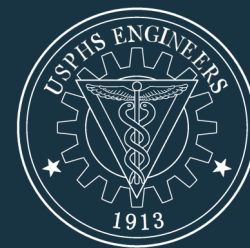
Conclusion

These are only a few of the critical roles and impacts resulting from the dedication and innovation of PHS Engineers since the start of the pandemic. Look closely, you will find the direct impact of "Health Engineering" on your life, advancing outcomes and supporting your community. USACE Engineers establishing ACS, PHS Engineers researching medical advances at FDA, and engineer officers in the Army, Navy, and Air Force medical services protecting service members and their families around the world.

The impact of the pandemic was felt in every community across the nation and the globe, and while we hope this is our "once in a century" pandemic, PHS Engineers remain prepared and ready to leverage our excellence to meet any need, to solve any problem, and partner with any community to relieve suffering and illness. This is our mission and our motto – "Machinatores Vitae: Paratus, Volens, Peritus." Engineering for Life: Ready, Willing, Excellence.

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2021 RADM Ian K. Burgess Award Recipient

LCDR Vicky Hsu is a clinical pharmacology reviewer for new oncology and hematology drugs at the Food and Drug Administration (FDA). As the lead clinical pharmacology reviewer, LCDR Hsu is responsible for optimizing the use of drugs in patients by identifying the best dose for each individual patient or specific patient population. During her time at the FDA, she has led the clinical pharmacology review approvals of many new cancer and hematology drugs.



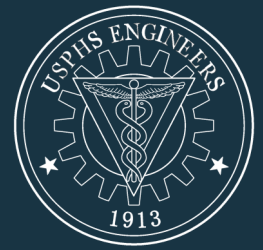
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Congratulations to CDR Kurt Kesteloot— Elected to the Commissioned Officers Association (COA) Board of Directors



CDR Kesteloot received his USPHS commission in 2004 and served with the Indian Health Service from 2004 to 2010. CDR Kesteloot has worked for the National Park Service (NPS) since 2010 and currently serves as a supervisory public health consultant. He provides technical assistance to 62 National Park units in 13 states through assessments of water and wastewater systems, water and wastewater design and review, assessment of food facilities as well as work on many other public health related issues. He also supervises four Public Health Service officers and is the Lead for NPS Engineering questions in the NPS Office of Public Health Field Services Branch.

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Engineers Analyze Promotion Data

LCDR's Timothy Martin, David Sullivan, and Teresa Kastner



The EPAC Career Development Subcommittee has a new initiative to generate an Engineer Promotion Database to help officers manage their careers and best prepare for promotion. The project team is led by LCDRs Timothy Martin, David Sullivan, and Teresa Kastner.

As you know, there is a decreasing amount of promotion data available to our officers, and almost none that is specific to PHS Engineers. Wouldn't it be nice to have a better idea of what it takes to get promoted? How many attempts are typical for achieving a specific rank? Are my awards competitive with other PHS Engineers? The project team is answering your questions with DATA!

To capture this critical promotion data, Engineer Officers contributed nearly 100 datasets in a recent anonymous and voluntary survey that closed on December 1st, 2021.

The project team is currently analyzing the data and preparing a first-ever Engineer Promotion Data report. Keep an eye out; we anticipate the report will be released to our Engineer Officers in February 2022.

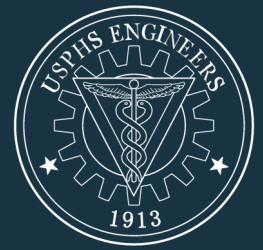
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2021 JOAG Excellence Award Recipient



LT Colin Tack serves as a Medical Device Investigator stationed in Jamaica, NY at the Food and Drug Administration's Office of Regulatory Affairs, Office of Medical Device and Radiological Health Operations. In this role, he primarily conducts inspections and investigations of medical device manufacturers to ensure compliance with federal regulations and the manufacture of safe and effective medical devices.

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Congratulations to LCDR Michael Gifford—Elected as the 2023 EPAC Chair

LCDR Gifford works for the National Park Service (NPS) in the Park Facility Management Division. His duties include managing national programs for emergency relief funding involving transportation infrastructure, bridge safety, risk, and quality inspection. He stated that it is an honor to serve and that he looks forward to taking the team through 2023 as EPAC Chair.



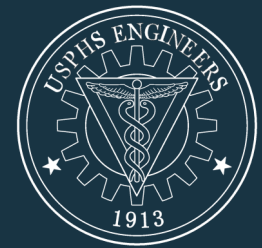
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Society of American Military Engineers (SAME) 2021 Green Medal Recipient



The SAME Green Medal, which recognizes a junior officer or civilian who has demonstrated outstanding contributions to public health engineering and science, was awarded to LT Bijay Tamang. He is a Senior Environmental Engineer assigned to the Indian Health Service since January 2020. In his current position, LT Tamang, manages 43 active projects to serve the health needs of over 9,000 Native Americans in Eastern Washington and Northern Idaho.

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A Perspective on Two Contrasting COVID-19 Deployments

LCDR Garrett Chun, P.E.

In March 2020, I watched in dismay as the onset of the COVID-19 pandemic spread across the world and into our country. Schools abruptly went to virtual learning and most federal workers transitioned to telework overnight. Like other fellow PHS Officers, I was called to deploy in response to COVID-19 and, like many others, was called to deploy again. My experience is perhaps unique in that my two COVID deployments were in the same area albeit with differing functions.

In early April 2020, I received a call from the Regional Incident Support Team Region 9 (RIST-9) to deploy to the FEMA building in Oakland as a Liaison Officer. Like many others at the time, I had been teleworking since mid-March and very rarely got out beyond the house. On arrival in Oakland, I met up with several other PHS Officers. Some were assigned to the Office of the Assistant Secretary for Preparedness and Response (ASPR) and others, like myself, were on the RIST-9 team and there to augment the ASPR Officers. Region 9 is a fairly large region covering California, Nevada, Arizona, Hawaii, Saipan, Guam, American Samoa, and the Native American Tribes in the above-mentioned states. I was assigned to be the Liaison Officer for the Tribes. The basic duty was to attend the various meetings and keep an ear out for what medical supplies, PPE, and personnel requests might be coming from the numerous tribes and then to provide daily situational reports (sitreps) to command.

The Navajo Nation is the largest tribe in the US and encompasses FEMA Regions 9, 6, and 8 (Arizona, New Mexico, and Utah). With most of the reservation in Region 9, it was agreed that Region 9 would take the lead in the coordination efforts. The latter portion of this deployment I spent a good amount of my time providing support in getting two Alternative Care Sites assembled quickly: one staffed with a PHS RDF team and the other with a Disaster Medical Assistance Team (DMAT). These sites were designed as a place for COVID positive patients with asymptomatic or mild illness to recuperate away from potentially multi-generational and/or high occupancy homes. As I ended that deployment, I wondered what it was like for the responders there on the ground.

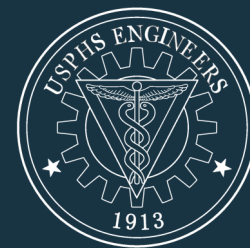
Seven months later, in October 2020, I got that opportunity to see what it was like to serve in the Navajo Nation in a different capacity. Throughout 2020, the Indian Health Service (IHS) had allocated a large number of IHS engineers and environmental health officers to the Water Access Mission and thus was looking for non-IHS water/wastewater engineers to deploy to a smaller Water Cistern and Onsite Wastewater

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System mission. This mission was to assess single family homes that lacked running water and proper sewage systems, draft site utility designs, and ultimately construct such improvements using grant money from the Coronavirus Aid, Relief, and Economic Security (CARES) Act. To cover a wider area, our team of five split up and placed ourselves in Kayenta, Winslow, and Gallup.



Typical Pit Toilet

I was stationed in Gallup and traveled mostly to homes in the Naschitti, Mexican Springs, and Wide Ruins Chapters. The standard protocol when engaging with community members was: 1) always don a mask, 2) never enter a home, and 3) after knocking on a door, step back six to eight feet. My routine would be to drive to home sites during the weekday to interview homeowners, collect design information, and then spend the weekend completing the AutoCAD drafting since a stay-at-home weekend curfew was in effect for the duration of

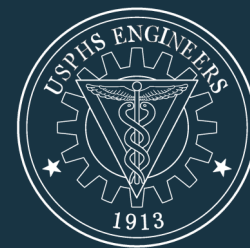
my time there. Collectively, as a team, we were able to assess approximately 210 total homes and provide water/sewer designs for about 69 homes.

Having two contrasting COVID deployments, both in relation to the Navajo Nation, was certainly unique. I was able to see the progressive impact of COVID from a wide lens that one has at a regional support office and I was also able to have a more personal experience witnessing the turmoil and hardship that this disease has caused at a community level. As I had no prior experience with IHS, I am also grateful for the opportunity to work in these capacities and get a glimpse into life on the Navajo Nation.



Soil Profile Test

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2021 RADM Robert C. Williams Engineering Literary Award-Peer Reviewed Recipients

The 2021 RADM Robert C. Williams Engineering Literary Award was presented to Dylan Neu and NIOSH Research Team

Paper title: Surface Dosimetry of Ultraviolet Germicidal Irradiation Using a Colorimetric Technique

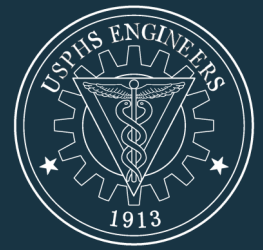
Journal: Annals of Work Exposures and Health, Volume 65, Issue 5, June 2021, Pages 605–611, <https://doi.org/10.1093/annweh/wxaa147>.



Authors: Dylan T. Neu
CAPT (ret) Kenneth R. Mead (Engineer category)
LT Tia L. McClelland (Health Services category)
William G. Lindsley
CAPT Stephen B. Martin, Jr. (Engineer category)
Graeham Heil
Mitch See
H. Amy Feng

All of the authors work (or worked) for the Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health (NIOSH). NIOSH has the mandate to assure "every man and woman in the Nation safe and healthful working conditions and to preserve our human resources." NIOSH has more than 1,300 employees from a diverse set of fields including epidemiology, medicine, nursing, industrial hygiene, safety, psychology, chemistry, statistics, economics, and many branches of engineering. The overarching goals of the Institute are to: 1) Conduct research to reduce worker illness and injury, and to advance worker well-being; 2) Promote safe and healthy workers through interventions, recommendations, and capacity building; and 3) Enhance worker safety and health through global collaborations. This work was undertaken as a collaborative effort involving researchers from the NIOSH Division of Field Studies and Engineering, the Respiratory Health Division, and the Health Effect Laboratory Division. The goal was to show that commercially-available ultraviolet (UV) dosimeters could be used to ensure proper UV dose levels when UV surface disinfection systems are used in healthcare spaces, including ambulance patient compartments.

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2021 RADM Robert C. Williams Engineering Literary Award - Open Category Recipients



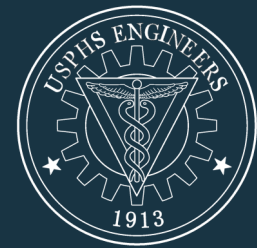
Recipients of the 2021 RADM Robert C. Williams Engineering Literary Award – Open Category taken at the FDA 3D Printing Core Lab in Building 62 on the FDA White Oak Campus, Silver Spring MD (Left to Right – CDR Leo Angelo Gumapas, CDR James Coburn, LCDR Timothy Martin)

CDR Leo Angelo Gumapas serves as the Environmental Engineering Program Chief for Program Support Center (PSC). CDR Gumapas provides oversight and develops HHS Department wide policies to comply with environmental laws, regulations and mandates, serves as PSC's Environmental Justice Lead regarding Federal Real Property Actions, and supports HHS' Sustainability and Climate Change actions.

CDR James Coburn serves as the Senior Advisor for Emerging Technologies in the Food and Drug Administration's Office of Counterterrorism and Emerging Threats. CDR Coburn guides agency-wide strategies and interagency collaborations to increase advanced manufacturing in critical regulated medical products.

LCDR Timothy Martin serves as a Subject Matter Expert for the Biomedical Advanced Research and Development Authority within the Office of the Assistant Secretary of Preparedness and Response. LCDR Martin prioritizes investments to expand the United States' industrial base for the manufacturing of medical countermeasures.

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2021 Engineer Category Day

LT Bijay Tamang

On June 23, 2021, the Engineer Professional Advisory Committee (EPAC) hosted its second Virtual Engineer Category Day. Many months of collaboration between EPAC leadership, Events Subcommittee leadership, and the Category Day Team were instrumental in the success of this year's event. Lessons learned from the 2020 Virtual Category Day provided a strong foundation of knowledge to build upon as well. It is also worth acknowledging that the event would not have been possible without the officers who volunteered to share their experiences with the 117 engineers (a record crowd!) who attended. It was truly a team effort, and speaks highly of the USPHS Engineer Category, as a whole.

This year's presentations included an insightful look into our fellow engineer officers' excellent work and accomplishments to advance and promote public health. The following presentations were offered:

2021 Category Day Presentations:

- CDC/NIOSH EPHB: Engineering Contributions to a Year of Pandemic Response (0.5 PDH)
- The Importance of EPAC Awards Process (Tips and Lessons Learned) (0.5 PDH)
- Python Programming Solutions Applied to a Logistics Environment (0.5 PDH)
- Protecting Public Health and Protecting History (0.5 PDH)
- Development and Utilization of Model-Based Process System Engineering Tools (0.5 PDH)
- Backup Power for Tribal Water and Waste Water Facilities during PSPS Events (0.5 PDH)
- NFPA 101 Life Safety Code and NFPA 99 Healthcare Facilities Code Overview (0.25 PDH)
- Enhanced Visualization of DHF Infrastructure Through Webmaps and Autodesk Revit (0.5 PDH)
- Reducing Total Dissolved Solids Output in the Leupp Well (0.5 PDH)

The event had noteworthy firsts. The first "Interactive Social Session" was launched, an initiative designed to learn more about fellow engineers. The opportunity enabled all attendees to turn on their cameras and interact with the group by answering questions such as their favorite food, hobbies, etc. All engineers love to interact with masses of people, right? Humor aside, it was a great way to learn about the person behind the voice, even if only for a brief period. The event also implemented an "evaluator initiative" to help presenters and the moderator improve their communication skills through actionable feedback and a defined process. Additionally, our Chief Professional Officer, RADM Edward Dieser, presented the Spring 2021 Chief Engineer Awards and the 2021 Society of American Military Engineers Awards to well-deserving engineer officers.

Even though this year's Category Day was considered a success, it still had challenges. Deployments in support of the Unaccompanied Children Apollo Mission impacted officers involved in carrying out the event. The abundance of "float" in the schedule vanished quickly. Through careful planning and consistent collaboration among all involved, the group overcame logistical challenges to keep the event on track. This is an advantage of being part of a group of professional problem solvers and dedicated service members.

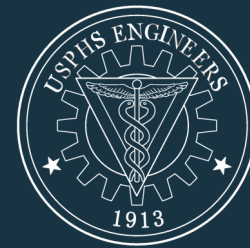
Lastly, presenters and attendees received 4.25 professional development hours (PDH) and a Certificate of Achievement signed by RADM Dieser. The Events Subcommittee Team would like to thank all the presenters, attendees, and everyone who assisted in delivering a successful event!

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New Engineer Officers

The EPAC would like to acknowledge the following engineers who have recently become Commissioned Officers. The EPAC welcomes each of you and hopes you will enjoy a long and prosperous career in the PHS.

| Rank | Name | OPDIV | City | State |
|------|-----------------|-------|----------|-------|
| LT | David Ederer | CDC | Chamblee | GA |
| LT | Jonathan Harris | IHS | Parker | AZ |

Fair Winds and Following Seas

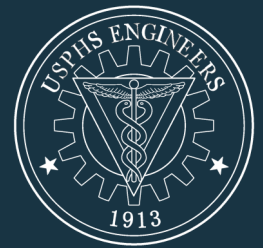
The EPAC would also like to recognize the engineer officers who have recently retired from Commissioned Corps service. The EPAC sincerely appreciates your leadership and dedication to the mission of PHS engineers.

| Rank | Name | OPDIV |
|------|------------------|----------|
| CAPT | William Stanley | IHS |
| CAPT | Marjorie Wallace | SAMHSA |
| CAPT | David Engelstad | EPA |
| CAPT | Jennifer Proctor | Interior |
| CAPT | Steven Anderson | IHS |
| CAPT | Mark Bader | IHS |
| CAPT | Louis Lightner | OS |
| CAPT | Peter Nachod | IHS |
| CDR | John Hall | FDA |
| CDR | Roger Martinez | IHS |
| CDR | Dennis Haag | IHS |
| CDR | Michael Copeland | EPA |
| CDR | Travis Monson | IHS |
| CDR | Dayton Newbrough | IHS |
| CDR | John Pulsipher | IHS |
| CDR | Craig Haugland | IHS |
| CDR | Burke Helmer | IHS |
| LCDR | Raffi Papazian | FDA |
| LCDR | Everett Bighumb | IHS |



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Dear Readers,

Machinatorres Vitae (Engineering for Life) is a publication of the EPAC, but we need help in bringing you the information and stories that you want to read. Please consider submitting an article for an upcoming issue or let us know when you or a colleague have reached a milestone, been recognized for an accomplishment, or have an experience to share. If you are an accomplished writer, send something along that is already polished. If you don't feel like a Hemingway or Dickinson, just send enough detail so the writing team can take hold of it and build the story for you.

The writing staff can only see a bit of the big world that is public health engineering. There are numerous accomplishments even within our readership that remain unknown except in the relatively small circles around you. If you have not presented at a national meeting, the likelihood is that no one outside of your agency, or possibly even office, ever heard about the project that you nearly exhausted yourself completing. Here is your chance to shine!

All ideas are welcomed. Remember that we do not have to solely focus on work going on within the PHS. Let us know if you hear of new technologies or applications, or just find an interesting story from the outside world. The rule of thumb is that if you as an engineer are interested in it, then others will be too!

Send your thoughts, suggestions, or a brief synopsis of a proposed article to the newsletter coordinator, CDR Jason Petersen, at Jason.Petersen@ihs.gov.

Thank you,

The Newsletter Team
EPAC Information Subcommittee

Machinatorres Vitae is published twice annually and posted on the USPHS Engineer Professional Advisory Committee website. The deadline for submitting articles for the **Spring 2022** edition is **February 28, 2022**.

This newsletter is for informational purposes only and does not reflect official views of the United States Public Health Service Commissioned Corps or USPHS leadership.