Facilities Presentation to the Clinical Center Research Hospital Board (CCRHB)

by
Dan Wheeland, P.E.
Director, Office of Research Facilities

February 16, 2024

Announcements and Agenda

- Positive Results from Quarterly Meetings with Congressional Appropriations Committee Staffs
  - As you may recall, the Buildings & Facilities appropriation was increased:
    - From $200M (FY21) to $250M (FY22)
    - From $250M (FY22) to $350M (FY23)
    - We are currently in a Continuing Resolution (CR). Hopefully, an appropriation will be passed and sustain (or improve upon) the increases to date.
  - We are cautiously optimistic that we will receive, in addition to the FY24 B&F funds, ~$120 million of Non-Expiring Expenses Funds (NEF) for the following projects:
    - *Electrical Power Reliability for Building 10: $26.1M
    - **Central Utility Plant Chiller and Cooling Tower Replacements: $40M
    - **Building 11 Provide Sprinkler System: $11.37M
    - Repair Steam & Chilled Water Lines: $29M
    - Repair Parking Garages: $13.36M
- Project Updates

* Direct benefit to the Building 10 Complex
** Indirect benefit to the Building 10 Complex

C105559 Pharmacy and Permanent Intravenous Admixture Unit (P-IVAU) Renovation

Compounding Room with Biosafety Cabinet

Compounding Room with Isolator

Identified Risk/Impact: Interim IVAU is only temporary, is inadequate in size and there is no backup plan in case of a facility emergency. Will involve a new penthouse to house dedicated air handling equipment.

Project Benefit / Risk Mitigation Strategy: Improved safety and compliance.

Funding Status: Funded

Schedule Status:

- December 2020: Design-Build contract awarded to DPR Construction in Sep 2019. Completed demolition in July 2020. Final design completed December 2020.
- May 2022: The new Pharmacy Inpatient and Outpatient areas were completed in February 2022. Pharmacy began operations in May 2022.
- July 2022: The new IVAU reached construction completion and began commissioning.
- June 2023: Decision made to replace all 24 Pass-Through Units, causing project delay of 5 months.
- *March 2024: Installation, Operational, and Performance (IOQ) Qualification of HVAC System*
- *April 2024: Air Visualization Studies*
- *June – August 2024: Environmental Monitoring Performance Qualification (EMPQ) and activation process for the new facility.*
- *November 2024: SPHA Approval*

C100883 Radiopharmacy and Cell Labeling Facility

Radioactive Material (RAM) Cleanroom Concept Picture

Cell Labeling Cleanroom Concept Picture

Identified Risk/Impact: Provide compliant program space for both radiopharmacy and cell labeling work. Construct new mechanical penthouse on roof (requires O/H crane). Construct new mechanical room on B1-P level (parking impact).

Project Benefit / Risk Mitigation Strategy: : Improved patient safety and regulatory compliance by providing clean rooms for both Radiopharmacy activities and biologics radiolabeling and associated spaces. Includes new redundant and dedicated mechanical systems in a new penthouse.

Funding Status: Funded in Fiscal Year 2023.

Schedule Status:

- February 2023: Completion of design.
- September 2023: Construction contract awarded.
- December 2023: Construction mobilization
- *May 2025: Construction anticipated to complete.*

C112347 – Sterile Processing Upgrades

Identified Risk/Impact: Infection control, sterile processing production delays, and regulatory compliance.

Project Benefit / Risk Mitigation Strategy: Improved safety, production, workflows, and regulatory compliance.

Funding Status: Funded

Schedule Status:

- Two new surgical steam sterilizers in B1 Level have been replaced.
- *Once Sterile Processing relocates to the B1 Level in late January 2024, the current sterile processing area on the 2nd Floor will be renovated and specialty equipment replaced.*
- *November 2024: Estimated completion date.*

C100663 E-Wing Renovation Including Cell Processing

Identified Risk/Impact: Outdated and inadequate facilities, negatively impacting mission accomplishment.

Project Benefit / Risk Mitigation Strategy: Renovated and modernized facilities to support cutting edge research.

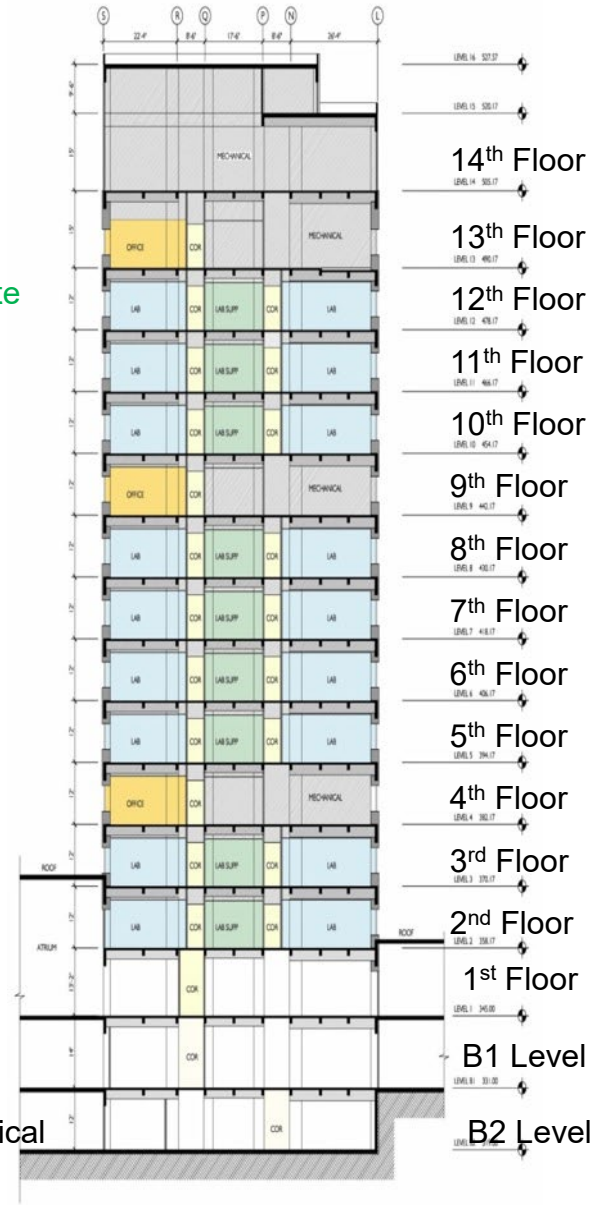
Funding Status: Funded

Schedule Status:

- March 2024: Occupancy of all floors except the 12E cGMP space
- May 2024: Estimated completion of validation of cGMP space for the Center for Cellular Engineering

C100663 E Wing Cross Section and Housing Plan

Mechanical	14th Floor
Mechanical	13th Floor
CC-DTM cGMP Suite	12th Floor
NIAID	11th Floor
NIDDK	10th Floor
NIDDK, Mechanical	9th Floor
NHLBI	8th Floor
NHLBI,NIMH	7th Floor
NHLBI	6th Floor
NINDS,NIDDK	5th Floor
NIMH, Mechanical	4th Floor
CC-DTM	3rd Floor
CC-DTM	2nd Floor
CC-DTM, WALS	1st Floor
FAES, DFOM	B1 Level
Cagewash, Mechanical	B2 Level



Green font represents Clinical Center space

C104935 Center for Cellular Engineering (CCE) Cell Processing Facility

Identified Risk/Impact: Inadequate amount of cGMP-compliant space to accomplish critical research objectives.

Project Benefit / Risk Mitigation Strategy: New facility to support DTM with additional aseptic Cell Processing and Engineering.

Funding Status: Funded

Schedule Status:

- November 2020: Construction completed.
- April 2022: Commissioning, Qualification, and Validation (CQV) completed.
- June 2022: Environmental Monitoring Performance Qualification (EMPQ).
- January 2023: Remaining punchlist items completed. However, improvements were identified to ensure that the facility remains in a state of control during high ambient temperatures and during monthly generator tests.
- *February 2024: Occupancy by CCE will commence at the completion of HVAC Uninterruptible Power System and Chilled Water system improvements.*
- *Follow-on projects for Enhanced Humidification and Exhaust System upgrade to follow 12E completion and occupancy.*

C103157 Surgery, Radiology and Laboratory Medicine (SRLM) Building, including Catheterization Lab and Interventional Radiology

Looking from north to south

Looking from west to east

Identified Risk/Impact: Clinical Center Departments of Perioperative Medicine, Laboratory Medicine, Radiology and Imaging Sciences, and the NHLBI Cardiac Catheterization Program are housed in 1980-era obsolete space with mechanical, electrical, and plumbing infrastructure that cannot be economically upgraded. Leaks and floods occur regularly in the existing space.

Project Benefit / Risk Mitigation Strategy: Safe, compliant, maintainable, and flexible facilities to support cutting-edge research and optimal patient care.

Funding Status: Design-Build contract for new addition and renovation is funded and awarded.

Schedule Status:

- March 2022: Design-Build Contract for the new addition and renovation was awarded.
- July 2028: Renovation scheduled completion date.

C103157 Surgery, Radiology and Laboratory Medicine (SRLM) Building, including Catheterization Lab and Interventional Radiology

- ✓ **Phase 0:** Preparatory site logistics, closure of Center Drive gate at Old Georgetown Road, new Temporary Vehicle Inspection Facility, new Driveway for Northwest Childcare Center, ACRF Garage preparations.
  - Bottom line: Construction site is relatively enclaved off from other campus operations, enhancing safety and security. Impacts to traffic circulation and parking were managed through regular communications and efforts to offset impacts with reasonable countermeasures.
- **Phase 1:** Site utilities, excavation including partial ACRF Garage demolition and utility tunnel demolition, SOE, foundation, etc.)
  - Encountered asbestos and evidence of a fuel spill – both have been remediated
  - Demolition activities were paused on January 8, 2024 to accommodate surgical activities; communication protocols were effective
  - Over 400 foundation piles to be in place by end of March 2024
- **Phase 2:** New addition
  - Design is approaching 95% (several submissions were rejected)
  - Construction scheduled for completion by Fall 2026
- **Phase 3 & 4**: Relocation of NCI labs into the SRLM & clearance of West Lab Wing for Phase 5
- **Phase 5**: Renovation of West Lab Wing
  - Complete by July 2028

C103157 Surgery, Radiology and Laboratory Medicine (SRLM) Building

Utility prep work

Site prep included removal of playground

Covered walkway to protect children and other pedestrians near the NW Childcare Center

Staged concrete pipes for relocating utilities

C103157 Surgery, Radiology and Laboratory Medicine (SRLM) Building

C103157 Surgery, Radiology and Laboratory Medicine (SRLM) Building

C103157 Surgery, Radiology and Laboratory Medicine (SRLM) Building

C109701 - Outpatient Exam Room Refresh 7 & 9

Identified Risk/Impact: The exam rooms have not been renovated since they were built. We are closing 4 rooms at a time on each floor for a period of less than two months.

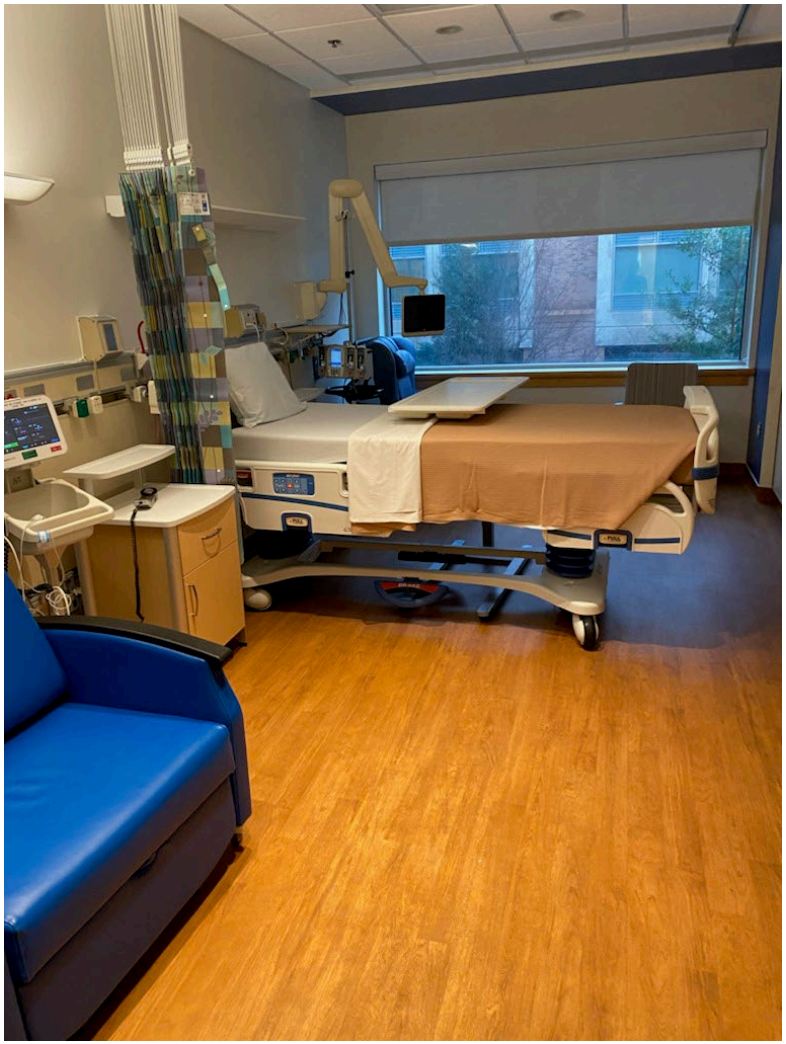
Project Benefit / Risk Mitigation Strategy: Drastically improved spaces for outpatient exam rooms. Project includes new infection control sinks.

Funding Status: Funded

Schedule Status:

- July 2021 – Project Awarded
- August 2022 – Design Completed
- October 2022 – Construction started
- January 2024 – Complete Phase 4
- June 2024 – Closeout Project

C106566 – Public Restroom & Patient Room Refresh



Completed Patient Room

Identified Risk/Impact: This is a cosmetic upgrade. Public restrooms and patient rooms have not been renovated since the CRC was built.

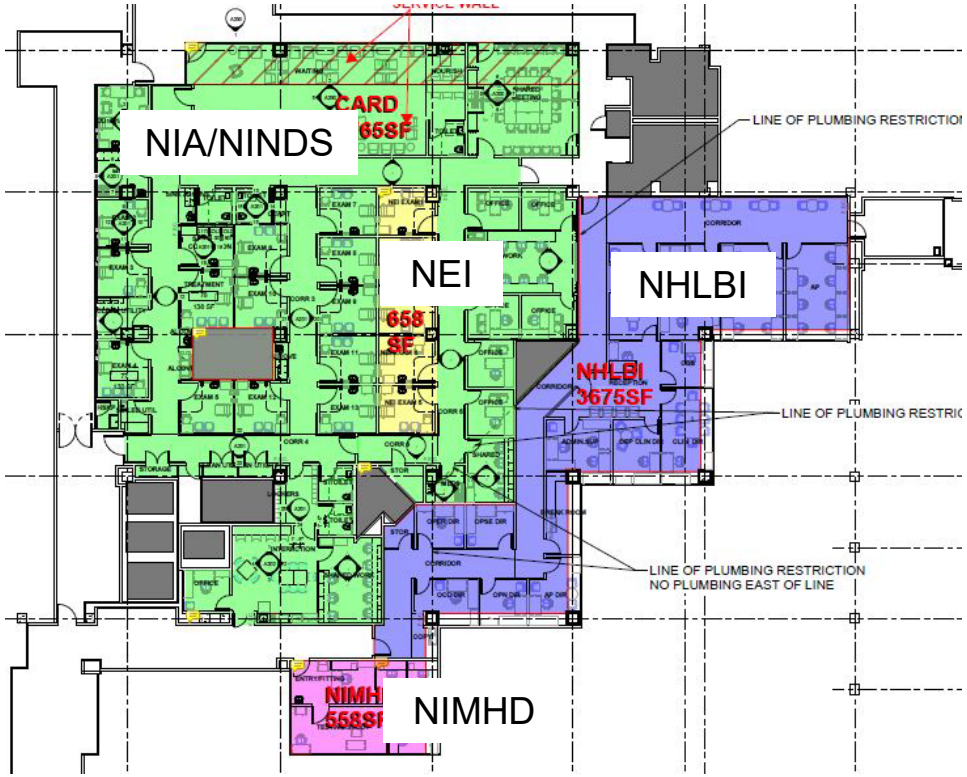
Project Benefit / Risk Mitigation Strategy: Improving both types of spaces for patients and visitors. Renovating rooms as they become available.

Funding Status: Funded

Schedule Status:

- June 2018 – Project Awarded
- June 2019 – Complete Public Restrooms
- June 2024 – Complete Patient Rooms (dependent on room availability)

C115777 CARD Program Renovation NIA/NINDS, NHLBI, NIMHD



Identified Risk/Impact: Additional clinical and administrative support space is required for NIA/NINDS/NEI Center for Alzheimer's and Related Dementias (CARD) program and other ICs.

Project Benefit / Risk Mitigation Strategy: New facility will collocate ICs with related missions for collaboration and provided clinical space including NIA/NINDS/NEI within Building 10 and prov ide needed administrative space for NHLBI and NIMHD clinical programs.

Funding Status: Most of the work is fully funded.

Schedule Status:

- *July 2024: Demo Start*
- *January 2025: Demo Completion*
- *July 2024: Final Design Start*
- *August 2025: Construction Start*
- *April 2027: Construction Completion*
- *July 2027: Occupancy*

C109075, C112756 Nurse Station Upgrades

3rd Floor - 3NE, 3NW, 3SE-N, 3SE-S, IMC, PVCS, ICU-1, ICU-2

Identified Risk/Impact: Upgrade aging nurse station workspace to improve patient care efficiency

Benefit: Sustain program support

Funding Status: Funded

Schedule Status:

- ✓ C109075 - Phase I, II, & III, occupancy is complete. Phase IV is undergoing occupancy; Phase V is estimated to complete by 5/15/2024.
- ▪ C112756 – Phase I is estimated to complete by 3/18/2024. 2 more phases after that are estimated to complete by 10/30/2024.

C109709 Post-Anesthesia Care Unit (PACU) & Pre-Op Renovation

Identified Risk/Impact: Insufficient operational program space.

Benefit: Sustainability of surgery program.

Funding Status: Funded

Schedule Status:

- Construction in 4 phases.
  - ✓ Phase 1 - Relocate pre-anesthesia clinic – completed.
  - ✓ Phase 2 – Renovate & Relocate existing waiting room to pre-anesthesia clinic space.
  - Phase 3 - Expand pre/post anesthesia space into existing waiting room space.
  - Phase 4 – Misc. improvements to existing PACU space.
- Phase 3 in progress
  - ✓ Demolition of ceiling and flooring has been completed.
  - ✓ All the piping routing, ADA compliance and grounding wire re-routing issues are sorted out.
  - ✓ Waste and sanitary lines removed, and core drilled for new toilet and sink locations based on the newly finalized bathroom layout.
  - ✓ Plumbing has been completed for the waste and vac 1st floor tie in for the sink.
  - Framing, layouts, walls, and electrical rough-ins are in progress.
  - 75% Bulkheads were framed for headwall units. Insulation of the duct and hot/cold water lines is completed per scope. Med gas tie-in work is ongoing.
  - ✓ Ductwork in patient care area is complete. Bathroom door frame and wall closing is complete.
  - Working with CTSI, Bio-MED, CIT to address nurse call, data outlets, monitors near headwall.

Schedule:

	Target/Current Projection	Actual
✓ Contract award	Aug 2021	08/26/21
✓ 100% Design completion	Apr 2022	04/06/21
✓ DTR construction permit issue	May 2022 / Jul 2022	07/14/22
✓ Construction Start	Jun 2022	07/15/22
▪ Substantial completion	Aug ‘22/Sep ’23/Oct ’23/MAR ‘ 24	

Seismic Preparedness

- On August 23, 2011, a magnitude 5.8 earthquake in Mineral, Virginia was felt throughout the northeast USA. NIH did not know what the local Ground Peak Acceleration values were, nor did we understand what the structural capacity of the Clinical Research Center. As a result, our only information was derived from ad hoc disaster assessment teams. We did not know if we had to evacuate patients or if the structure was safe.
- In 2015, two strong motion sensors were installed per the United States Geological Survey (USGS) guidelines. One sensor is located at the North side of CRC and the second sensor is located at the South side of CRC in the proximity of building 60. So now we will know what the local Ground Peak Acceleration values were.
- In parallel, we conducted a computerized structural analysis of the Clinical Research Center structure.
- As a result of our investments in seismic preparation, we can immediately measure the local Ground Peak Acceleration values and compare them with the structural capacity of the CRC. We will still need to deploy teams to assess buildings for damages such as broken utility lines, but we will have a high degree of confidence in our knowledge of fundamental questions such as whether we need to evacuate patients or not due to structural issues.
- If the peak ground accelerations exceed 0.050 g, evacuation might be warranted. In such an event, time permitting, ORF would survey stairwells to ensure structural integrity, and elevator technicians would test elevators for non-ambulatory patients prior to elevator use. If values are lower than 0.050 g, we will have a high level of confidence that the structure resisted the earthquake.
- On January 16, 2024, the USGS revealed its latest National Seismic Hazard Model. Noteworthy changes in the new model show the possibility of more damaging earthquakes along the central and northeastern Atlantic Coastal corridor, including in the cities of Washington D.C., Philadelphia, New York and Boston. Link: usgs.gov/news/national-news-release/new-usgs-map-shows-where-damaging-earthquakes-are-most-likely-occur-us

Results

Return Period	Probability of Exceedance in 50 years	Peak Ground Acceleration
224 years	20 %	0.027 g
475 years	10 %	0.050 g
975 years	5 %	0.080 g
2475 years	2 %	0.150 g
4975 years	1 %	0.250 g
9975 years	0.5 %	0.390 g

Increasing Earthquake Level

*Based on majority of risk parameters

C106418 Electrical Switching Station and Emergency Generators

Identified Risk/Impact: The electrical infrastructure serving the Building 10 Complex is in poor condition and is inadequate in capacity to serve the SRLM.

Project Benefit / Risk Mitigation Strategy: Improved reliability and capacity of electrical equipment.

Funding Status: Design-Bid-Build contract is funded and awarded.

Schedule Status:

- September 2022: Design-Bid-Build contract awarded
- December 2025: Scheduled completion date

C100231 Black Start of Cogeneration Plant

Identified Risk/Impact: Loss of steam generation/hot water/chilled water distribution due to power outage.

Project Benefits / Risk Mitigation Strategy: In a regional power outage, NIH will be able to start the 23-megawatt Cogeneration plant to 1) supply power to boilers to generate steam to buildings during an area power outage; and 2) supply power to chillers to generate chilled water for critical loads, including patient care.

Funding Status: Funded

Schedule Status: *Construction was completed on August 13, 2023.*

Summary

- Building 10 E Wing is now partially occupied and will provide the Department of Transfusion Medicine significantly improved quality of space for patient care and research. The cGMP program, located on the 12th Floor (AKA 12E), will involve extensive validation steps to ensure that it will meet all relevant criteria and will represent NIH's largest cGMP facility.
- The Intravenous Admixture Unit (IVAU) portion of the Pharmacy Renovation experienced a delay due to defective pass-through units. All 24 pass-through units were replaced with high quality, maintainable units, so we feel that it was critical to bite the bullet and address this now, rather than settle for a lower quality product.
- Various other projects briefed today will improve the Environment of Care for several Clinical Center Departments. Projects like the Electrical Switching Station and Emergency Generators and the Cogeneration Black Start will improve our preparedness for regional and local power outages, due to either natural or manmade events. Also on the topic of emergency preparedness, we have invested in local sensors and structural analyses to respond better during future seismic events.
- The SRLM project has made strong progress since your last visit.
  - Site logistics are proceeding well, with modest impact to hospital operations.
  - The project experienced minor setbacks, including the discovery of asbestos and evidence of a prior fuel spill in the soil. This required specialized remediation, disposal, air quality monitoring, and coordination with the State of Maryland Department of the Environment. Those issues are now behind us.
  - The noise/vibration protocols have proven functional during demolition operations. Regarding the foundation, the use of augered piles, as opposed to driven piles, will also reduce noise/vibration impacts.
  - The design review process identified important issues that have required that the designer make corrections, especially in plumbing and mechanical. It is critical to correct these deficiencies at this stage.

Summary (Continued)

- Capital Funding Outlook:
  - Quarterly meetings with the Senate and House Labor, Health and Human Services, and Education Appropriations Subcommittees continue. The staff recently toured the Bethesda Campus, providing NIH an opportunity to show them infrastructure that is in poor shape, including space in the Building 10 Complex.
  - The Fiscal Year 2023 increase in the Buildings & Facilities appropriation, along with the Fiscal Year 2024 Non-Expiring Expenses Fund (NEF), have provided NIH an opportunity to improve the condition of its facilities, including our patient care facilities as well as the underlying infrastructure supporting healthcare.
  - The Fiscal Year 2024 Buildings & Facilities appropriation is uncertain, as we are in a Continuing Resolution. The amount of the appropriation is critical because it affects our current year and serves as the comparison for the Fiscal Year 2025 Buildings & Facilities appropriation.
  - Other positive signs of support include:
    - November 1, 2023: The NIH Leadership Forum included two agenda topics regarding facilities and infrastructure
    - December 20, 2023: Dr. Bertagnolli and Dr. Rathmell participated in a Campus tour, which included a visit to portions of the Building 10 Complex that are in poor condition
- Thank you for your continued interest and support.