Research: Where Will It Take Us?

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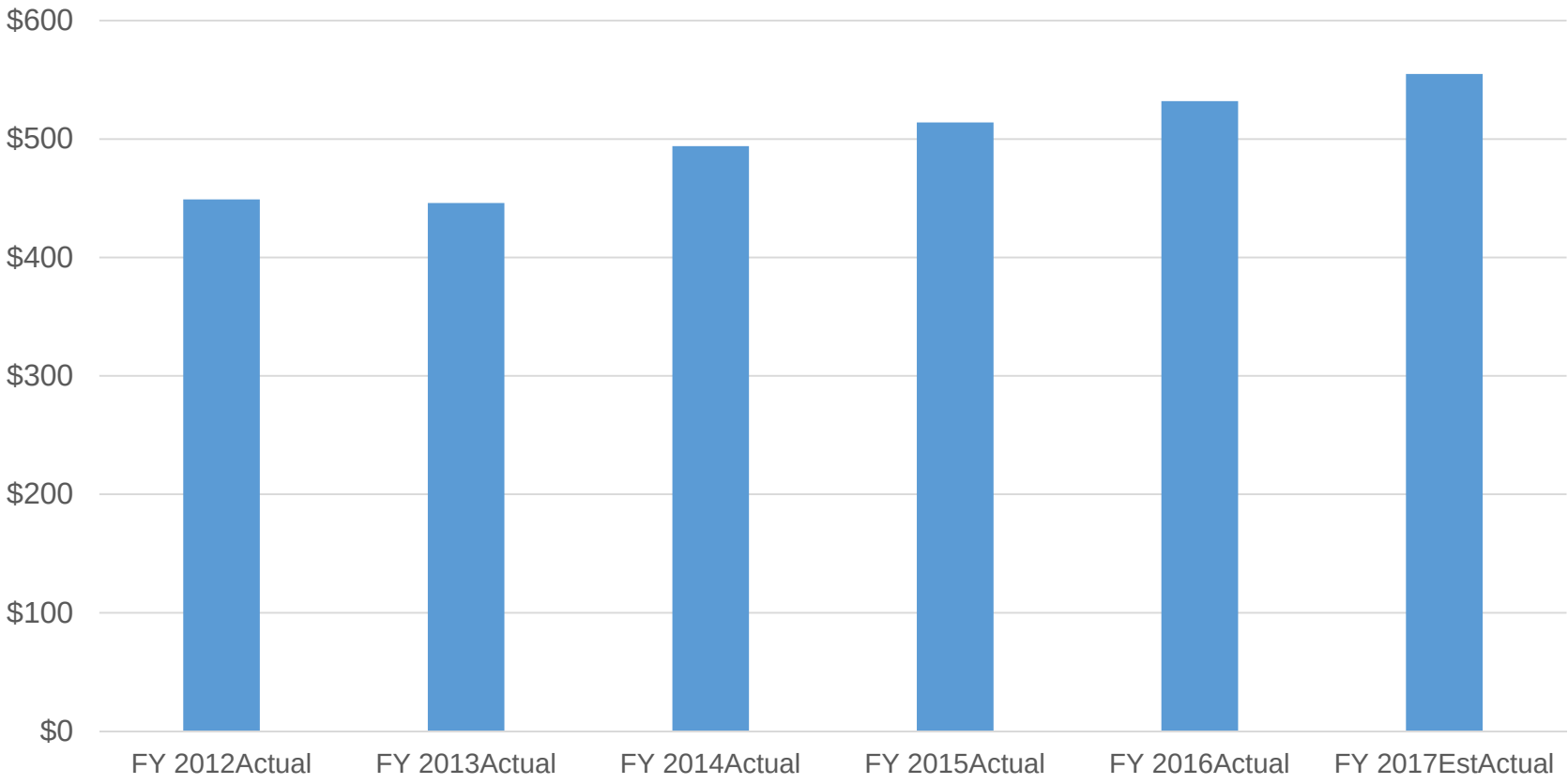
Alison N. Cernich, Ph.D., ABPP-Cn
Director, National Center for Medical Rehabilitation Research

NIH *Eunice Kennedy Shriver* National Institute of Child Health and Human Development

Maintaining Momentum

- Continued collaboration with Trans NIH committee
- Cures Act
- Leadership and Participation in Trans NIH Initiatives
- Workshops (Primary and Co-sponsored)
- Interagency Collaboration
- International Efforts
- New Funding Opportunities

Rehabilitation Funding at NIH



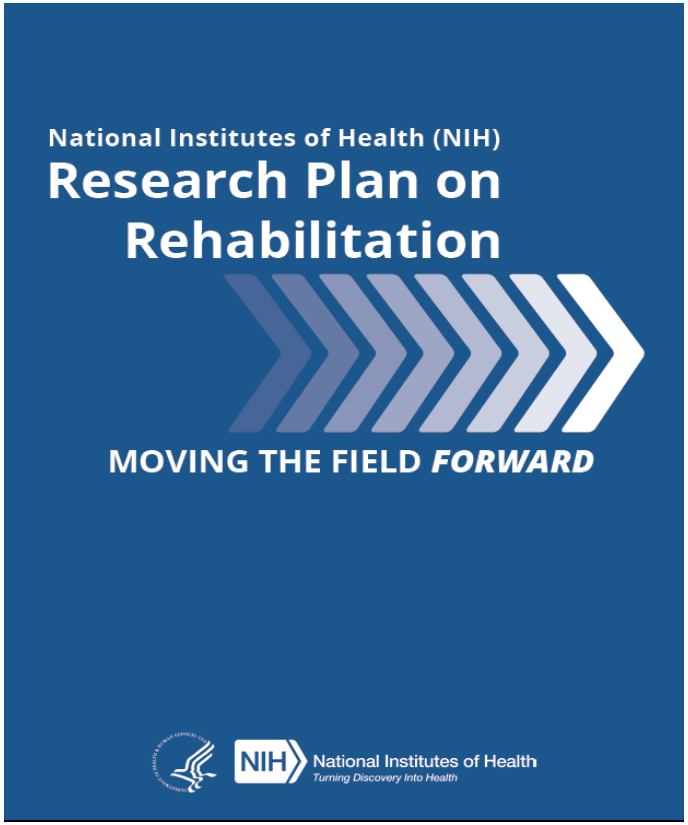
Funding data from https://report.nih.gov/categorical_spending.aspx; estimates are based on RCDC actual data, dollars reported are in millions and rounded.

Implications of the 21st Century Cures Act (P.L. 114-255): Improving Medical Rehabilitation Research at the NIH

1990 Law	2016 Law	Progress
Research plan required within 18 months, with updates as appropriate	Revised research plan not less than every five years; NCMRR Director annually reports to Coordinating Committee and Advisory Board, identifying resources for research	✓
Coordinating Committee makes recommendations for research priorities	Coordinating Committee makes recommendations for research priorities; Committee periodically hosts scientific workshop	✓
Establishes Advisory Board with specified membership	Reauthorizes Advisory Board with updated, specified membership; Adds DPCPSI Director	✓
	Review and coordination/prevent duplication	✓
	Secretary may enter into Interagency Agreements	✓
	New definition of medical rehabilitation research	

NIH Research Plan on Rehabilitation

1) Rehabilitation Across the Lifespan
2) Community and Family
3) Technology Use and Development
4) Research Design and Methodology
5) Translational Science
6) Building Research Capacity and Infrastructure



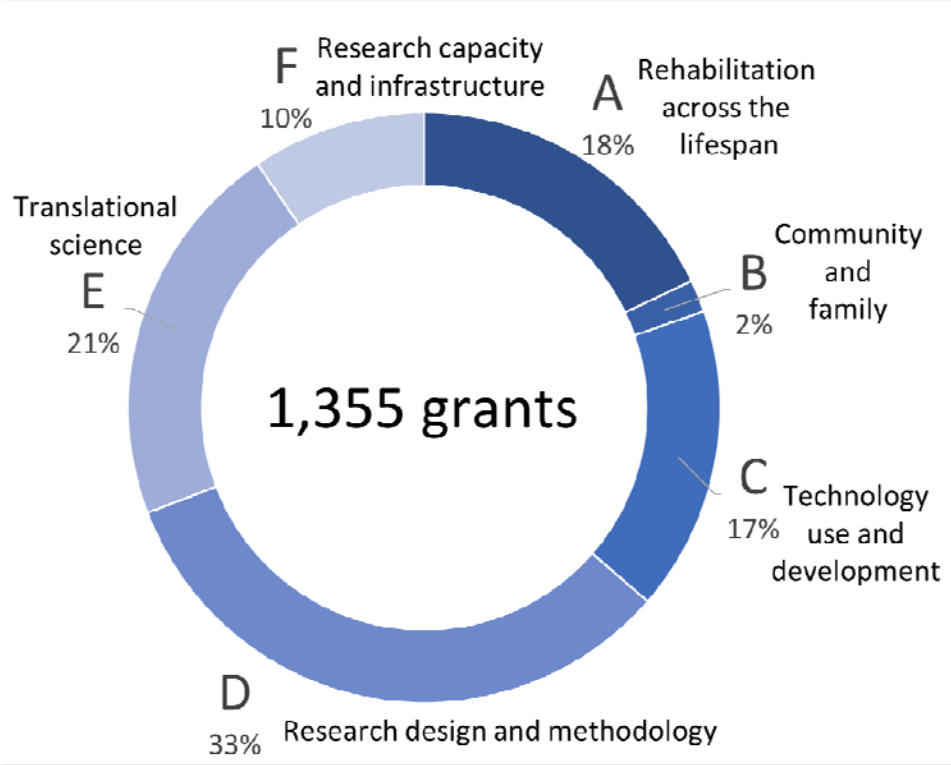
https://www.nichd.nih.gov/publications/pubs/Documents/NIH_ResearchPlan_Rehabilitation.pdf

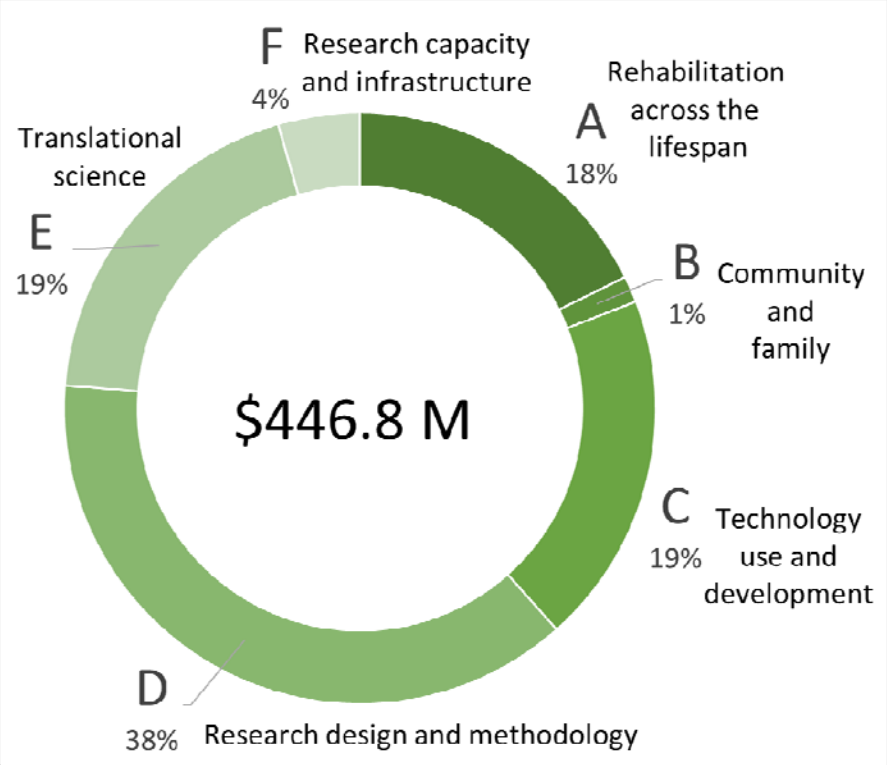
Overarching Strategy: Analysis

- Baseline data taken from 2015 portfolio
  - Prior to plan publication
  - Allows for the year prior to serve as an “as is” for the rehabilitation portfolio
- Using only the Rehabilitation Research, Condition and Disease Category (RCDC)
  - Official categories that are verified by the Institutes and Centers
  - Lists of projects available to the public
  - Official dollars verified by Financial Management at NIH
  - Contains the Physical Rehabilitation Category
- Removed Intramural projects

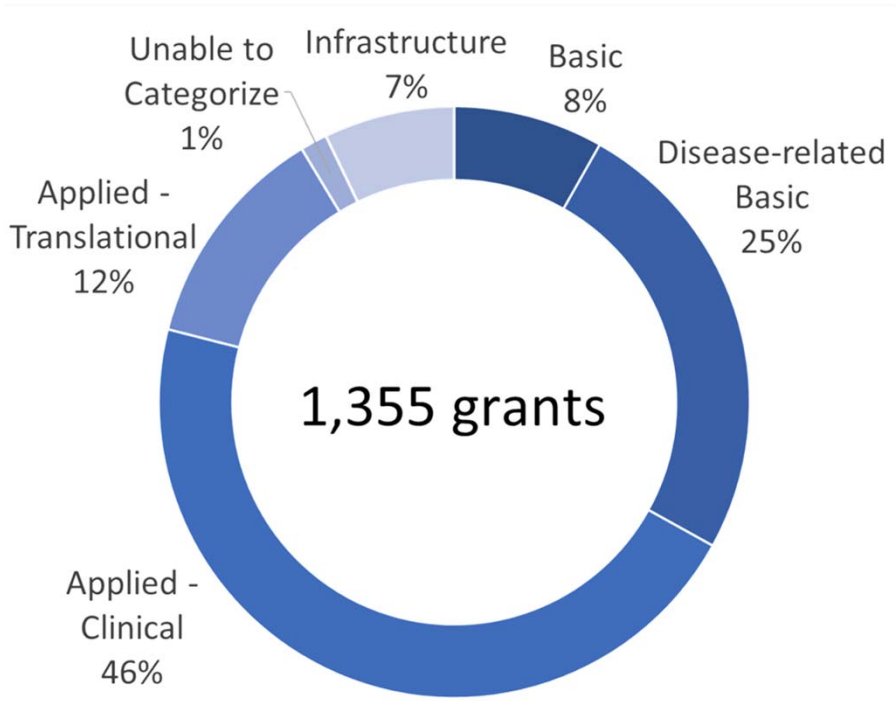
- Each project categorized in two “Tiers”
  - Tier 1 – Based on a keyword approach for the 6 categories within the Rehabilitation Research Plan; primary and secondary codes are based on the primary and additional aims of each project
    - Rehabilitation Across the Lifespan (A)
    - Community and Family (B)
    - Technology Use and Development (C)
    - Research Design and Methodology (D)
    - Translational Science (E)
    - Research Capacity and Infrastructure (F)
  - Tier 2 – This is the phase of research for each project: basic, disease-related basic, or applied (translational or clinical)

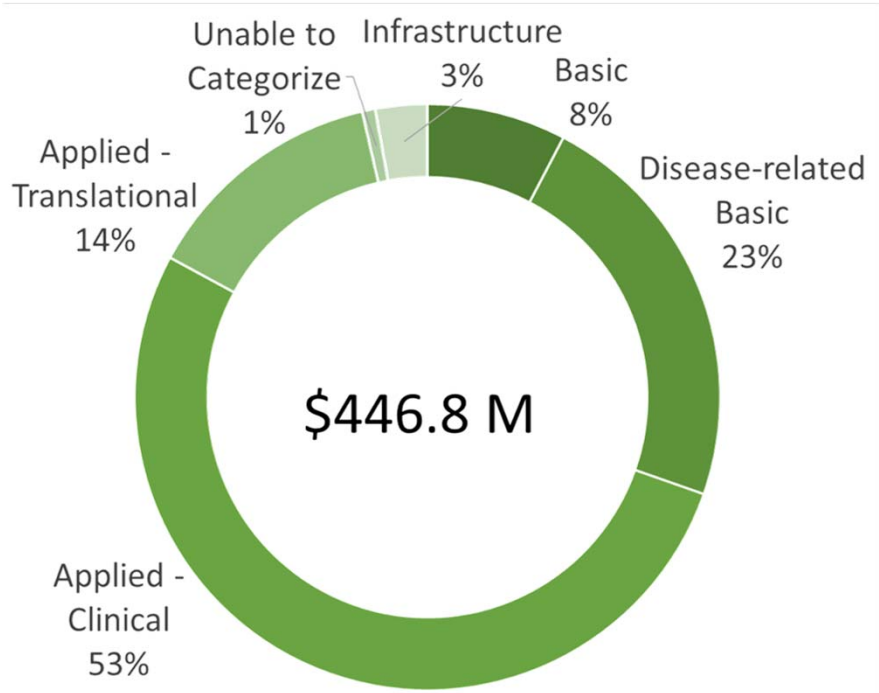
Research Category Analysis (Primary Categories)





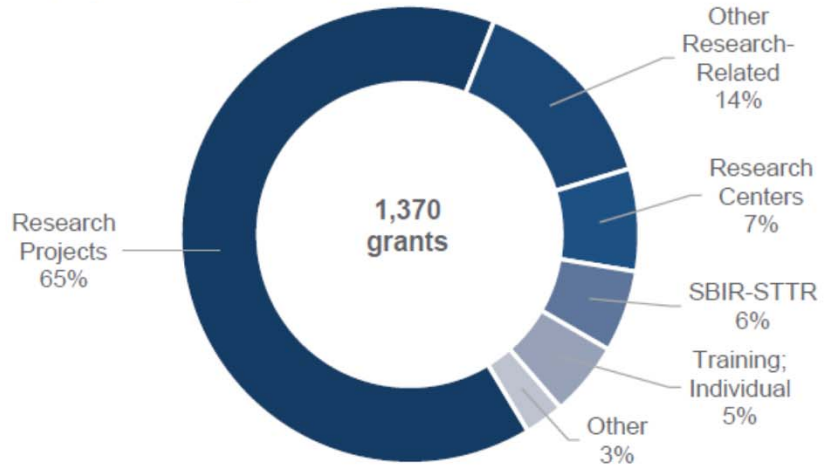
Research Type Analysis (Tier II Categories)



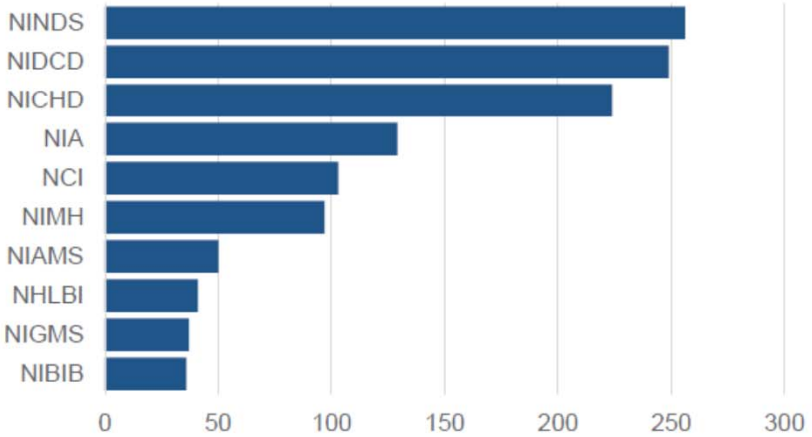


Number of Projects

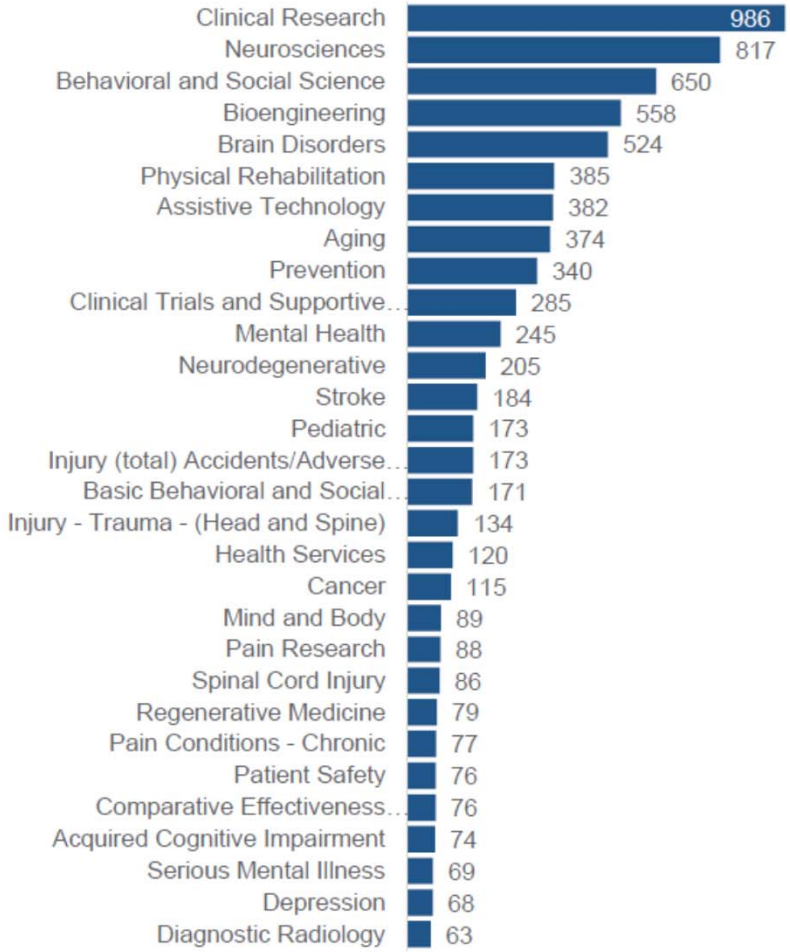
Grants per funding mechanism



Grants per IC (top 10 ICs)

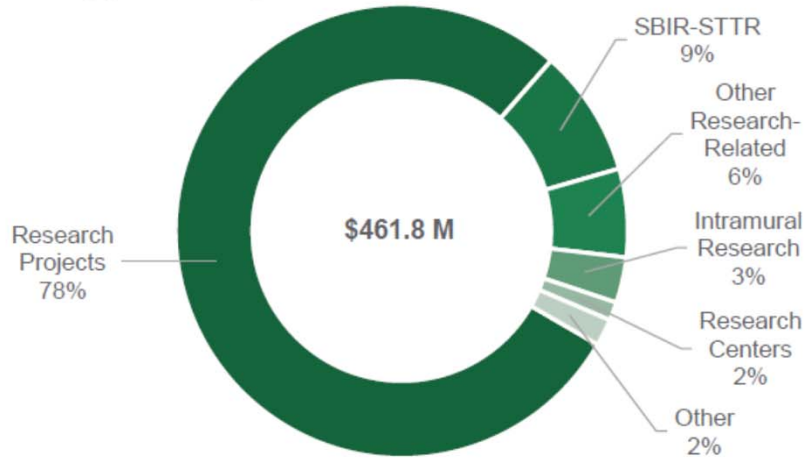


Grants per RCDC term (top 30 terms)



Total Funding ($M)

Funding per funding mechanism



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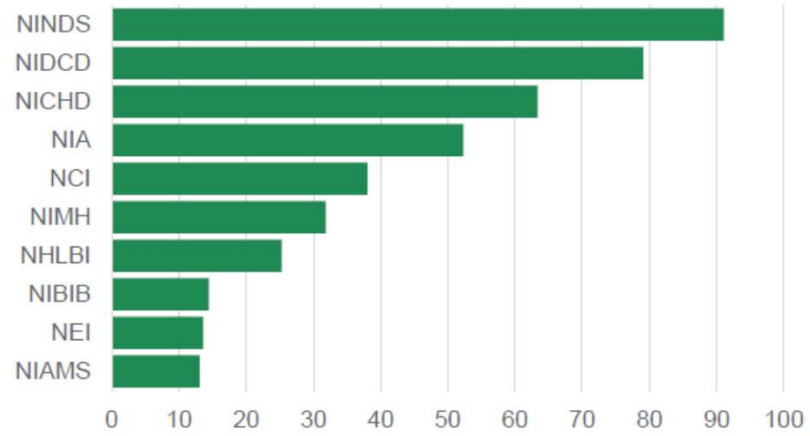

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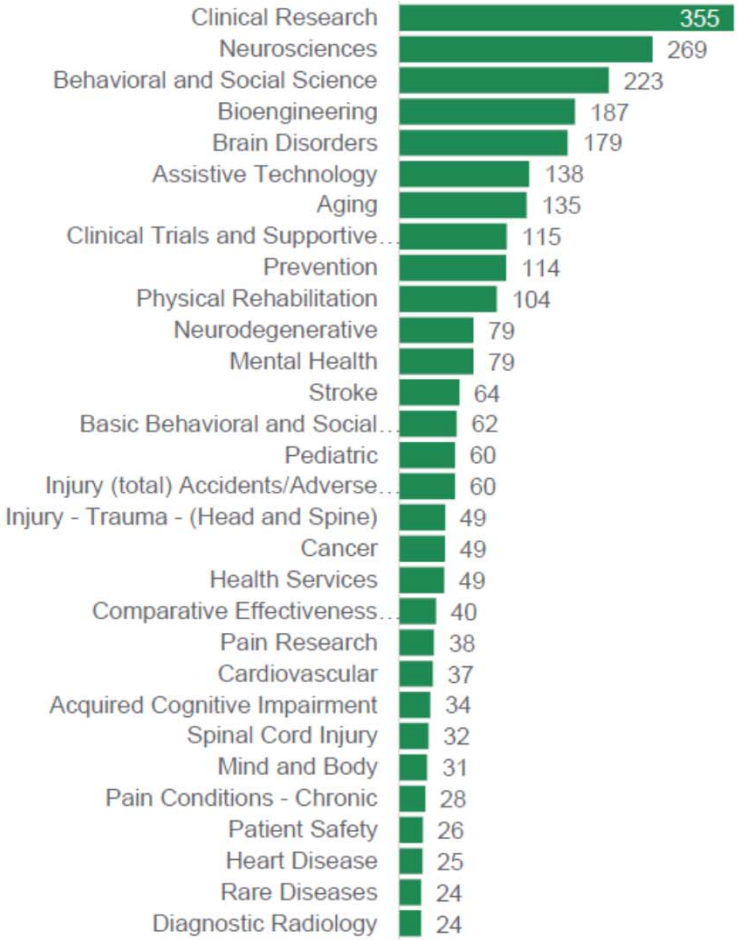
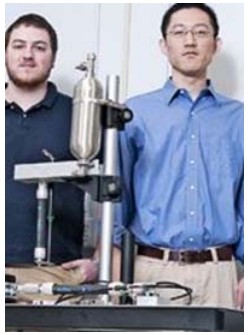


Prosthetics and Orthotics



- Multiple trials of the safety, efficacy, and control of:
  - Robotic prosthetics
  - Power return non-robotic prosthetics
  - Osseointegration
  - Neural interfaces for prosthetic control
  - Control algorithms for upper and lower extremity prosthetics
- Power return and alternative power sources
- 3D printing for AFOs and KAFOs

Optimizing the Investment in Medical Devices for Rehabilitation (May, 2017)

- Diverse group of scientists, payor organizations, venture capitalists, and industry and representatives from federal research funding, regulatory and coverage agencies
  - Approximately 100 in person attendees; 102 live streams
  - Proceedings pending publication
- Federal Roundtables sponsored by NIDILRR for workshop planning and follow-up work

- Videocast available:
  - Day1: https://videocast.nih.gov/summary.asp?Live=22155&bhcp=1
  - Day2: https://videocast.nih.gov/summary.asp?live=22159&bhcp=1

Interagency Collaboration

- Joint Funding Announcements
- Partnership Calls
- Interagency Committees & Workgroups
- Participation in Reviews
- Review and Analyses of Portfolios
- Interagency Agreements

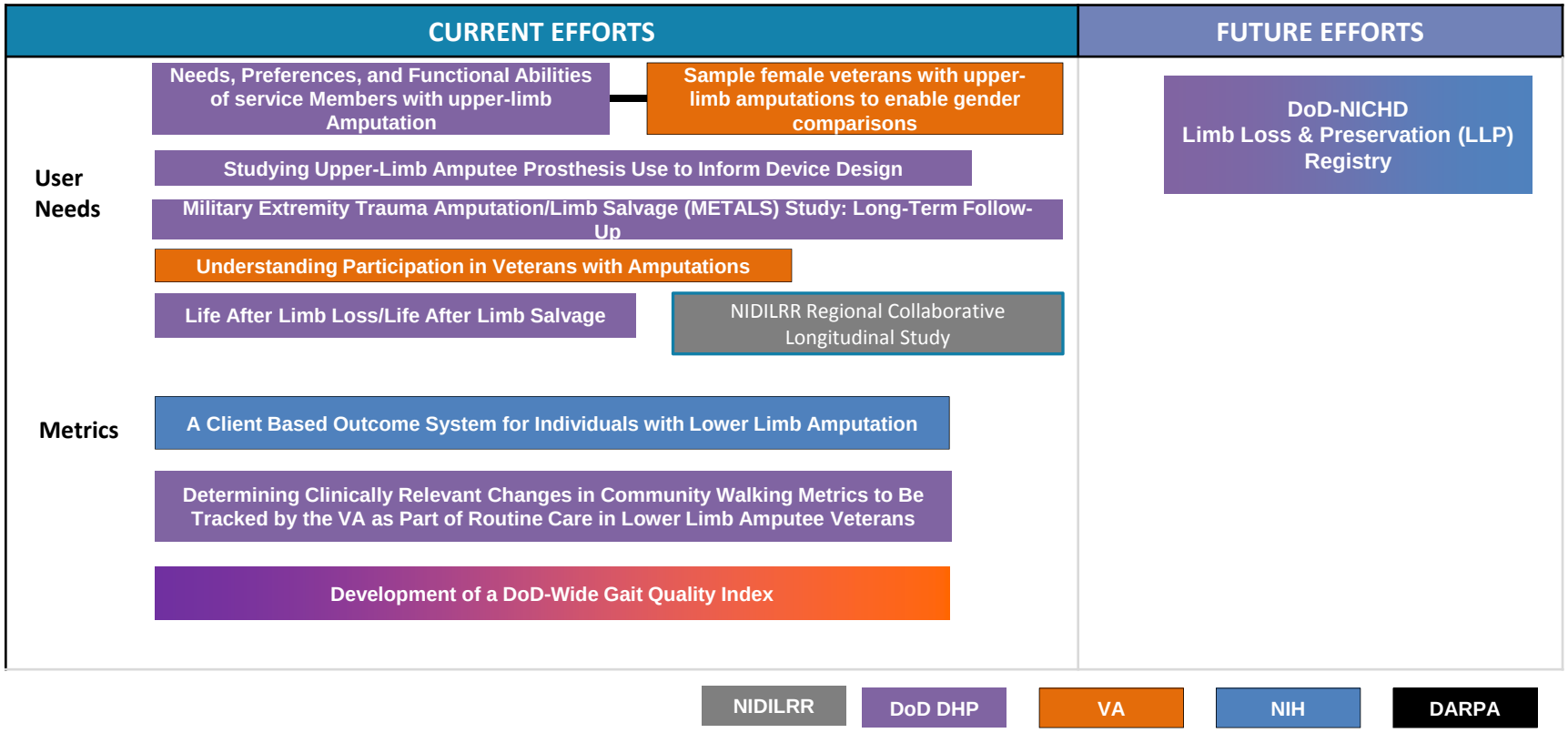
Limb Loss and Amputation

User needs and preferences	•Outcome measure development
Device development	•Prototypes, power, propulsion, robotics •Interfaces, sockets, and osseointegration •Control systems (myoelectrics, pattern recognition) •3D printing and visual scanning of limbs
Rehabilitation and Restoration	•Restoration of movement, sensation, proprioception •Regeneration, reinnervation, and stimulation of residual limb

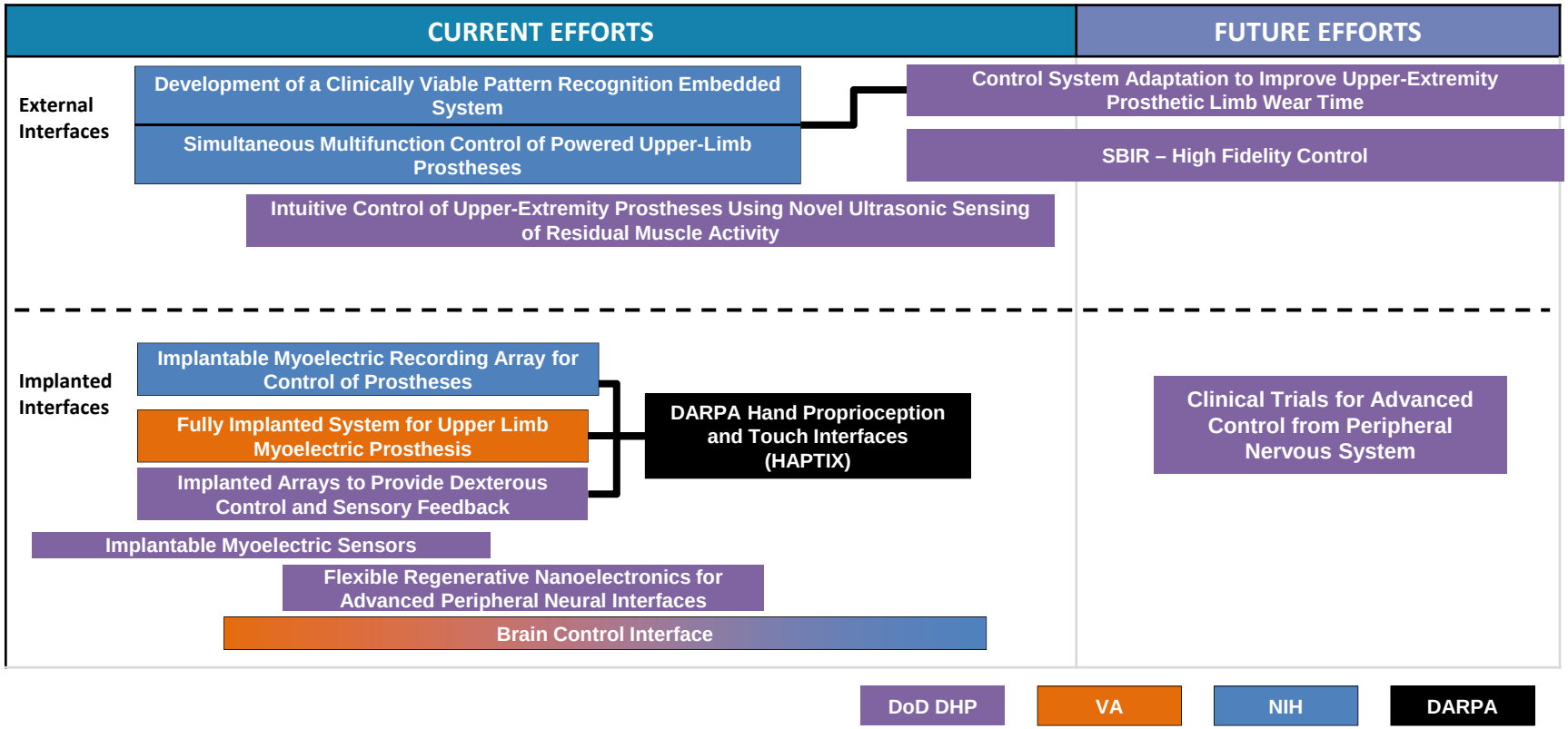
METRC
Major Extremity Trauma & Rehabilitation Consortium

BADER CONSORTIUM
Bridging Advanced Developments for Exceptional Rehabilitation

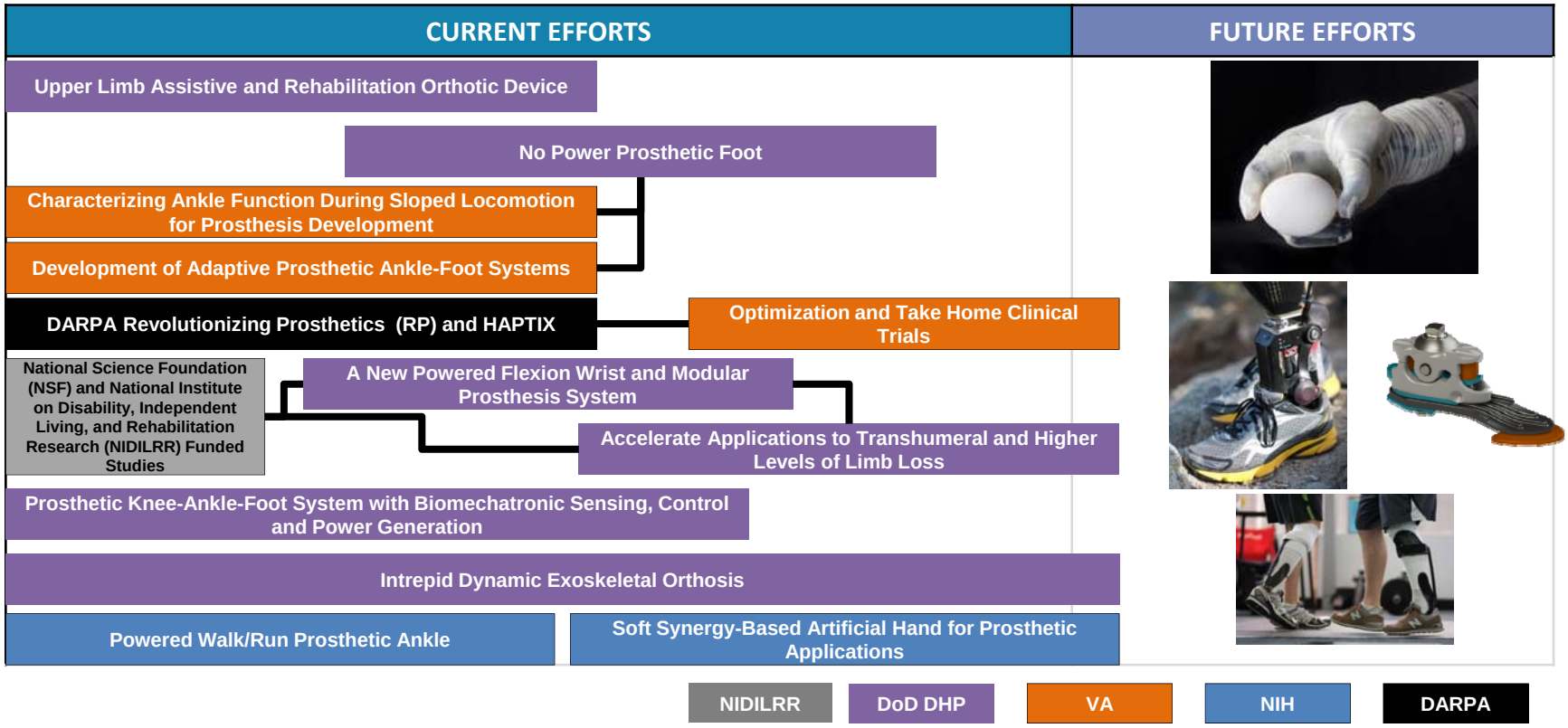
Limb Loss and Amputation



Limb Loss and Amputation: Control

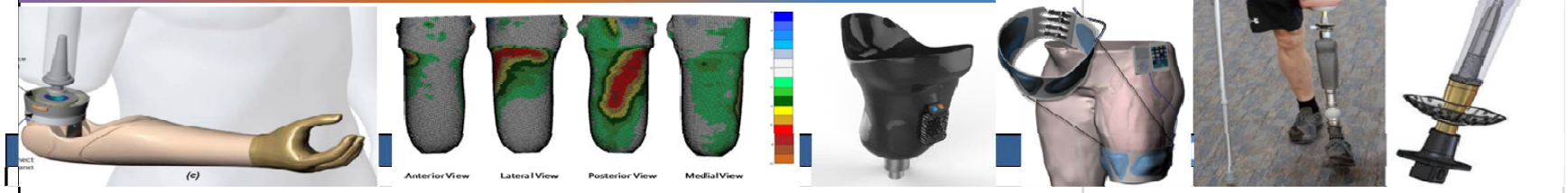


Limb Loss and Amputation: Technology



Limb Loss and Amputation: Interface

CURRENT EFFORTS	FUTURE EFFORTS
Osseointegration Device Development and Testing Optimizing Skin Interface and Preventing Infection Sensor Integration for Structural and Physiological Monitoring	Long Term Monitoring and Optimization of Osseointegration
Residual Limb Health	
Instrumented Liners and Sockets	Optimization of Socket Technology
Socket Development	
Socket System Testing	



DoD DHP | VA | NIH

International Work

- World Health Organization effort focused on catalyzing the implementation of and research on rehabilitation in Low and Middle Income Countries (LMICs)
- Includes a focus on priority assistive products
- Research agenda in development and NIH is involved for physical and sensory disability

REHABILITATION 2030

a call for action

leadership

Pan American Health Organization

World Health Organization Americas

Rede de Reabilitação Lucy Montoro

GOVERNO DO ESTADO SÃO PAULO

Research Infrastructure

Centralized research infrastructure in specific domains:

- Analysis of large data sets
- Biomechanics and modelling of movement
- Technology assessment and product development
- Clinical trial design
- Regenerative Medicine
- Neuromodulation: clinical applications

Sites offer:

- State-of-the-art research facilities
- Courses and workshops
- Mentorship and consultations
- Pilot grants
- Other collaborative opportunities

MR3 Medical Rehabilitation Research Resource NETWORK

NIH Resources

NCMRR webpage: https://www.nichd.nih.gov/about/org/ncmrr/

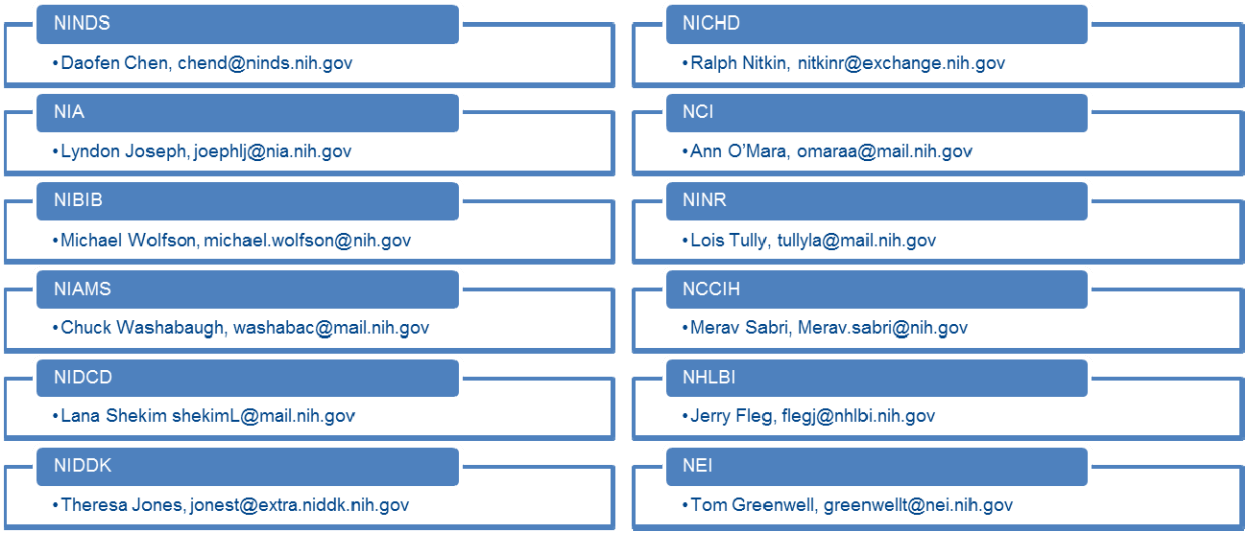
Join the Rehabilitation Research Listserv: https://www.list.nih.gov; **rehab-nih**

NIH Homepage: www.nih.gov

NIH Reporter: Database of all NIH-funded grants searchable by topic or institution/locale http://projectreporter.nih.gov/reporter.cfm

Center for Scientific Review: Study section descriptions and rosters www.csr.nih.gov

Videos on NIH Peer Review: http://cms.csr.nih.gov/ResourcesforApplicants/InsidetheNIHGrantReviewProcessVideo.htm

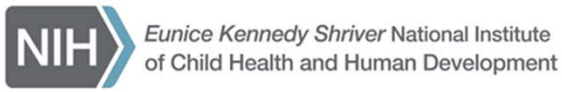


Questions & Comments

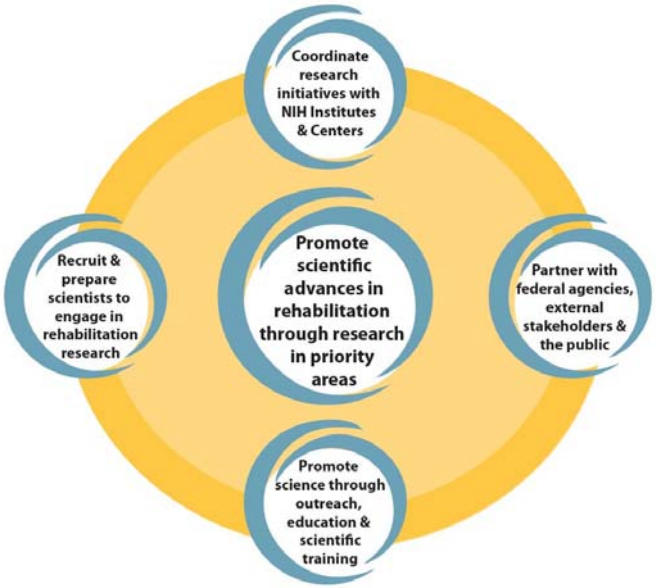
Limb Loss and Preservation Registry - NIH-NICHD-NCMRR-2018-16
https://www.fbo.gov/index?s=opportunity&mode=form&id=707e6a8430bcfe46cae904dcd2164e72&tab=core&_cview=0

Back Up Slides

Additional Information on NCMRR funding and resources

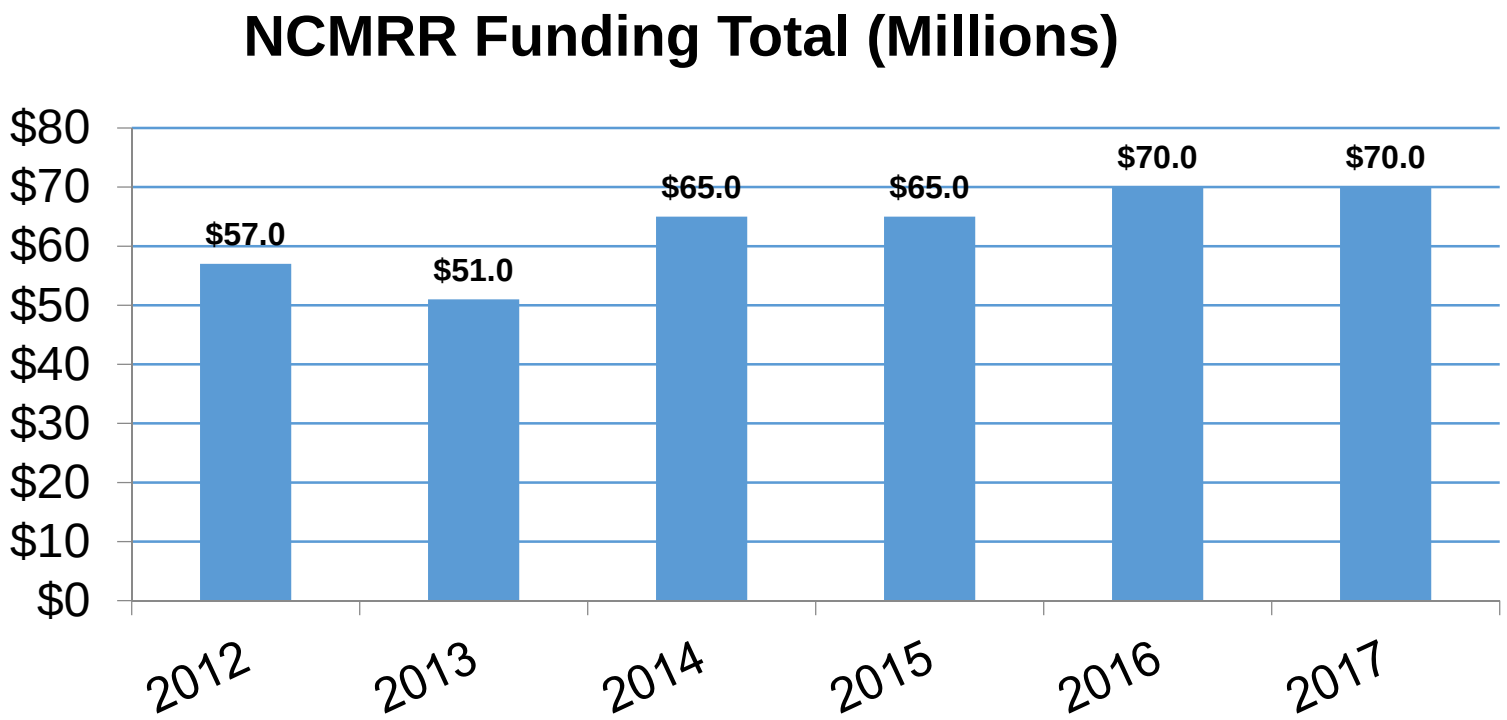


National Center for Medical Rehabilitation Research

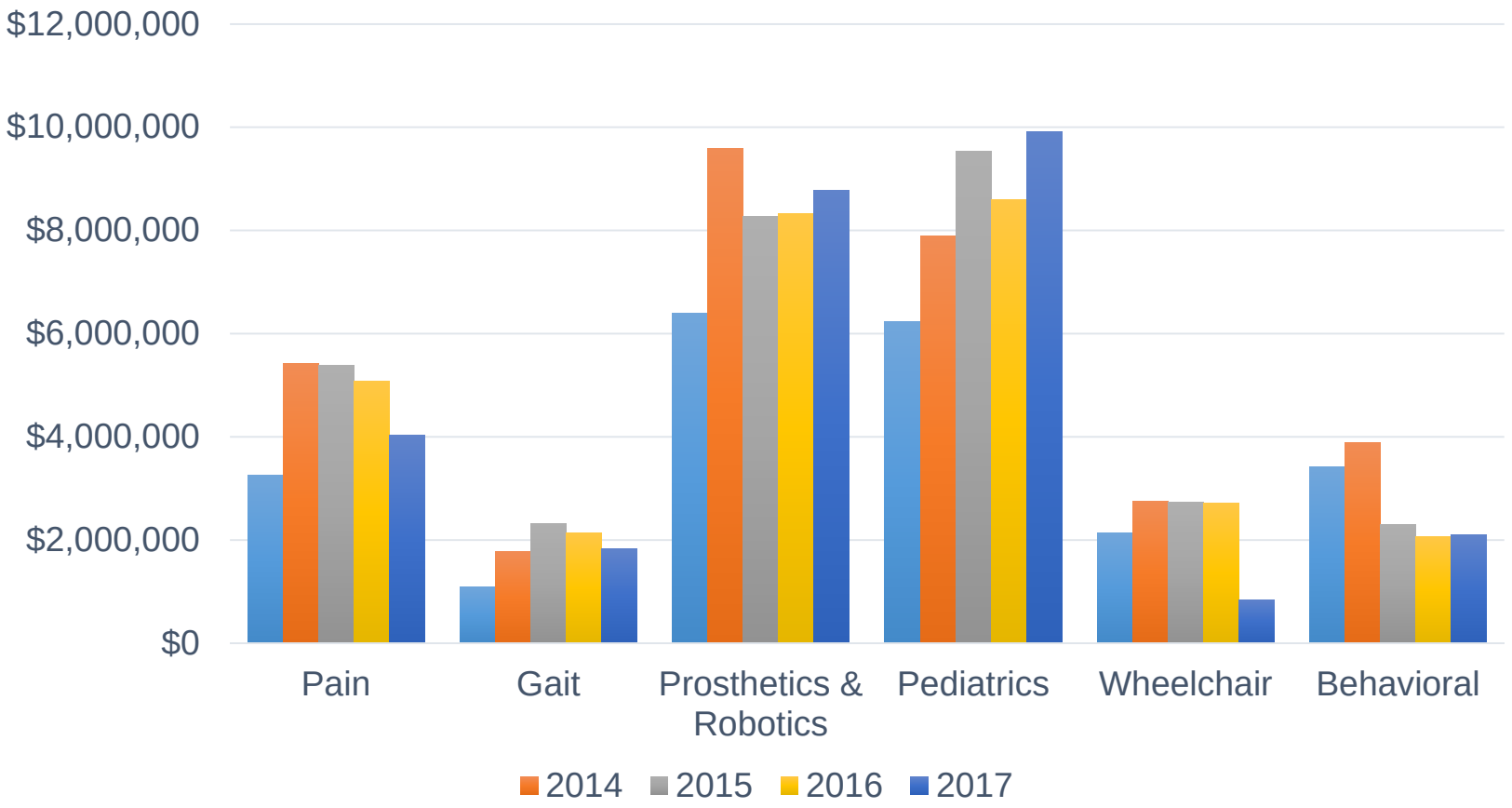


- Established in 1990 within NICHD to promote rehabilitation research within the NIH, coordinate efforts of the ICs, and promote collaboration with other federal agencies.
- Provide for funding of research projects, career development, small business grants, and research infrastructure.
- Lead for:
  - Trans NIH Medical Rehabilitation Coordinating Committee
  - Rehabilitation Research Plan
  - Federal Interagency Coordination

Funding for NCMRR

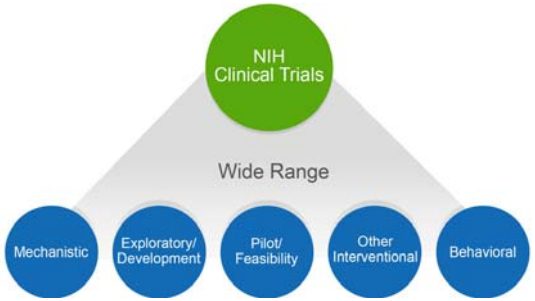


NCMRR Investment Snapshot: Categories



NIH New Policies & Announcements

- **Clinical Trials Policy**
  - https://grants.nih.gov/policy/clinical-trials.htm



- **Next Generation Researchers Initiative**
  - https://grants.nih.gov/ngri.htm
  - **Early Stage Investigator & Early Established Investigator**

- **FOAs**
  - PAR-17-163, Research To Address Sleep Disorders in the Context of Medical Rehabilitation (R01): March 30, 2018, March 29, 2019
  - PAR-17-183, NICHD Research Education Programs (R25)
  - PAR-17-161, NCMRR Early Career Research Award (R03): March 30, 2018; March 29, 2019
  - PAR-16-116, Bioengineering Research Grants (R01)
  - PAR-17-083, NIBIB Biomedical Technology Resource Centers (P41)
  - PAR-18-324, Testing Interventions for Health-Enhancing Physical Activity (R01 - Clinical Trial Optional)
  - RFA-HL-18-019, Increasing Use of Cardiovascular and Pulmonary Rehabilitation in Traditional and Community Settings (R61/R33)

Trans NIH Initiatives to Follow

All of Us Research Program:

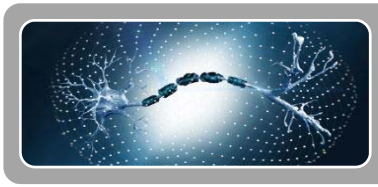
- https://allofus.nih.gov/

BRAIN Initiative FOAs

- https://www.braininitiative.nih.gov/funding/

Molecular Transducers of Physical Activity Consortium

- https://commonfund.nih.gov/MolecularTransducers/overview



Stimulating Peripheral Activity to Relieve Conditions

- https://commonfund.nih.gov/sparc