NIAID: State of the Institute and Priorities in HIV/AIDS Research

Anthony S. Fauci, M.D.
Director
National Institute of Allergy and Infectious Diseases
National Institutes of Health
May 17, 2018
Azar Confirmed as HHS Secretary, Hargan as Deputy HHS Secretary

Alex M. Azar II, JD

Eric D. Hargan, JD
Adams Confirmed as 20th U.S. Surgeon General

Jerome M. Adams, MD, MPH
Jan. 16: U.S. Surgeon-General Adams Visits NIH
Redfield Named CDC Director

Robert R. Redfield Jr., MD
W.H.O. Elects Ethiopia’s Tedros as New Director General

Tedros Adhanom Ghebreyesus, Ph.D.
April 20, 2018: Dr. Tedros Visit to NIH and Signing of WHO-NIAID MOU
Budget Update
March 23, 2018: FY 2018 Spending Bill Signed into Law

- Total U.S. budget: $4.4 trillion
  - Discretionary budget: $1.3 trillion

- NIH receives $37.3 billion for FY 2018
  - $3 billion (9 percent) increase over FY 2017
<table>
<thead>
<tr>
<th>IC</th>
<th>FY 2017 Operating</th>
<th>FY 2018 Omnibus</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCI</td>
<td>$5,659,955</td>
<td>$5,634,800</td>
<td>-0.4%</td>
</tr>
<tr>
<td>NIAID</td>
<td>$4,905,718</td>
<td>$5,260,210</td>
<td>7.2%</td>
</tr>
<tr>
<td>NHLBI</td>
<td>$3,209,929</td>
<td>$3,383,201</td>
<td>5.4%</td>
</tr>
<tr>
<td>NHGRI</td>
<td>$528,346</td>
<td>$556,881</td>
<td>5.4%</td>
</tr>
<tr>
<td>NCATS</td>
<td>$704,330</td>
<td>$742,354</td>
<td>5.4%</td>
</tr>
<tr>
<td>NIGMS</td>
<td>$2,646,152</td>
<td>$2,785,400</td>
<td>5.3%</td>
</tr>
<tr>
<td>NIA</td>
<td>$2,048,814</td>
<td>$2,574,091</td>
<td>25.6%</td>
</tr>
<tr>
<td>NIDA</td>
<td>$1,070,846</td>
<td>$1,383,603</td>
<td>29.2%</td>
</tr>
<tr>
<td>Other ICs</td>
<td>$11,597,879</td>
<td>$12,936,053</td>
<td>11.5%</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$32,371,969</strong></td>
<td><strong>$35,256,593</strong></td>
<td><strong>8.9%</strong></td>
</tr>
<tr>
<td>OD</td>
<td>$1,728,603</td>
<td>$1,925,893</td>
<td>11.4%</td>
</tr>
<tr>
<td>B&amp;F</td>
<td>$128,567</td>
<td>$128,863</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$34,229,139</strong></td>
<td><strong>$37,311,349</strong></td>
<td><strong>9.0%</strong></td>
</tr>
</tbody>
</table>
NIAID Funding, FY 2000-2018

Dollars in Billions

Fiscal Year


$1.6B  $2.1B  $2.7B  $3.2B  $3.7B  $4.0B  $4.3B  $4.5B*  $4.5B  $4.7B  $4.4B  $4.4B  $4.9B  $5.2B  $5.3B

*Beginning in FY 2012, budget no longer passes through funds to the Global Fund.
# National Institutes of Health

## Budget Comparison by Institute/Center

(Dollars in Thousands)

<table>
<thead>
<tr>
<th>IC</th>
<th>FY 2018 Omnibus</th>
<th>FY 2019 President’s Budget</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCI</td>
<td>$ 5,634,800</td>
<td>$ 5,626,312</td>
<td>-0.2%</td>
</tr>
<tr>
<td>NIAID</td>
<td>5,260,210</td>
<td>4,761,948</td>
<td>-9.5%</td>
</tr>
<tr>
<td>NHLBI</td>
<td>3,383,201</td>
<td>3,112,948</td>
<td>-8.0%</td>
</tr>
<tr>
<td>NHGRI</td>
<td>556,881</td>
<td>512,979</td>
<td>-7.9%</td>
</tr>
<tr>
<td>NCATS</td>
<td>742,354</td>
<td>685,087</td>
<td>-7.7%</td>
</tr>
<tr>
<td>NIGMS</td>
<td>2,785,400</td>
<td>2,572,669</td>
<td>-7.6%</td>
</tr>
<tr>
<td>NIA</td>
<td>2,574,091</td>
<td>1,988,200</td>
<td>-22.8%</td>
</tr>
<tr>
<td>NIDA</td>
<td>1,383,603</td>
<td>1,137,403</td>
<td>-17.8%</td>
</tr>
<tr>
<td>NIRSQ, NIOSH, NIDILRR</td>
<td>-</td>
<td>730,794</td>
<td>-</td>
</tr>
<tr>
<td>Other ICs</td>
<td>12,936,053</td>
<td>12,936,053</td>
<td>-11.6%</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$ 35,256,593</td>
<td>$ 32,562,401</td>
<td>-7.6%</td>
</tr>
<tr>
<td>OD</td>
<td>1,925,893</td>
<td>2,004,306</td>
<td>4.1%</td>
</tr>
<tr>
<td>B&amp;F</td>
<td>128,863</td>
<td>200,000</td>
<td>55.2%</td>
</tr>
<tr>
<td><strong>Total (Program Level)</strong></td>
<td>$ 37,311,349</td>
<td>$ 34,766,707</td>
<td>-6.8%</td>
</tr>
<tr>
<td>Opioids &amp; Serious Mental Illness</td>
<td>-</td>
<td>750,000</td>
<td>-</td>
</tr>
<tr>
<td><strong>Grand Total NIH</strong></td>
<td>$ 37,311,349</td>
<td>$ 35,516,707</td>
<td>-4.8%</td>
</tr>
</tbody>
</table>
The President Proposes a Budget

The Congress Determines the Budget
Legislative Update
**Senate Leadership in 115th Congress**

- **Majority Leader:** Mitch McConnell (R-KY)

- **Minority Leader:** Chuck Schumer (D-NY)
House Leadership in 115th Congress

- House Speaker: Paul Ryan (R-WI) - retiring

- Majority Leader: Kevin McCarthy (R-CA)

- Minority Leader: Nancy Pelosi (D-CA)
Senate Committee Leadership

- Senate Appropriations Committee
  - Chair: Richard Shelby (R-AL)
  - Ranking Member: Patrick Leahy (D-VT)

- Labor-HHS Appropriations Subcommittee
  - Chair: Roy Blunt (R-MO)
  - Ranking Member: Patty Murray (D-WA)
House Committee Leadership

- **House Appropriations Committee**
  - Chair: Rodney Frelinghuysen (R-NJ)*
  - Ranking Member: Nita Lowey (D-NY)

- **Labor-HHS Appropriations Subcommittee**
  - Chair: Tom Cole (R-OK)
  - Ranking Member: Rosa DeLauro (D-CT)

- **House Energy and Commerce Committee**
  - Chair: Greg Walden (R-OR)
  - Ranking Member: Frank Pallone (D-NJ)

*retiring
Selected NIAID Legislative Activities

March 8, 2018

House Energy and Commerce Subcommittee on Oversight and Investigations

Topic: Examining U.S. Public Health Preparedness for and Response Efforts to Seasonal Influenza
Selected NIAID Legislative Activities (cont.)

- April 18, 2018
- House Appropriations Subcommittee on Labor-HHS

**Topic:** Biodefense and Emerging and Re-emerging Infectious Diseases
Selected NIAID Legislative Activities (cont.)

- April 11, 2018: House Appropriations Subcommittee on Labor-HHS
- May 17, 2018: Senate Appropriations Subcommittee on Labor-HHS

Topic: FY 2019 Budget Hearing - National Institutes of Health
April 11, 2018

Congressional Meet and Greet Hosted by Rep. Pete Sessions (R-TX)

Topic: NIH research, including NIAID Zika and Influenza Vaccine Research
Antimicrobial resistance

Universal flu vaccine

Tuberculosis
Antimicrobial resistance

Universal flu vaccine

Tuberculosis
White House Plan for Combating Antibiotic-Resistant Bacteria (CARB) – March 2015

- National Action Plan goals
  - Stewardship
  - Surveillance
  - Diagnostics
  - Research
  - International Collaboration

Additional NIAID Funding: $100M (FY 2016), $50M (FY 2017), $50M (FY 2018)
Novel Approaches to Address Antimicrobial Resistance

- Antimicrobials
- Harnessing the Immune System
- Manipulating Microbial Communities
- Antivirulence Strategies
- Rapid Diagnostics
NIAID Antibacterial Resistance Leadership Group (ARLG)

- Created in June 2013 to develop, prioritize, and implement a clinical research agenda on antibacterial resistance

- To date, the ARLG has
  - reviewed >90 study proposals
  - initiated >35 studies
  - included data from >13,000 subjects
  - published >85 manuscripts
Antimicrobial resistance

Universal flu vaccine

Tuberculosis
■ Current seasonal influenza vaccines are not consistently effective

■ Pandemics do occur and response after the fact is not effective

■ “Chasing after” potential pandemic outbreaks (pre-pandemic viruses) is costly and ineffective
Selected Examples of “Pre-Pandemic” Influenza Outbreaks

- H3N2v
- H5N6
- H7N9
- H10N8
- H5N1

Newly emerging  Re-emerging/resurging  “Deliberately emerging”

January 2018
Chasing Seasonal Influenza — The Need for a Universal Influenza Vaccine

CI Paules, SG Sullivan, K Subbarao, and AS Fauci
A Universal Influenza Vaccine: The Strategic Plan for the National Institute of Allergy and Infectious Diseases

EJ Erbelding, D Post, E Stemmy, PC Roberts, A Deckhut Augustine, S Ferguson, CI Paules, BS Graham, AS Fauci
Selected Targets for “Universal” Influenza Vaccines

Courtesy of VRC
Influenza A Hemagglutinin (HA)

Head region
- Target of current influenza vaccines
- Differs among influenza strains
- Many mutations (●) each season

Stem region
- Target of universal influenza vaccines
- Similar among influenza strains
- Few mutations each season

Courtesy of VRC
Representative Approach to the Development of a Universal Influenza Vaccine

Influenza Virus

Head

Stem (vaccine target)

HA Viral Surface Protein

Remove

Stabilize

HA Stem

Attach

HA Stem Nanoparticle Vaccine

Nanoparticle

Courtesy of VRC
Antimicrobial resistance

Universal flu vaccine

Tuberculosis
In 2016,

- TB remains the top ID killer worldwide
- ~10.4M new TB cases worldwide
- ~1.7M deaths (4% drop from 2015), including 400,000 people co-infected with HIV
- >~600,000 new cases of drug-resistant TB, including 490,000 with MDR-TB
Nov. 2017: WHO Global Ministerial on Ending TB in the Sustainable Development Era, Moscow
Comprehensive TB Research Portfolio

Generic TB Research

MDR-TB

TB/HIV Co-infection
Concrete Action Now: UN High-Level Meeting on Tuberculosis

N Herbert et al.

“...a once-in-a-generation opportunity to transform the global response at the first UN General Assembly (UNGA) High-Level Meeting on Tuberculosis to be held on Sept. 26, 2018, in New York.”
Lancet Commission on Tuberculosis: Building a Tuberculosis-free World
E Goosby et al.

- Pivot to new strategies to address TB burden
- Address social, financial and clinical barriers to TB care
- Invest in TB research and development – global priority
- Need substantial dedicated resources to implement strategies to end TB
HIV Prevention in the NIH HIV Research Agenda
<table>
<thead>
<tr>
<th>Research Area</th>
<th>Amount (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemiology of Transmission</td>
<td>19.1</td>
</tr>
<tr>
<td>Biology of Transmission</td>
<td>15.5</td>
</tr>
<tr>
<td>Microbicides</td>
<td>86.3</td>
</tr>
<tr>
<td>Vaccines</td>
<td>509.1</td>
</tr>
<tr>
<td>Behavioral Prevention</td>
<td>37.9</td>
</tr>
<tr>
<td>Antiretrovirals as Prevention</td>
<td>65.5</td>
</tr>
<tr>
<td><strong>Total NIAID HIV Prevention</strong></td>
<td><strong>$730.1</strong></td>
</tr>
<tr>
<td><strong>Total NIAID HIV/AIDS</strong></td>
<td><strong>$1.67 Billion</strong></td>
</tr>
</tbody>
</table>
Enrollment in HPTN 071 (PopART) Completed

- HPTN 071 (PopART), Population Effects of Antiretroviral Therapy to Reduce HIV Transmission
- Launched in 2013
- Goal: Determine the impact of a package of HIV prevention interventions on community-level HIV incidence
- Enrollment: 48,541 adults in 21 communities in South Africa and Zambia
PrEP Use in the United States

Approximately 1.2 MILLION PEOPLE are at high risk for HIV and could benefit from comprehensive HIV prevention strategies, including PrEP

- In 2016, there were 77,120 PrEP users in the U.S., up from 8,768 PrEP users in 2012

Sources: CDC, AIDSVu
Reasons Cited for Not Using PrEP*

- Cost
- Potential side effects
- Do not know where to access
- Impact on insurance
- Do not feel at risk
- Provider’s reaction to request for PrEP

*MSM PrEP-informed non-users

Source: KH Mayer et al. IAS 2017 Abstract
Long-acting Antiretrovirals for Prevention

- RCT of long-acting cabotegravir vs. TDF/FTC for PrEP
- 4500 MSM and TGW in multiple countries

- RCT of long-acting cabotegravir vs. TDF/FTC for PrEP
- 3200 women in Sub-Saharan Africa
Antibody-Mediated Prevention (AMP) VRC01 mAb Phase 2b Studies in High Risk Men and Women

11 countries
47 sites - 4200 volunteers
> 70% enrolled

Enrolling MSM and TGW
Opened April 2016
N=2700

Enrolling Women
Opened July 2016
N=1500

Courtesy Julie Ledgerwood, DO
Long-acting bNAbs Protect NHPs Against SHIV Infection

A Single Injection of Crystallizable Fragment Domain-modified Antibodies Elicits Durable Protection from SHIV Infection
R Gautam, MA Martin et al.

- Long-acting broadly neutralizing antibodies 10-1074-LS and 3BNC117-LS protect macaques against SHIV infection
- Protect for a median of 4-6 months
An HIV Vaccine is Essential for Ending the HIV/AIDS Pandemic

AS Fauci

Development of a moderately effective vaccine together with optimal implementation of existing treatment and prevention modalities could end the current HIV pandemic.
Dual Pathway to Ending the HIV/AIDS Pandemic

End of the HIV/AIDS Pandemic

- HIV Vaccine
- Non-vaccine Prevention