

# LUPUS RESEARCH PROGRAM



**MISSION:** Fund research to understand, prevent and diagnose lupus and to improve treatments and quality of life of patients, including Service Members and their Families, Veterans and the general public

## Congressional Appropriations

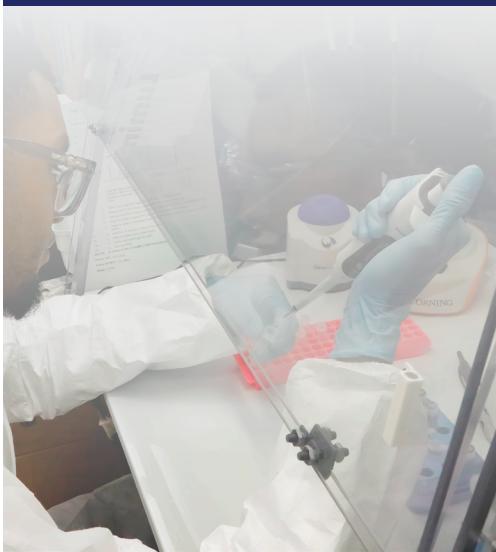
FY17-FY24:

**\$65M total**



"Participating in the first-ever Lupus Research Program for the DOD proved not only exhilarating but hopeful. What I came away with is that there is reason to believe that the 'cruel mystery' of lupus will be solved, and that by research, this devastating disease will no longer be misunderstood. Though irreversible lupus damage plagues my own life, I am immeasurably grateful to help our younger community look forward to quick diagnosis, appropriate medications, quality of life, a longer life expectancy and maybe even the cure."

*Kyra Miller,  
Lupus Foundation of America,  
FY17 and FY19 Consumer Peer Reviewer*



## SCOPE OF THE PROBLEM



Between  
**~161,000 to 1.5 million**  
Americans live with lupus<sup>1</sup>



Lupus affects women at a rate **~10 times higher** than men and is the 11th leading cause of death in women ages 25-44<sup>2</sup>



Minorities are at a **2-3X higher risk** of developing lupus<sup>3</sup>

## RELEVANCE TO MILITARY HEALTH



Over a 10-year period within the MHS, lupus medical encounters for Service Members and beneficiaries included:<sup>4</sup>  
**67,372 patients**  
**705,352 out-patient encounters**  
**287,442 hospital bed days**



Women Service Members are **12.3X** more likely to develop lupus compared to men<sup>5</sup>

## PROGRAM PRIORITIES

- Advance understanding of biological or genetic subsets of lupus patients to improve appropriate treatment of these patients
- Gain insight into disease mechanisms and heterogeneity by understanding responses to novel and existing interventions
- Improve quality of life of patients

<sup>1</sup> Izmirly PM, et al. *Arthritis Rheumatol* 73, no. 6, 2021:991-996.

<sup>2</sup> Yen EY, et al. *Arthritis Rheumatol* 70, no. 8, 2018:1251-1255.

<sup>3</sup> <https://www.lupus.org/health-disparities>

<sup>4</sup> Defense Medical Surveillance System, Armed Forces Health Surveillance Division

<sup>5</sup> Denagamage P, et al. *MSMR* 30, no. 12, 2023: 2-5.



## PROGRAM IMPACT AND OUTCOMES

### Research Breakthroughs – Making a Difference



#### Biomarkers of Lupus Nephritis Progression - Cell Distance Mapping 4

Machine learning-based algorithms applied to images of kidney tissue samples identified markers associated with progression towards end-stage renal disease and renal failure.

- Complex cell features
- Specific inflammatory markers

*Impact:* Better predictors of progressive renal disease and potential new therapeutic targets for lupus nephritis.



#### Advances in Precision Medicine - Epigenetics Modifications to DNA

Genomic analysis of unaffected and affected twins uncovered foundational links to lupus origins.

- 59 areas of different DNA modifications
- Potential for interactions with 41 FDA-approved drugs

*Impact:* Potential risk factors for disease and opportunities to repurpose drugs as treatments for lupus.



#### Understanding Systemic Lupus Erythematosus Progression - Role of Mac-1

Investigation of a single nucleotide polymorphism that causes increased Mac-1 expression identified a causal link between B cell receptor expression and progression of systemic lupus erythematosus at the molecular level.

- Sustained immune cell activity
- Overproduction of interferon

*Impact:* Potential therapeutic target and insight into other autoimmune disorders resulting from B cell dysfunction.



#### Etiology of Disease Severity - Interferon Signaling versus Inflammation

Assessment of inflammatory factors associated a key protein complex involved in the inflammatory cellular signaling response with the development of severe disease.

- Regulation of immune responses
- Differentiation of signaling and inflammation roles

*Impact:* Potential target to treat systemic lupus erythematosus and improve quality of life.

### Accelerating Improvements in Quality of Life

Transformative Vision Awards aim for dramatic improvements in quality of life at the personal or health care system levels in the near term.

- **Walking Intervention to Improve Fatigue** – An individual-tailored, accessible and simple activity intervention to address fatigue and improve overall quality of life
- **Whole Health Empowerment for Endotypes of Lupus** – A group-based health coach-led program, WHEEL, with distinct curricula for treating intermittent versus persistent type 2 symptoms
- **Treatment and Education Approach for Childhood-Onset Lupus** – A coping skills program, TEACH, administered by trained medical providers and designed to improve psychological, functional and disease-related outcomes in youth
- **Virtual Vision Screening for Continuous Hydroxychloroquine Use** – Incorporates vision screening in rheumatology clinics to reduce care burden for patients receiving hydroxychloroquine therapy, a therapy used to reduce inflammation and treat disease symptoms



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