



# A Digital Care Program for Improving Fatigue and other HRQoL Domains in Autoimmunity





## A BRIEF BIO

# Nicole Bundy, MD, MPH Chief Medical Officer Mymee, Inc

- MD, MPH: Yale University School of Medicine and Yale School of Epidemiology and Public Health
- Board Certified in Internal Medicine and Rheumatology
- Former Assistant Professor of Medicine (Rheumatology), The Ohio State University Wexner Medical Center
- 5 years private practice experience in Rheumatology
- Fellow in the Institute for Functional Medicine certification program





## AUTOIMMUNITY

- An estimated 23 million Americans live with an autoimmune disease diagnosis<sup>1</sup>
- ANA positivity, which indicates a likely vulnerability to autoimmune disease, is on the rise<sup>2,3</sup>
- Recent data suggests 10-50% of COVID-19 cases result in chronic intermittent symptoms that are often typical of an autoimmune disorder<sup>4,5</sup>
- With COVID-19 cases approaching an estimated 100 million cases – the potential growth in autoimmune sufferers is staggering

Addison's disease  
Alopecia areata  
Ankylosing spondylitis  
Autoimmune hepatitis  
Autoimmune inner ear disease  
Behcet's disease  
Celiac disease  
CREST syndrome  
Crohn's disease  
Dermatomyositis  
Giant cell arteritis  
Giant cell myocarditis  
Granulomatosis with Polyangiitis  
Graves' disease  
Hashimoto's thyroiditis  
Hemolytic anemia  
Immune thrombocytopenic purpura  
Inclusion body myositis (IBM)  
Juvenile arthritis  
Type 1 diabetes  
Microscopic polyangiitis (MPA)  
Mixed connective tissue disease  
Multiple sclerosis  
Polyarteritis nodosa  
Polyglandular syndromes type I, II, III  
Polymyalgia rheumatica  
Polymyositis  
Primary biliary cirrhosis  
Primary sclerosing cholangitis  
Psoriasis  
Psoriatic arthritis  
Reactive Arthritis  
Relapsing polychondritis  
Rheumatoid arthritis  
Scleroderma  
Sjögren's syndrome  
Systemic Lupus Erythematosus  
Takayasu's arteritis  
Temporal arteritis  
Thrombocytopenic purpura  
Ulcerative colitis  
Undifferentiated connective tissue disease  
Vitiligo

1. Cooper G, et al. J Autoimmun 2009;33(3-4):197. 2. Selmi C. Autoimmun Rev 2010;9:A247.  
3. Dinse GE, et al. Arthritis Rheumatol. 2020 Jun;72(6):1026-1035. 4. Townsend L, et al. PLoS One. 2020 Nov 9;15(11). 5. Petersen MS, et al. Clin Infect Dis. 2020 Nov 30:ciaa1792.



## AUTOIMMUNITY

# Gaps in care

**Numerous studies across several different autoimmune diseases demonstrate a high unmet clinical need**

### SLE

Schmeding A, et al. *Best Pract Res Clin Rheumatol* 2013; 27(3): 363-75.  
Di Battista M, et al. *Clin Exp Rheumatol* 2018; 36: 763-77.  
Morgan C, et al. *Lupus* 2018;27: 681-87.  
Kent T, et al. *Lupus* 2017; 26: 1095-100.  
Yilmaz-Oner S, et al. *Z Rheumatol* 2017; 76: 913-19.  
Golder V, et al. *Lupus* 2018; 27: 501-6.  
Katsuri S, et al. *J Rheumatol* 2018; 45: 397-40.

### IBD

Knowles SR, et al. *Inflamm Bowel Dis* 2018; 24(4): 742-51.  
Ghosh S, et al. *J Crohns Colitis* 2007; 1(1): 10-20.  
Cohen BL, et al. *Aliment Pharmacol Ther* 2014; 39(8): 811-22.

### RA

Guimaraes MFBR, et al. *PLoS One* 2020; 15(3):e0230317  
Matcham F, et al. *Semin Arthritis Rheum* 2014; 44(2): 123-30.  
Ferreira RJO, et al. *Rheumatol* 2017;56(9):1573-78.

### PsA

Gudu T, et al. *Expert Rev Clin Immunol* 2018; 14(5): 405-17.  
Coates LC, et al. *Health Qual Life Outcomes* 2020; 18(1): 173.



## IMPACT ON PATIENTS

# The Burden Carried By Patients Only Multiplied in 2020

- From 2019 to 2020, there was a **52% decline** in respondents who said they were currently being treated by a rheumatology provider.
- Out-of-pocket costs **more than doubled** from 2019. The median annual out-of-pocket treatment cost in 2020 was \$1,000 — up from \$475 last year.
- **Almost half** (46.17%) of patients reported that their insurer subjected them to step therapy requirements. About another half (47.94%) reported that their provider needed to obtain prior authorization before getting a prescription.
- **Approximately 83%** (82.97%) of people living with a rheumatic disease reported at least one activity limitation as a result of their disease, including inability to exercise, work, and perform physical activities.

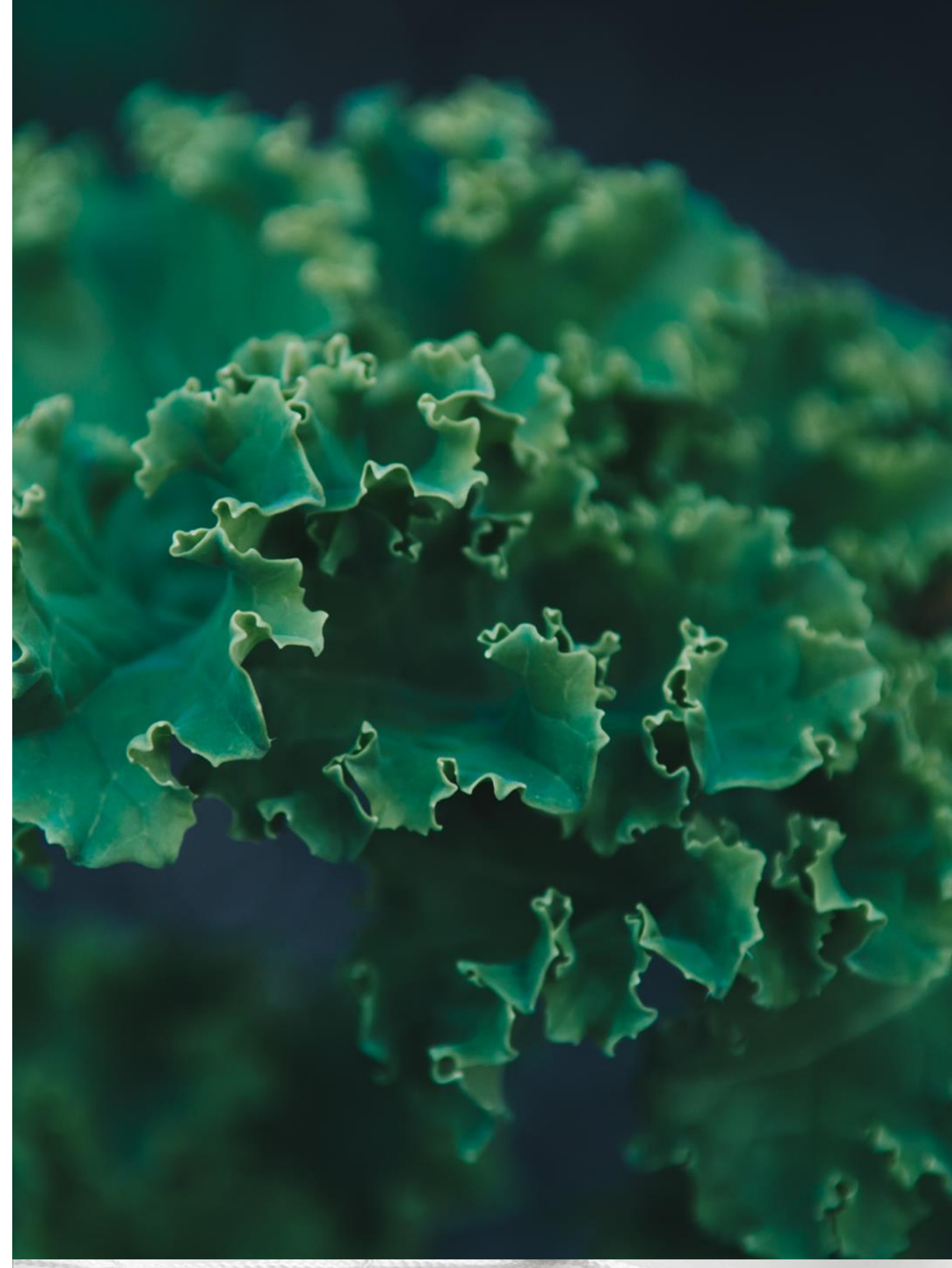


A NEW APPROACH

# Lifestyle and the autoimmune connection

- 77% of immune function is determined by non-heritable factors<sup>1</sup>
- Diet<sup>2</sup>, stress<sup>3</sup>, chemical exposure<sup>4</sup>, sleep<sup>5</sup>, and the gut microbiome<sup>6</sup> linked to SLE
- In RA, an anti-inflammatory diet improved outcomes and altered microbiome and metabolome composition<sup>7</sup>
- Treg function affected by diet<sup>8</sup>

1. Brodin P, et al. *Cell* 2015;160(0):37; 2. Mu Q, et al. *Front Immunol* 2015;6:608; 3. Song H, et al. *JAMA* 2018;319(23):2388; 4. Majka DS, et al. *Ann Rheum Dis* 2006;65(5):561; 5. Hsaio Y, et al. *Sleep* 2015;38(4):581. 6. Zhang H, et al. *Appl Environ Microbiol* 2014;80(24):7551; 7. Coras R, et al. *Arthritis Rheumatol.* 2020; 72 (suppl 10); 8. Arroyo Hornero R, et al. *Front Immunol.* 2020 Feb 21;11:253





POTENTIAL MECHANISMS OF ENVIRONMENTAL INFLUENCE ON AUTOIMMUNITY

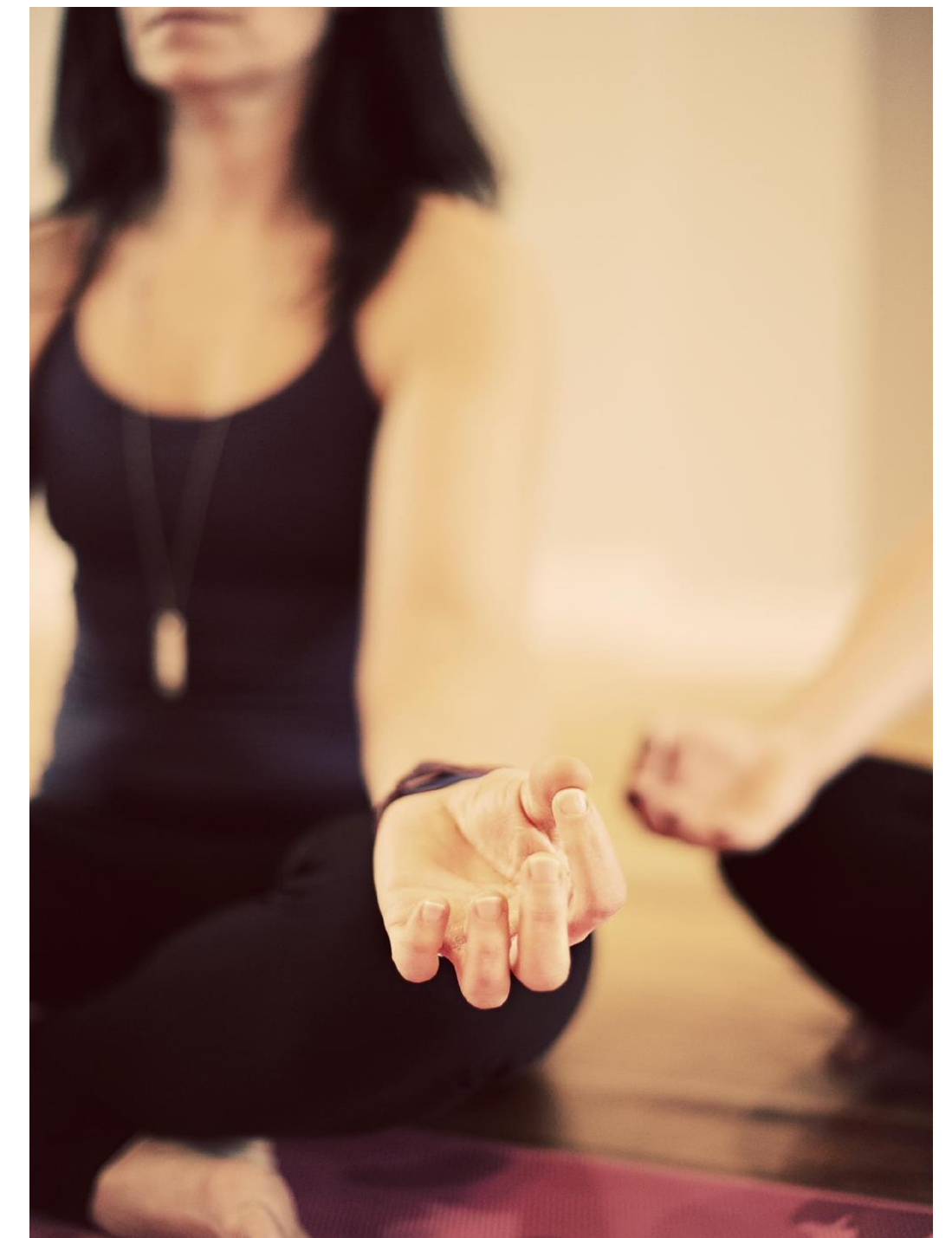
# Dietary and Lifestyle Effects on Epigenetics and the Microbiome

- Gaine ME, et al. Sleep Deprivation and the Epigenome. *Front Neural Circuits*. 2018 Feb 27;12:14.  
*“...clear evidence exists that epigenetic alterations occur following sleep deprivation.”*
- Barrón-Cabrera E, et al. **Epigenetic Modifications as Outcomes of Exercise Interventions Related to Specific Metabolic Alterations: A Systematic Review.** *Lifestyle Genom*. 2019;12(1-6):25-44.
- Codella R, et al. **Exercise has the guts: How physical activity may positively modulate gut microbiota in chronic and immune-based diseases.** *Dig Liver Dis*. 2018 Apr;50(4):331-341.



AUTOIMMUNITY

# Patients Looking for Ways to Help Themselves

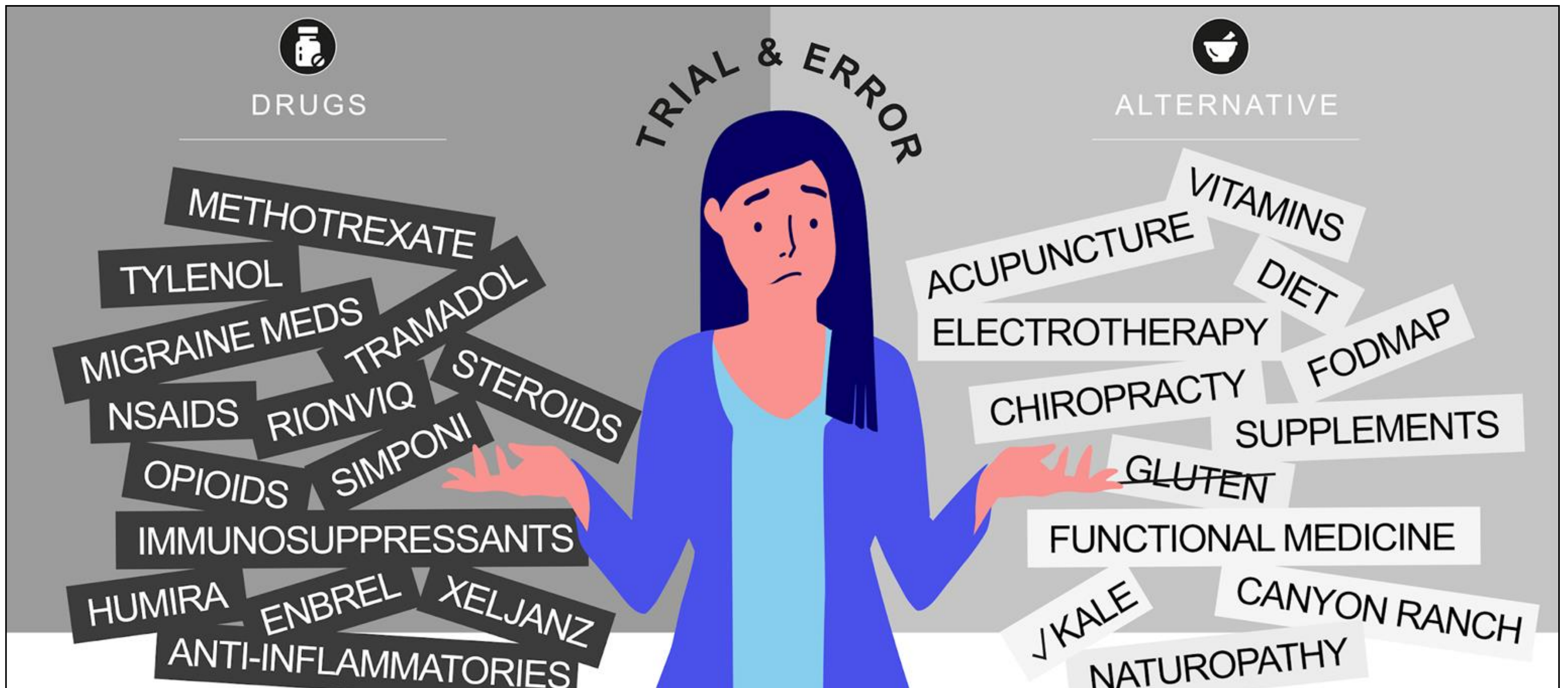






THE REALITY FOR PATIENTS AT HOME

# ... and Going Through Trial & Error of Treatments Alone





I have  
Lupus.  
I do a lot of  
guessing  
about what  
to eat and  
not eat.

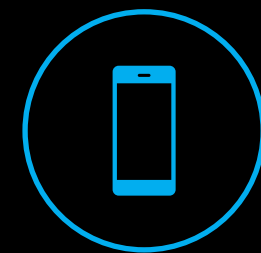
— MYMEE PARTICIPANT APPLICATION



## HOW IT WORKS

# The Mymee solution.

We take a highly personalized approach that uses proven technology to identify the unique triggers contributing to each person's flares in symptoms. Plus, our program is supported by certified health coaches who help guide behaviors and empower patients.



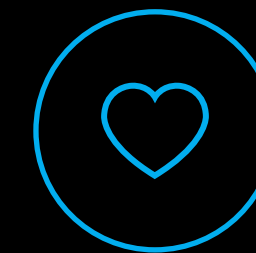
### MOBILE APPLICATION

Behavioral data collection



### INTELLIGENT ALGORITHMS

Detect individual triggers



### MONITORING AND COACHING

Data-driven care adjustments





## MYMEE BY THE NUMBERS

# Tackling autoimmune disease - on an “n of 1” basis.

Mymee helps physicians and their patients tap into the potential of personalized trigger identification and management in autoimmune disease

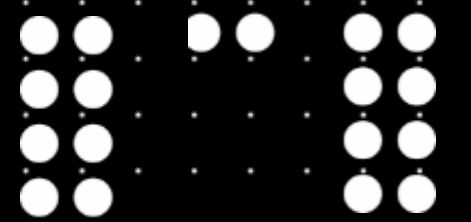
Built on over  
**1000** unique  
cases of  
autoimmunity

**90+** unique  
triggers matched  
with over **150**  
unique symptoms

From **lupus, RA**  
and **Crohns** to  
rare or undefined  
cases, like **COVID**  
**long haul**



# Mymee clinical validation.



## Can individualized diet and lifestyle modifications derived from digital therapeutics and health coaching improve symptoms of SLE?<sup>1</sup>

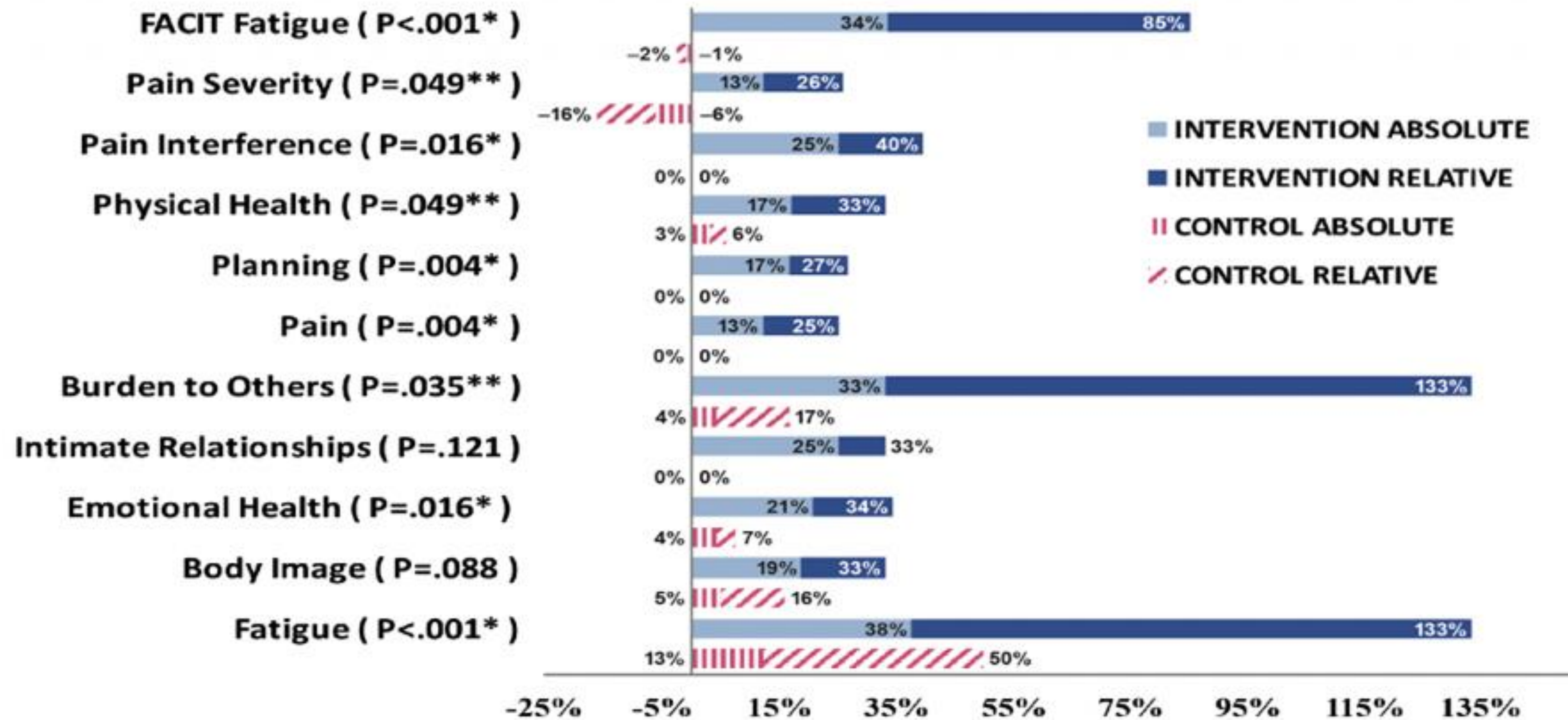
- RCT of adults with SLE
- 50 patients randomized to Mymee program + usual care or usual care alone
- Primary outcome measures: change in scores between baseline and 16 weeks for FACIT-Fatigue, BPI-SF, and LupusQoL
- PP analysis (34 subjects):
  - Greater improvement in intervention group vs controls in all domains
  - Adjusting for multiple tests, significant differences ( $p < .001$ ) in favor of intervention group found for FACIT, BPI-pain interference, and 4 domains of LupusQoL (fatigue, pain, planning, and emotional health)
  - BPI-pain severity, LupusQoL physical health and burden to others significant at  $p < 0.05$ .

1. Khan F, Granville N, Malkani R, Chathampally Y. Health-Related Quality of Life Improvements in Systemic Lupus Erythematosus Derived from a Digital Therapeutic Plus Tele-Health Coaching Intervention: Randomized Controlled Pilot Trial. J Med Internet Res. 2020 Oct 20;22(10):e23868. doi: 10.2196/23868. PMID: 33079070; PMCID: PMC7609202.



CLINICAL VALIDATION

# PP absolute and relative improvement by domain<sup>1</sup>



1. Khan F, Granville N, Malkani R, Chathampally Y. Health-Related Quality of Life Improvements in Systemic Lupus Erythematosus Derived from a Digital Therapeutic Plus Tele-Health Coaching Intervention: Randomized Controlled Pilot Trial. J Med Internet Res. 2020 Oct 20;22(10):e23868. doi: 10.2196/23868. PMID: 33079070; PMCID: PMC7609202.



WHAT'S NEXT

# How Mymee Partners with Physicians

- Mymee is not a cure, nor is Mymee a prescribing physician, nor does Mymee replace a prescribing physician.
- Mymee is complementary to a physician's treatment plan.
- Mymee works with doctors and their patients to optimize HRQoL for those with autoimmune and related diseases.
- Mymee never makes recommendations about medication changes and encourages all clients to address these questions with their prescribing physicians.





## RESOURCES AND PARTNERSHIP

- Visit [Mymee.com](https://mymee.com) to see our case studies and selected publications on the role of triggers in autoimmune disease



Back to Ice Skating for a 45-year-old Flight Attendant Suffering Debilitating Symptoms Associated with Post COVID Syndrome

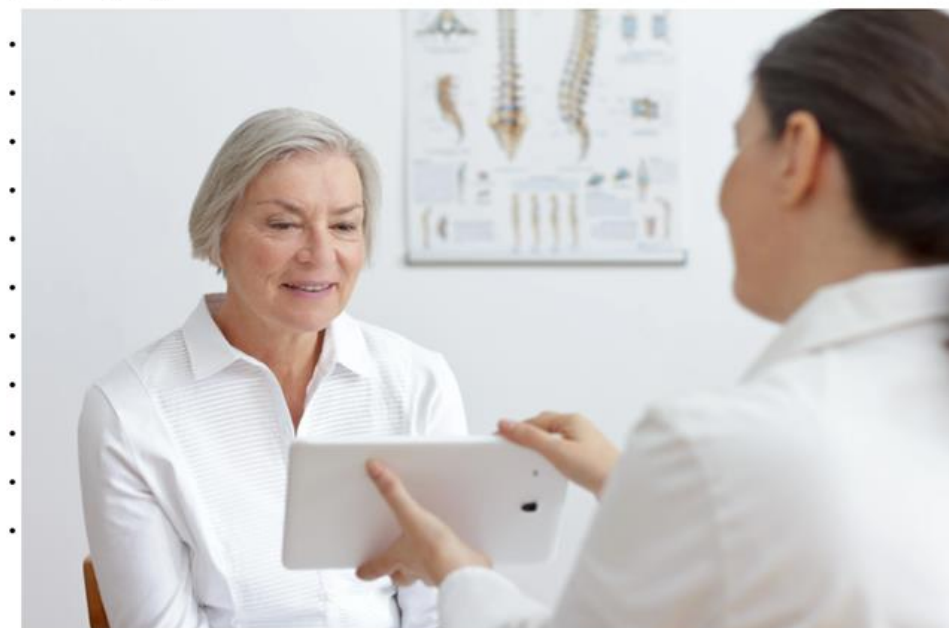


Evan's Case: Achieving improvements in mobility and pain in a 38-year old man with Ankylosing Spondylitis



Sherry's Case: Avoiding Gastric Pacemaker Surgery with the Mymee Program in a 33 year old woman with lupus

- Connect with us to learn more about Mymee or to join our referral network please get in touch



### REFERRAL PROGRAM

**Invite someone to rescue their health.**

If you have a patient who is struggling with unresolved symptoms, unpredictable flares or questions that have no answers, we are here to help.

[LEARN MORE →](#)



Thank you

Nicole Bundy, MD, MPH  
[nicole.bundy@mymee.com](mailto:nicole.bundy@mymee.com)

mymee.com

