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Knowledge that will change your world

Big Musculoskeletal Impact (BMI): Assessing Obesity and Its Complications

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Disclosures

	Company/Organization
Honorarium	ACR, Abbvie, Amgen, ArthritisPower, Aqtual, Bendcare, BMS, CorEvitas, FASTER, GSK, IlluminationHealth, Janssen, Labcorp, Lilly, Myriad, Novartis, Revero, Pfizer, Sanofi, Scipher, Setpoint, TNacity Blue Ocean, UCB
Research Grants	ACR, Abbvie, Amgen, ArthritisPower, Aqtual, Bendcare, BMS, CorEvitas, FASTER, GSK, IlluminationHealth, Janssen, Labcorp, Lilly, Myriad, Novartis, Pfizer, Sanofi, Scipher, Setpoint, UCB, United Rheumatology

Learning Objectives

1. Assess the relationship between Obesity and rheumatic diseases, and the impact on treatment and management
2. Apply strategies to improve the assessment, treatment, and management of Obesity

Outline

- How To Define Obesity
- Prevalence of Obesity
- Influence of Obesity on Rheumatic Diseases and Treatment
- Interventions
- Remote Monitoring for Obesity

Polling Question

Monitoring for obesity (e.g. via a Wifi equipped scale) and its complications via a smartphone app between visits is:

a) Currently reimbursed by many insurance companies
b) Not reimbursed by insurance companies
c) Not currently reimbursed, but will be reimbursed in 2023
d) What are you talking about? I have no idea.

Setting the Stage

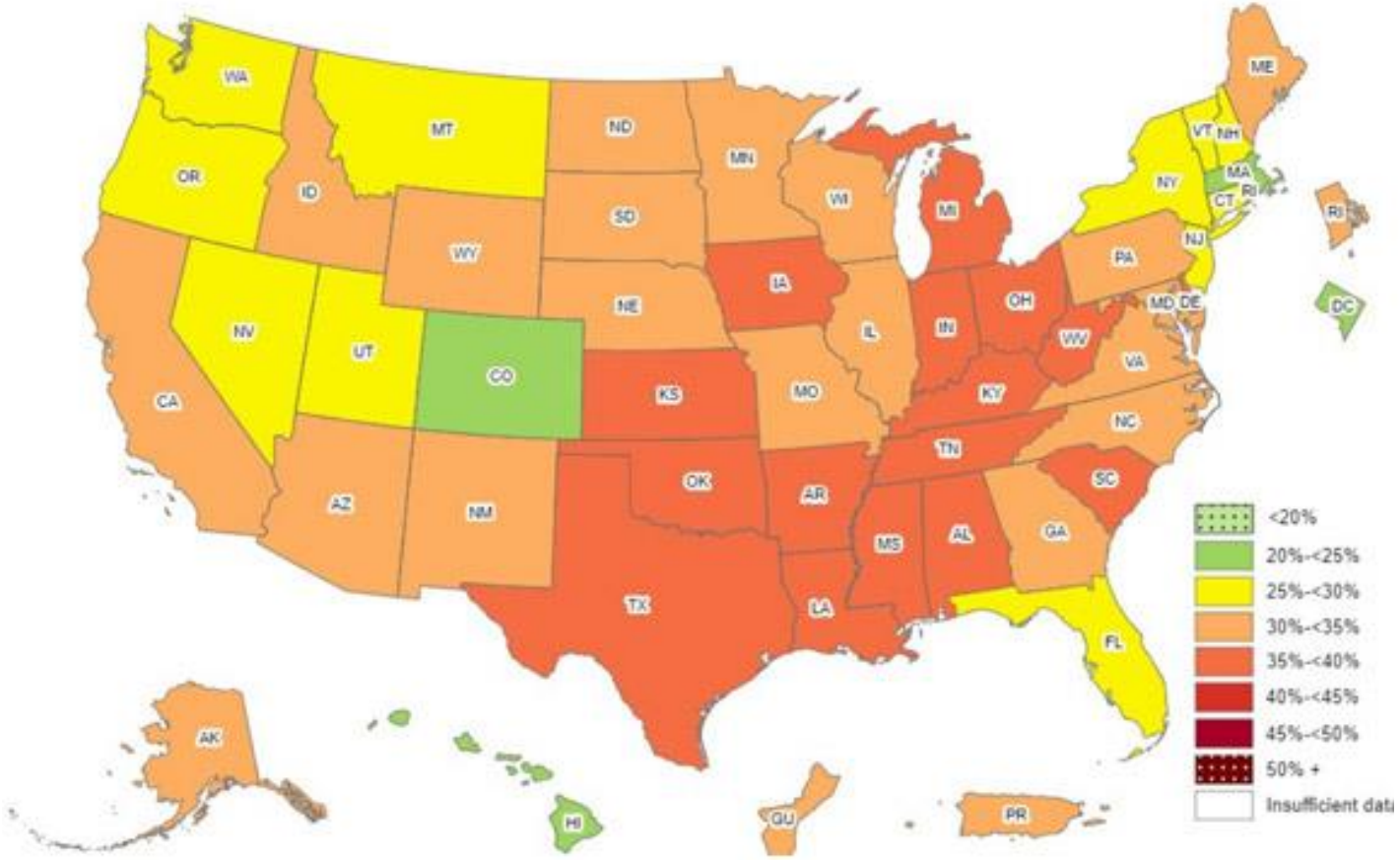
- **35 year old CCP+, RF+ woman with +FH of RA, presented with 5m history of polyarticular joint symptoms with systemic features**
- **On exam, BMI = 37, TJC = 13, SJC = 7, CRP = 51mg/L (ULN < 11)**
- **Started on MTX, dose escalated to 20mg/week, limited by fatigue. Prednisone 10mg/day initially, tapered over time**
- **After ~5 months, she now has residual pain in MCPs/PIPs and other joints, but no longer has overt synovitis**

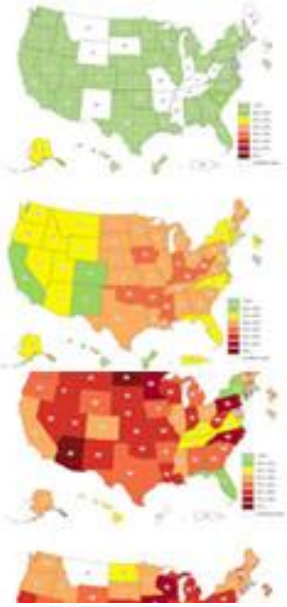
Measuring Obesity & Its Impact

- **WHO: 20-25 (healthy), 25-30 (overweight), 30-35 (obese), >35 (morbid obesity)**
- **But in measuring obesity…**
  - **Neither weight nor BMI ideal**
  - **Total body DXA; impractical for clinical care**
  - **Leptin?***
- **“Sarcopenic obesity” in RA**: obesity + sarcopenia as (skeletal muscle index ≤5.75 kg/m^2 in women and ≤8.50 kg/m^2 in men)**
- **Obesity raises CRP both in healthy people and in RA patients, especially for women*****

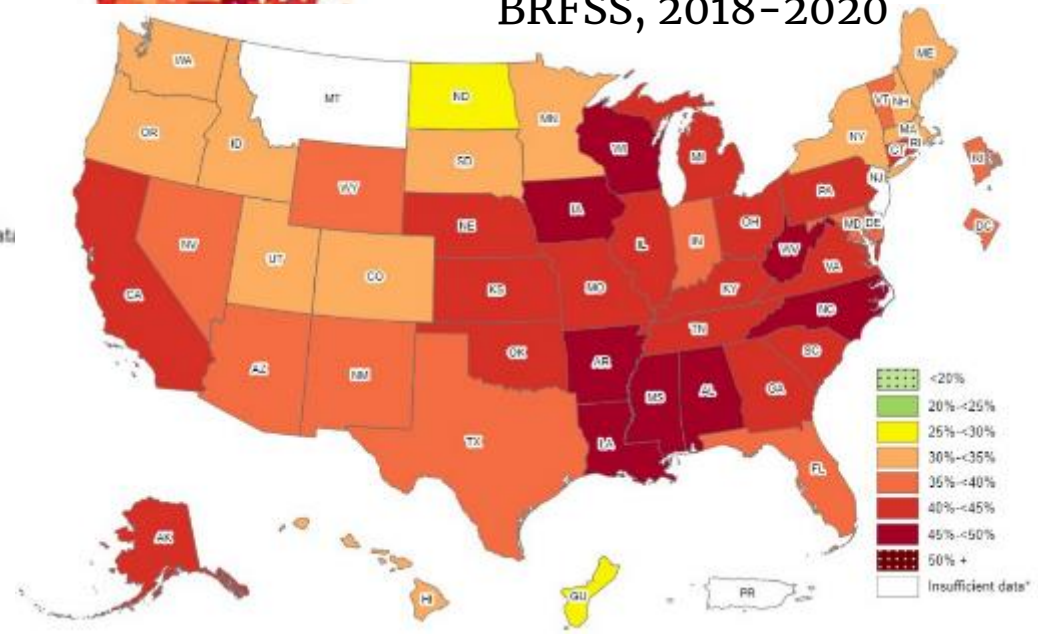
* Considine RV, et al. N Engl J Med. 1996;334:292-295
** Giles J, A&R 2008, 59: 807–815.
*** George M, AC&R 2017, 10.1002/acr.23229

Prevalence of Obesity in the U.S., 2022





Prevalence of Self-Reported Obesity Among Non-Hispanic Black Adults by State and Territory, BRFSS, 2018-2020

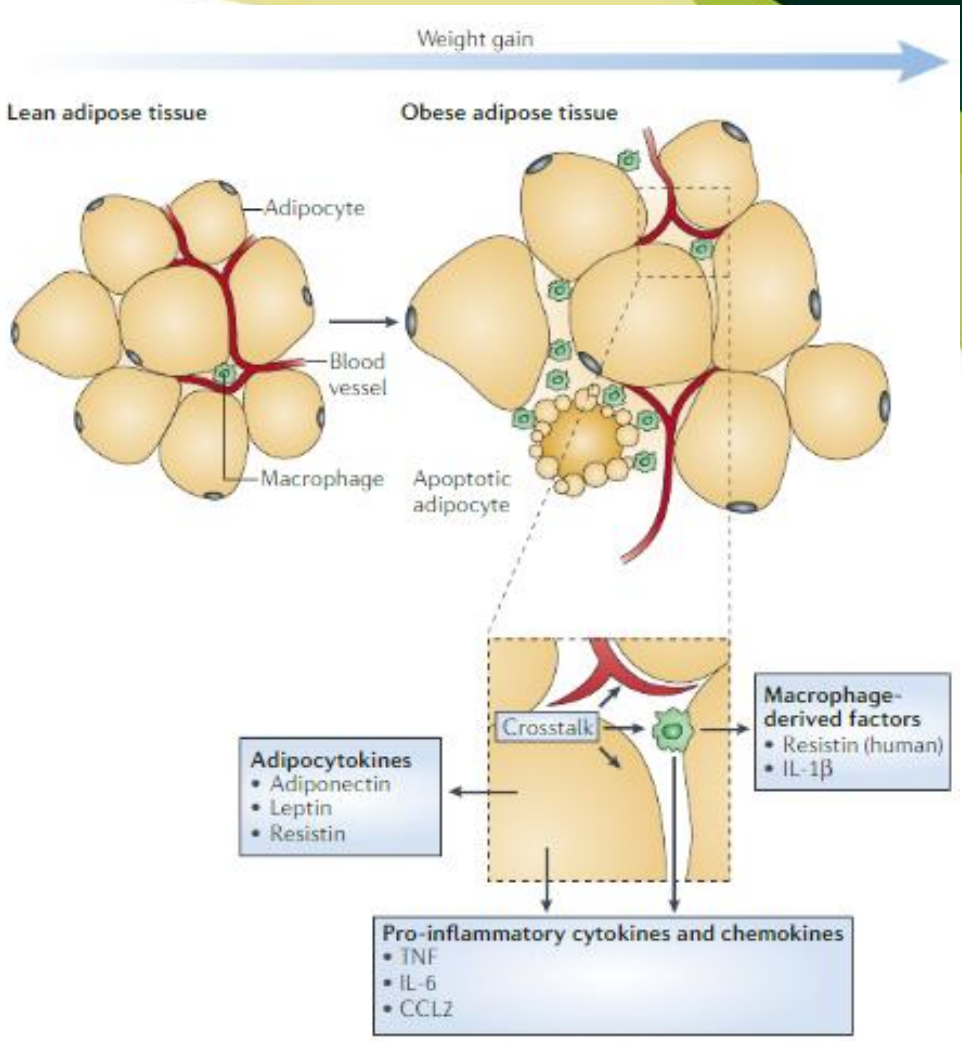


https://www.cdc.gov/obesity/data/prevalence-maps.html

- **Are some bDMARD or tsDMARDs more likely to be effective than others for obese patients?**
- **Long term, what is her risk for radiographic progression?**
- **Fundamental questions during her follow-up**
  - **Does she still have active RA?**
  - **How certain am I, and why?**

Adipose Tissue is Proinflammatory

- Increased levels of adipocytokines can[a,b]
  - — Activate monocytes
  - — Increase levels of inflammatory cytokines, including: TNF-α, IL-1, IL-6
  - — Induce proliferation of Th1 cells and decrease proliferation of regulatory T cells
- Similar cytokines are part of the inflammatory milieu of RA[b]



Tilg H, Moschen AR. *Nat Rev Immunol*. 2006;6:772-783

a. Hauner H. *Proc Nutr Soc*. 2005;64:163-169; b. Gremese E, et al. *Front Immunol*. 2014;5:576

Table 1. Adipokine serum levels in autoimmune rheumatic diseases.

Adipokine	RA	PsA	AS	SLE
	Trend Association with disease features			
Leptin	↑[21,22]	↑[35]	↓ (Males)[32]	↑[37]
	BMI, disease activity[23,34]	Disease activity[35]	Inversely with radiographic progression[34]	NR
Adiponectin	↑[38]	NA[35,36,39]	Unchanged[40–42]	↑[43,44]
	Radiographic progression[26,38,45]	NA[35,36,39]	HMW inversely correlated with radiographic progression[34]	Renal involvement (possibly)[44,46]
Resistin	NA[21,47–49]	↑[39]	↑[40,41,50]	↑[51,52]
		NR	NA[40,41,50]	Disease activity, disease damage[51]
Visfatin	↑[21,38,53]	↑[39]	↑[41]	NA[54–56]
	Radiographic progression (possibly)[28,53]	NR	Radiographic progression (possibly)[34,41]	NR

AS, ankylosing spondylitis; BMI, body mass index; HMW, high molecular weight; NA, existing data are contradictory or not enough to conclude; NR, not reported; PsA, psoriatic arthritis; RA, rheumatoid arthritis; SLE, systemic lupus erythematosus.

Ther Adv Musculoskel Dis
2018, Vol. 10(8) 157–167
DOI: 10.1177/1759720X18783894

Measuring BMI in Patients With Rheumatic Diseases

- BMI may not adequately define a patient's obesity
  - Patients with normal BMI can still be at risk for comorbidities that are associated with obesity
  - Weight loss in RA can result in cachectic obesity (low lean mass with high body fat percentage)

George MD, Baker JF. *Curr Rheumatol Rep*. 2016;18:6

Assessing Disease Activity in RA in the Setting of Obesity

- Inflammatory biomarkers that are elevated because of adiposity may lead to inaccurate assessment of RA disease activity[a]
  - — Elevated CRP may be from adipose tissue rather than from the synovitis
  - — This can provide a challenge in making treatment decisions

a. George MD, Giles JT, Katz PP, et al. *Arthritis Care Res (Hoboken).* 2017 Apr 10. doi: 10.1002/acr.23229.

Accurately Assessing Obesity in Practice

- BMI is not always an accurate measure.
- Use of MRI or CT scans to measure fat and muscle in patients are more commonly done in clinical research, not in practice
- Total body DXA scans also provide better assessment of fat and muscle in a patient
- Currently no gold standard

a. George MD, Giles JT, Katz PP, et al. *Arthritis Care Res (Hoboken).* 2017 Apr 10. doi: 10.1002/acr.23229.

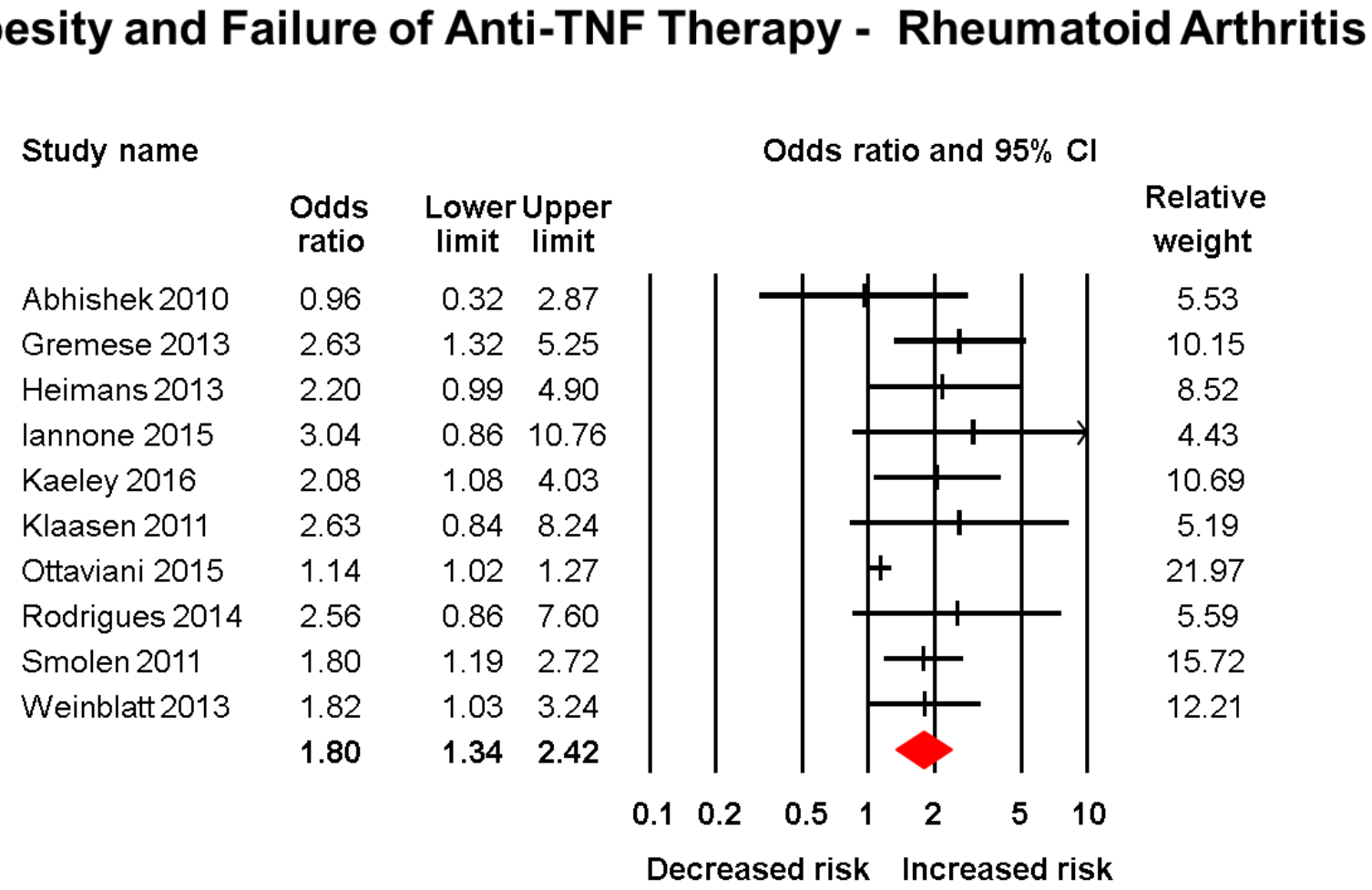
Assessing RA in the Setting of Obesity of Metabolic Syndrome

- Recognition of biases in clinical disease activity measures
- Biomarkers to assess disease activity in RA[a]
  - Clinical biomarkers
  - ESR and CRP
  - 14-3-3η[b]
  - MBDA
- Imaging modalities (US, MRI)[d]

a. Baker JF, et al. *Best Pract Res Clin Rheumatol*. 2015;29:566-579; b. Maksymowych WP, et al. *J Rheumatol.* 2014;41:2104-2113;
c. Curtis JR, et al. *Arthritis Care Res (Hoboken).* 2012;64:1794-803; d. Tan YK, et al. *Rheumatology (Oxford).* 2012;51:vii36-42.

TNFi treatment response in Obese RA Pts

- **More like to fail TNFi therapy; less likely to attain LDA or remission**

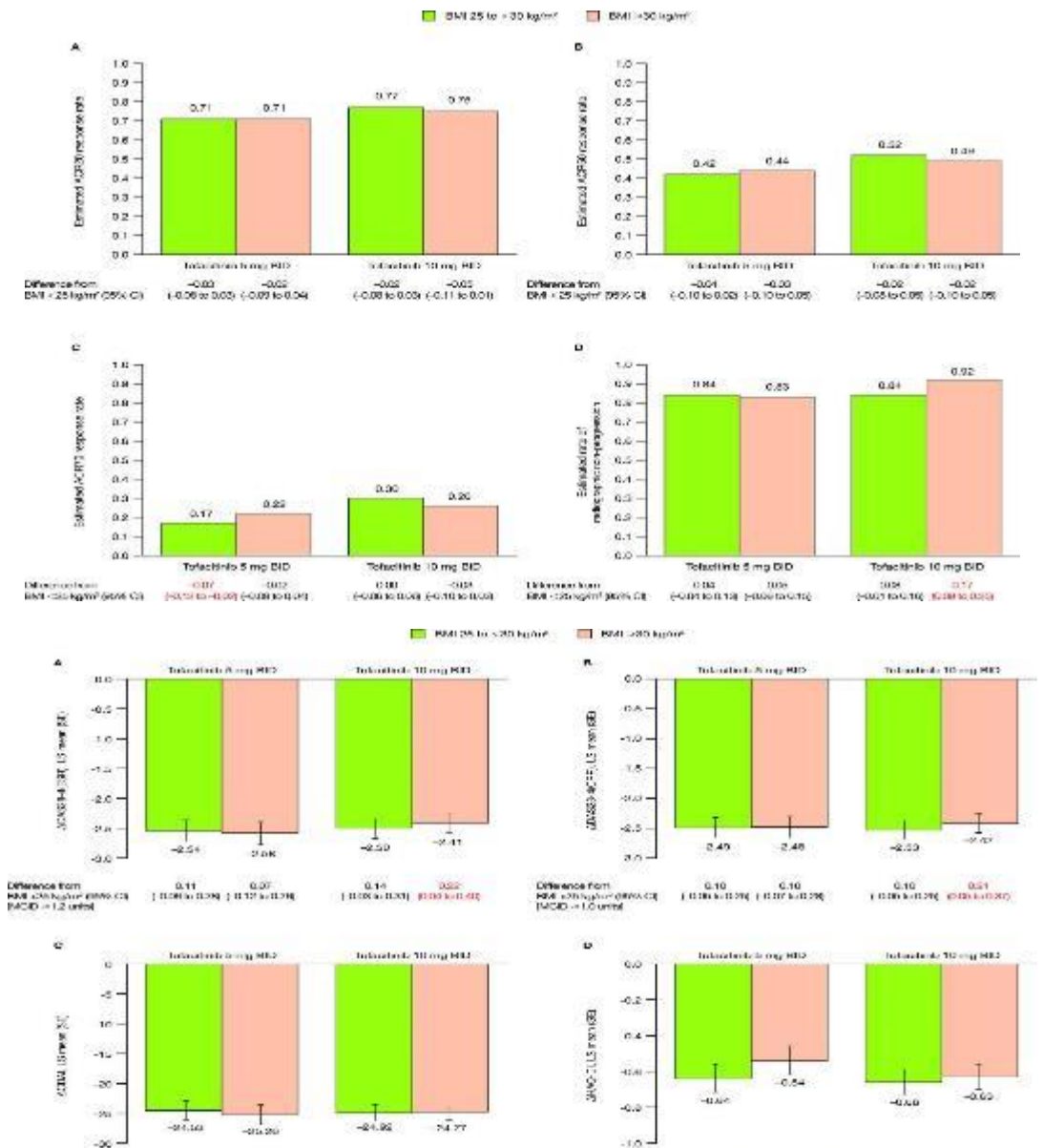


- **Similar for other diseases, fixed & weight-based dosing irrelevant (?)**

Singh S, Curtis JR et. al, LoS One. 2018 May 17;13(5):e0195123. doi: 10.1371

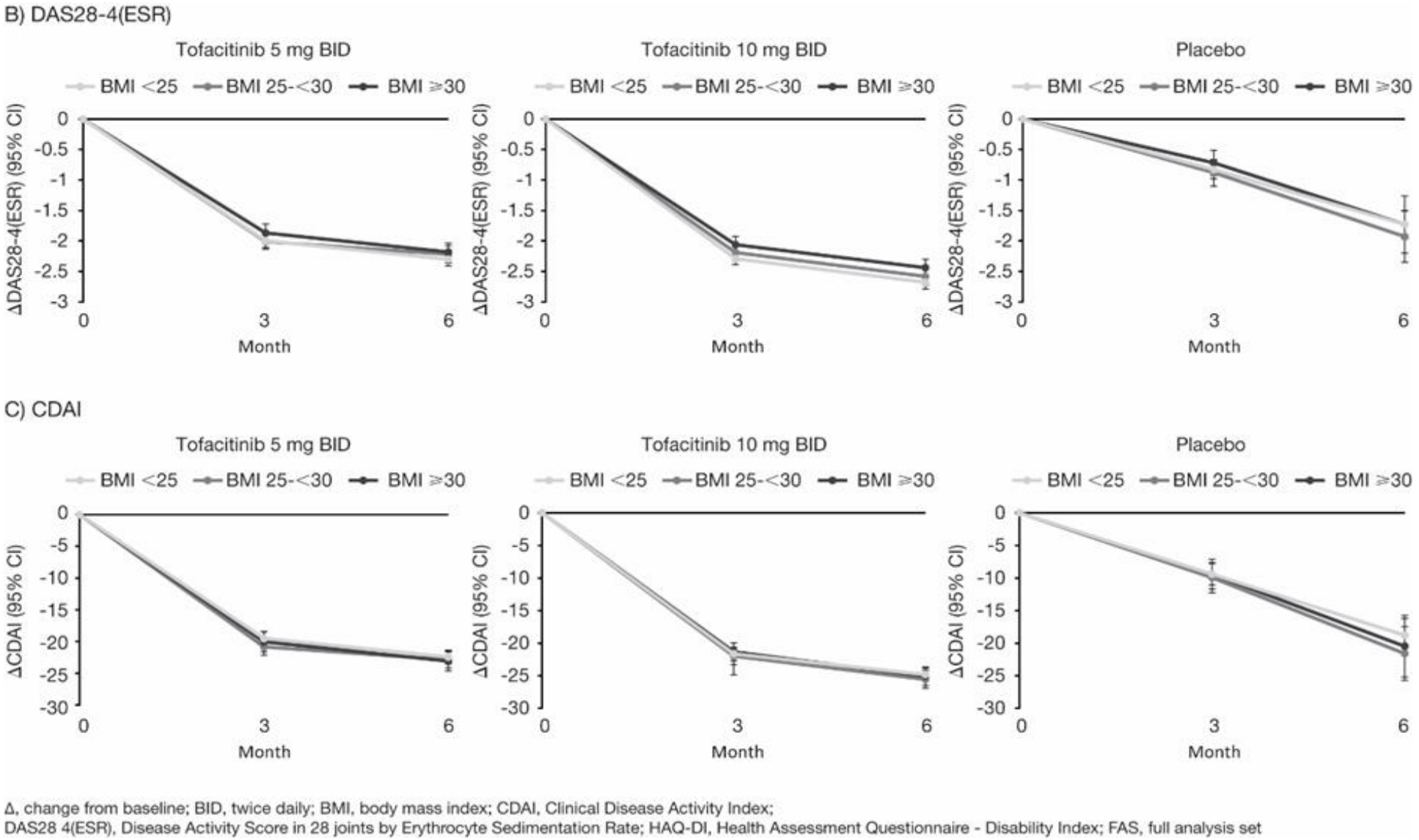
Obesity & Response to Other RA Treatments

- **Less clear for TCZ or for ABA; less diminution of benefit than for TNFi?**
- **Must consider potential for confounding; few analyses done on trial data adjusted for potential confounders**
- **JAKi**



Dikranian AH, Gonzalez-Gay MA, Wellborne F*, et al*
Efficacy of tofacitinib in patients with rheumatoid arthritis stratified by baseline body mass index: an analysis of pooled data from phase 3 studies
RMD Open 2022;**8:**e002103. doi: 10.1136/rmdopen-2021-002103

Obesity & Response to Tofacitinib

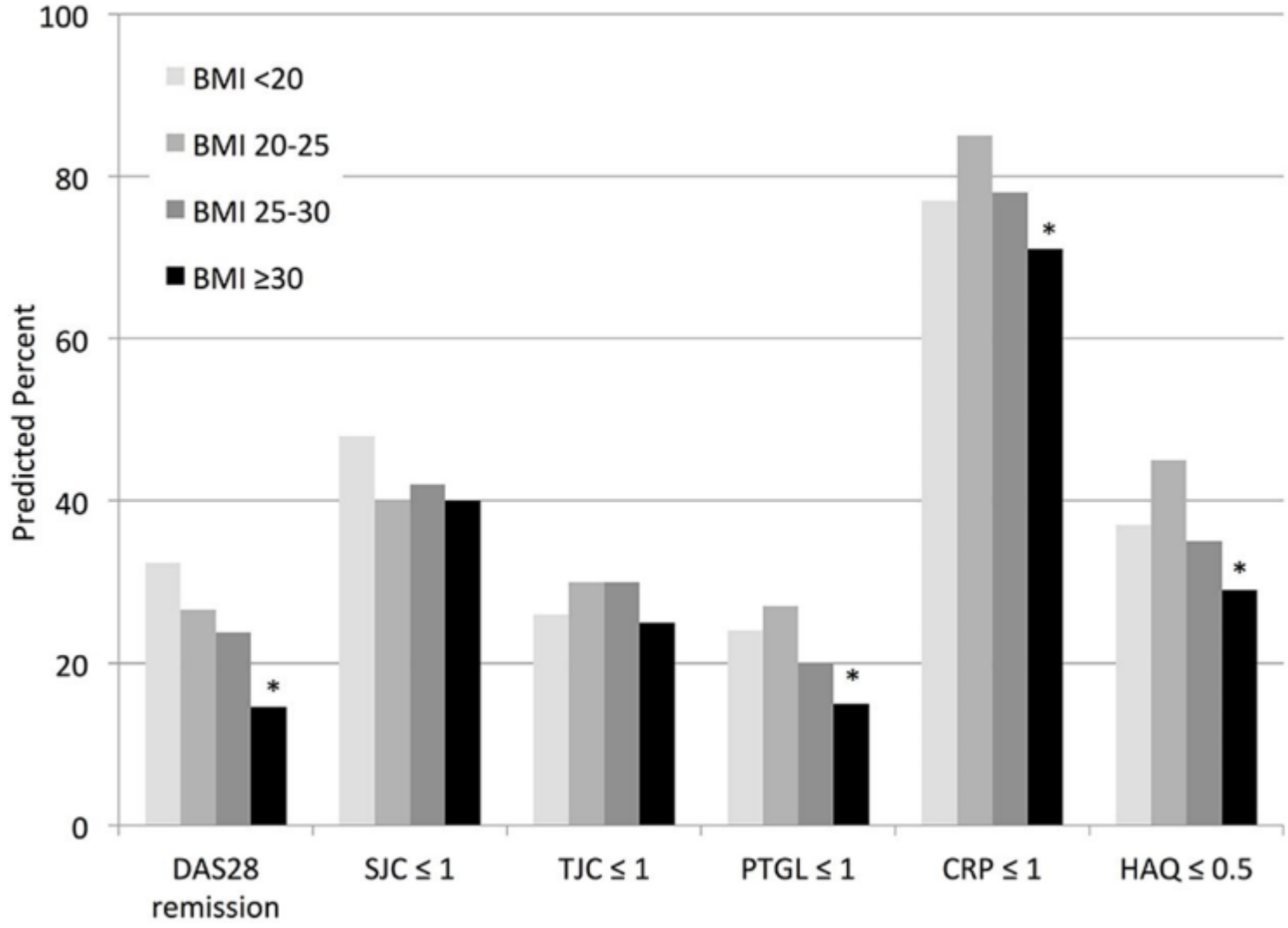


Δ, change from baseline; BID, twice daily; BMI, body mass index; CDAI, Clinical Disease Activity Index; DAS28 4(ESR), Disease Activity Score in 28 joints by Erythrocyte Sedimentation Rate; HAQ-DI, Health Assessment Questionnaire - Disability Index; FAS, full analysis set

Dikranian, *RMD Open* 2022;**8:**e002103. doi: 10.1136/rmdopen-2021-002103

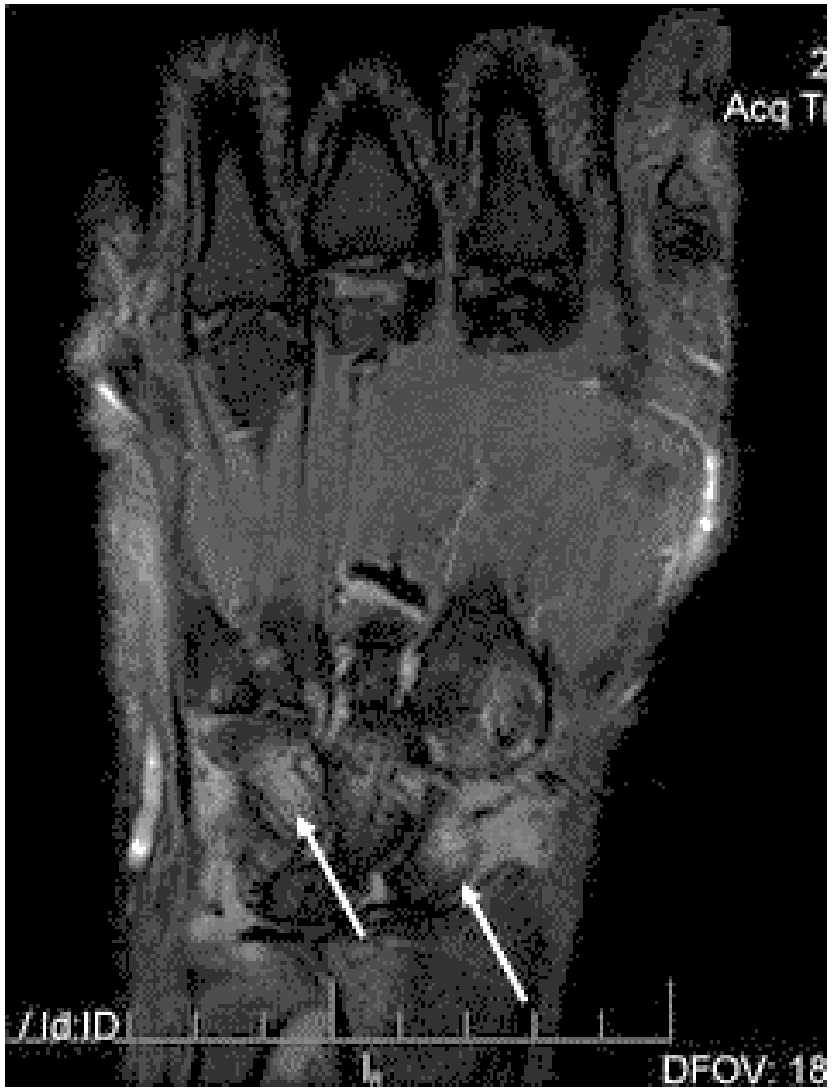
What about Obesity & X-ray Progression?

Lower Clinical Response In Golimumab Trials in Obese RA Pts



George et al. Ann Rheum Dis 2017;76:1743-1746

Lower BMI associated with greater bone edema (osteitis)



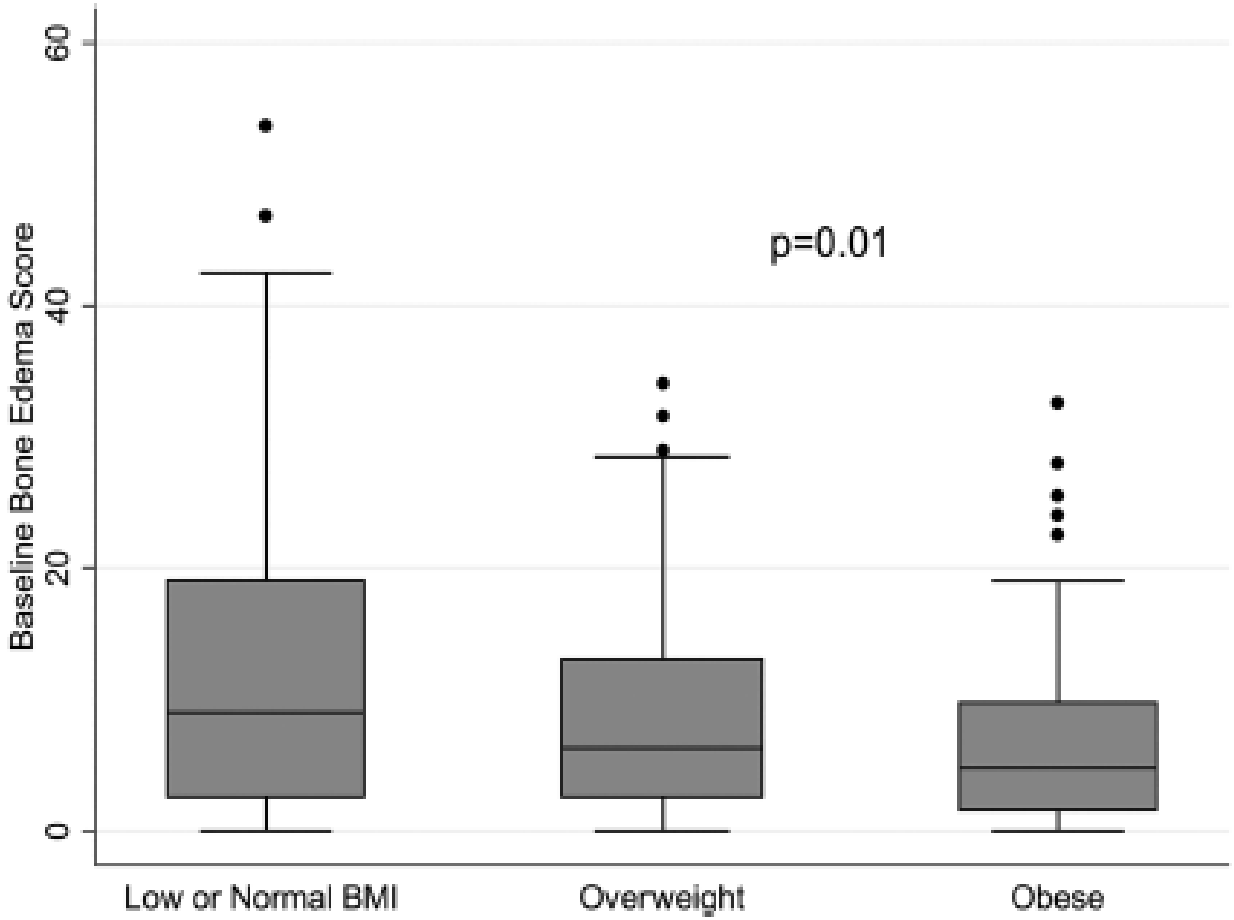
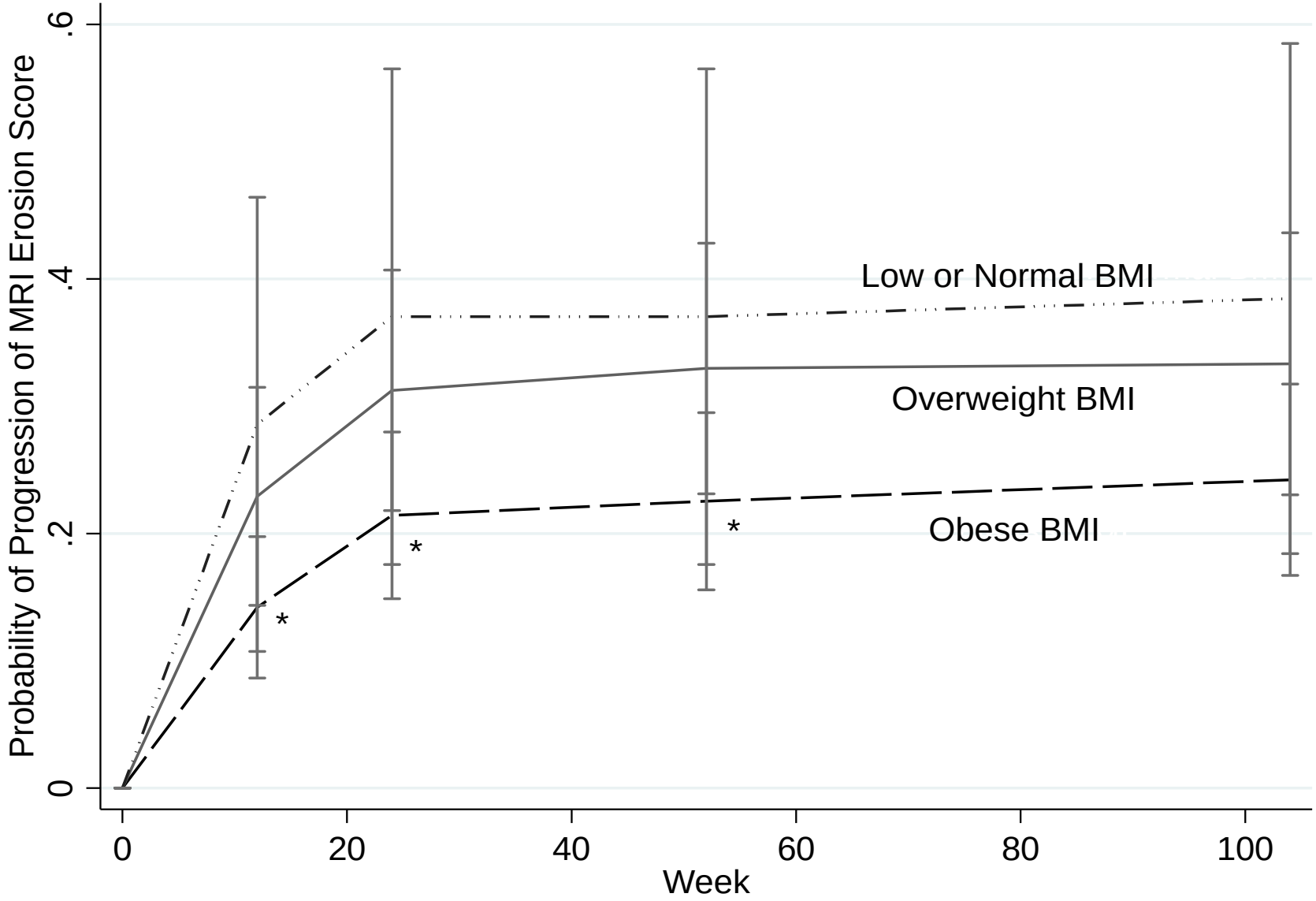


Figure 2 Baseline bone oedema by baseline body mass index (BMI) category.

Baker JF, et al. Ann Rheum Dis. 2014;73:1923-8

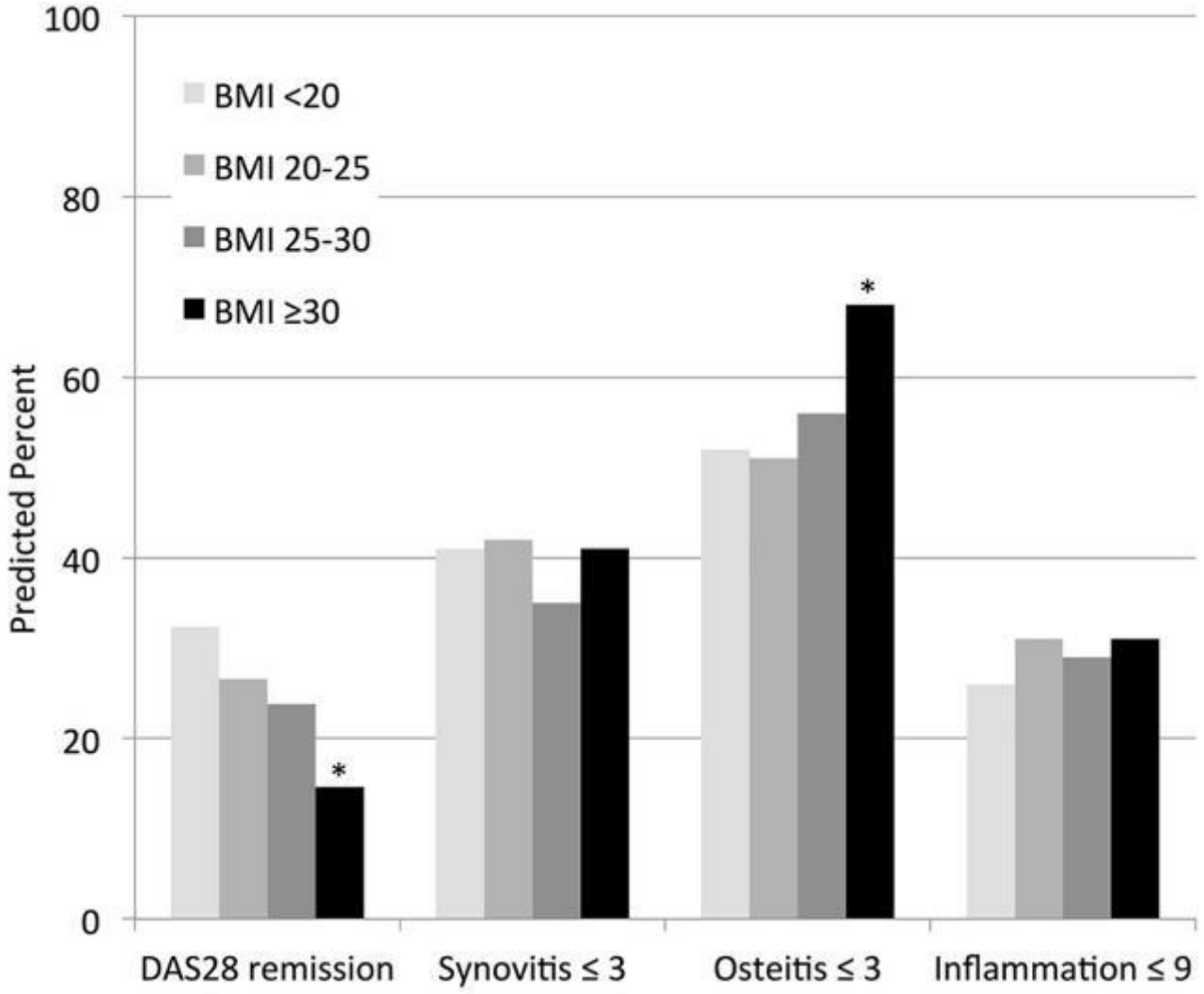
Non-Obese RA patients have more MRI damage



Baker JF, et al. Ann Rheum Dis. 2014;73:1923-8

Synovitis, Inflammation the Same, and Osteitis is Less Common

Rates of low clinical disease activity or low MRI scores at 24 weeks among different BMI groups.



George et al. Ann Rheum Dis 2017;76:1743-1746

Biomarker-based inflammation & Obesity

- **Possibility suggested that MBDA may include non-RA inflammatory component related solely to obesity**
- **Supportive data: in Corrona (CorEvitas) registry, even for people in CDAI remission (≤ 2.8), MBDA significantly associated with age, sex, obesity but not common comorbidities**
- **Conclusion: Call to re-calibrate the MBDA to improve correlation to RA disease activity, ? improved x-ray outcome prediction**

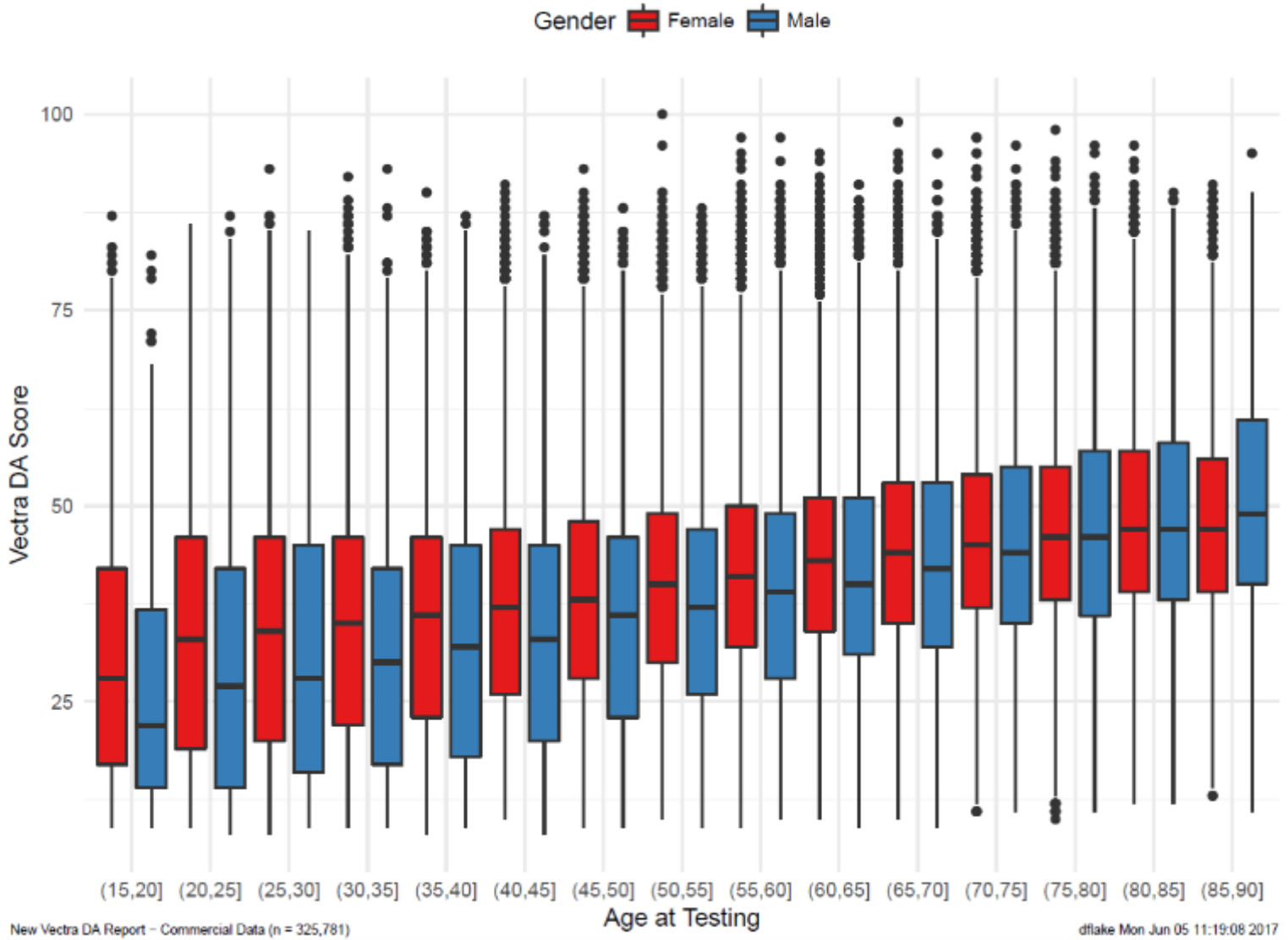
* Curtis JR, Semin Arthritis Rheum. 2017 Aug 2. doi: 10.1016

Description of cohorts used to Re-calibrate the MBDA

- **Lab database**
  - **325,781 patients with age (< 90 years old), gender, and MBDA scores (first test for multiply-tested patients)**
- **Clinical studies/registries**
  - **1411 RA patients with baseline data for MBDA score, age, gender, and BMI**
    - **CERTAIN, n = 105**
    - **InFoRM, n = 382**
    - **RACER, n = 332**
    - **BRASS, n = 424 (401 with X-ray data)**
    - **OPERA, n = 168 (154 with X-ray data)**

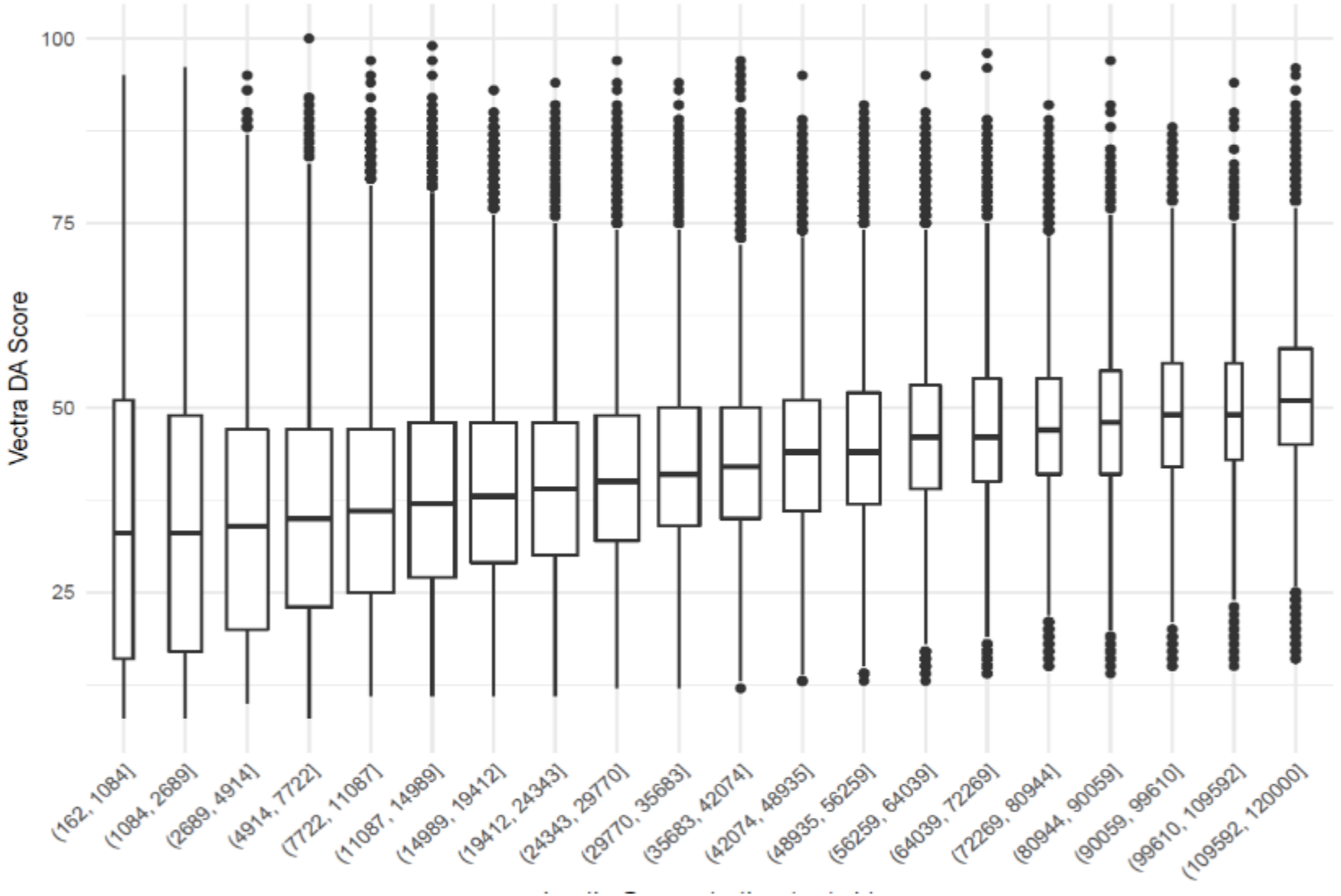
* Curtis et. al, Rheumatology (Oxford). 2019 May 1;58(5):874-883. doi: 10.1093

Relationship between MBDA score and age and gender



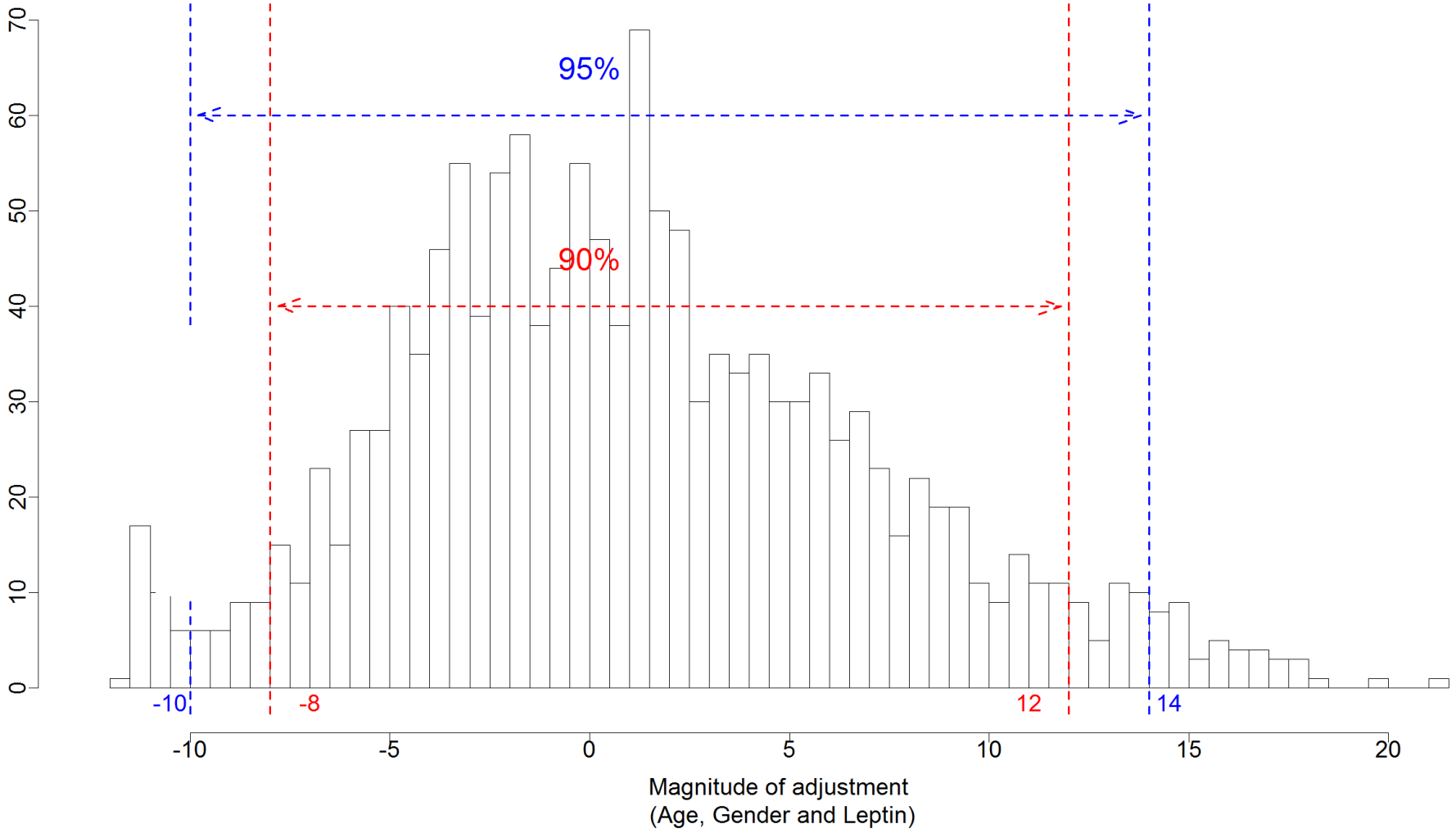
* Curtis et. al, Rheumatology (Oxford). 2019 May 1;58(5):874-883. doi: 10.1093

Relationship between MBDA and serum leptin



Baker, Curtis et. Al., Clin Rheumatol. 2021 Jun;40(6):2419-2426.

MBDA 2.0: Obesity-related Adjustment Modest for Most RA Pts



Bottom line: 12-22% of RA patients will change MBDA Score Category (e.g. High to Moderate); almost none change 2 categories

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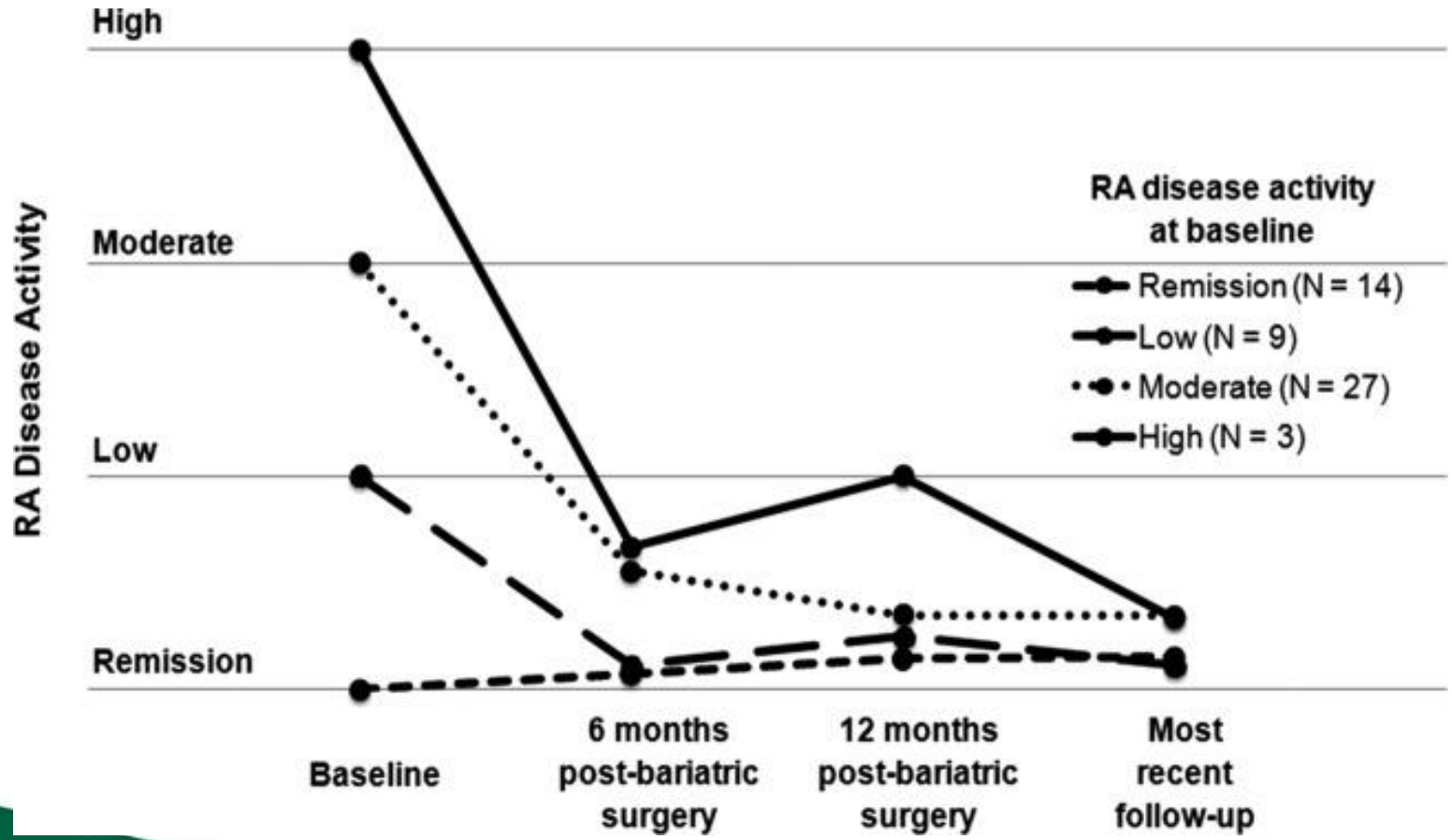
Interventions to Reduce Obesity

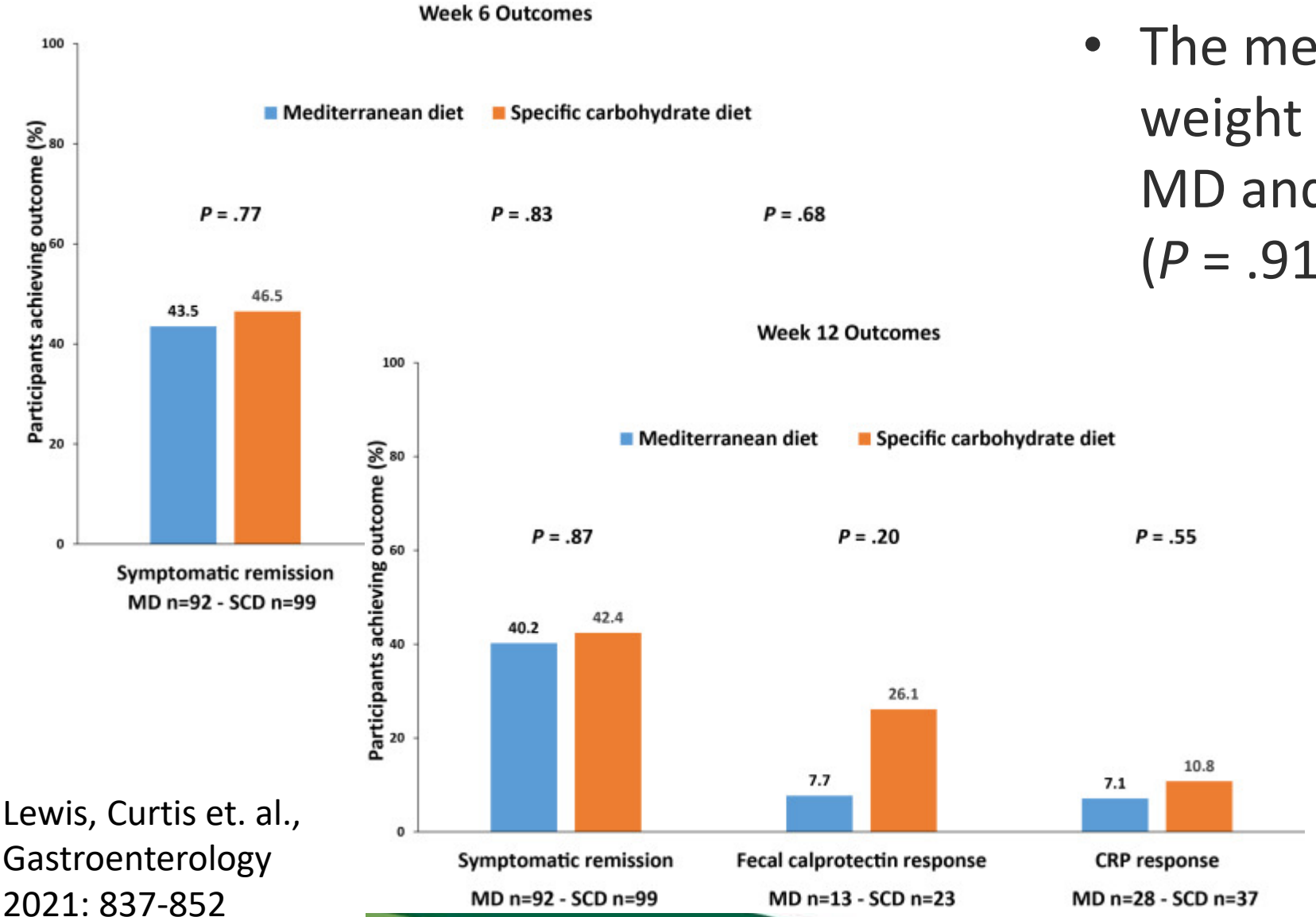
Effect of Weight Loss on Disease Activity in Patients with Inflammatory Arthritis

- Extensive weight loss has been shown to improve disease activity and lower inflammatory burden of RA and psoriatic arthritis [a,b]



a. Sparks JA, et al. Arthritis Care Res (Hoboken). 2015;67:1619-26; b. Egeberg A, et al. JAMA Surg. 2017;152:344-349

Dietary Intervention: Specific Carbohydrate Diet vs. Mediterranean Diet Crohn's Disease (and subgroup with inflammatory arthritis)



- The mean percentage change in weight was −2.6% ± 3.3% with MD and −2.6% ± 3.7% with SCD (*P* = .91).

Lewis, Curtis et. al., Gastroenterology 2021: 837-852

Examples of types of dietary recommendations for autoimmune diseases

1. Diet Patterns	2. Dietary Supplements
Elimination (of ingredients or nutrients) Low-FODMAP, Gluten-Free, Specific Carbohydrate	**Vitamins** A, D, E, K, B-Complex
Macronutrient proportion (specific % of carbohydrate, protein, and fat) Ketogenic, Carnivore, Atkins, McDougall	**Minerals** Selenium, Zinc, Sodium, Potassium
Restriction (of calories or eating timeframes) Low-calorie, very low-calorie, intermittent fasting	**Botanicals** Curcumin, Caffeine, Resveratrol, Tannins, Quercetin
Other Mediterranean Diet, DASH Diet	**Other** Fish oil, olive oil, essential fatty acids, probiotics

Cautionary Note: Diet and Autoimmune Disease

- Though there is much interest in harnessing diet as a method of disease management, establishing causality between diet recommendations and autoimmune disease outcomes is difficult.
  - Study limitations: poor diet adherence, small sample sizes, few long-term studies[a]
  - Findings on the effects of diet on autoimmune disease outcomes are largely heterogenous, both within and between diseases[b]
- Thus, new diet recommendations should be approached with caution.
- Still, there are promising findings – some diet patterns and dietary supplements have been systematically associated with improvement in specific autoimmune disease outcomes[c]

a. Mazzuca CB, et al. Nutrients. 2021 Nov 5;13(11):3956. doi: 10.3390/nu13113956 b. Gwinnut JM, et al. RMD Open. 2022;8(2):e002167. doi:10.1136/rmdopen-2021-002167; c. Daien C, et al. Joint Bone Spine. 2022;89(2):105319. doi:10.1016/j.jbspin.2021.105319

Findings in Select Autoimmune Diseases

Disease	Findings
Rheumatoid Arthritis*	**Mediterranean Diet** reduces disease activity[a], pain and swelling of joints in RA patients[c, d, e] and may improve physical function[e]. **Vitamin D Supplementation** potentially reduces disease activity[a] but not pain[c]. **Omega 3 Supplementation** improves disease symptoms[a], joint swelling and pain and duration of morning stiffness; fish oil reduces pain[b, c]
Psoriatic Arthritis*	**Mediterranean Diet** reduces disease activity[f, g]. **Vitamin D adequacy** improves symptoms[h]
Psoriasis*	**Low-calorie diets** improve all aspects of the disease[h, j]. **Mediterranean Diet** reduces disease severity and occurrence[h, i]. **Vitamin D adequacy** improves symptoms[b, h]

*** = weight loss outside of a specific diet has been associated with symptom improvement** [k]

a. Present Knowledge in Nutrition. Elsevier; 2020. doi:10.1016/c2018-0-02533-5; b. Krause's Food & The Nutrition Care Process. Elsevier, 2017. Print; c. **Gwinnut JM, et al. RMD Open. 2022;8(2):e002167. doi:10.1136/rmdopen-2021-002167;** d. Schönenberger KA, et al. Nutrients. 2021;13(12):4221. doi:10.3390/nu13124221; e. Forsyth C, et al. Rheumatol Int. 2017;38(5):737-747. doi:10.1007/s00296-017-3912-1; f. Caso, et al. Rheumatol Int. 2019;40(6):951-958. doi:10.1007/s00296-019-04458-7; g. Popa SL, et al. Nutrients. 2022;14(6):1278. doi:10.3390/nu14061278; h. Katsimbri, et al. Antioxidants. 2021;10(2):157. doi:10.3390/antiox10020157; i. Korovesi A, et al. Int J Dermatol. 2019;58(9). doi:10.1111/ijd.14523; j. Ko SH, et al. Cochrane Database of Systematic Reviews. 2019;2019(7). doi:10.1002/14651858.cd011972.pub2; k. di Minno MND, et al. Arthritis Care Res. 2012;65(1):141-147. doi:10.1002/acr.21711

Findings in Select Autoimmune Diseases

Disease	Findings
Lupus	(*limited evidence*) **Mediterranean Diet** may improve disease activity[a]. **Vitamin D supplementation** may decrease inflammatory and hemostatic markers[b, c]. **Omega-3 supplementation** may reduce inflammation, disease activity, endothelial dysfunction and oxidative stress. **Turmeric supplementation** may reduce proteinuria, hematuria, and systolic blood pressure[c].
Inflammatory Bowel Disease	**Low-FODMAP Diet** reduces gastrointestinal symptoms and improves quality of life[f, g]. **Elimination diets** in general have been associated with reduced disease symptoms (abdominal pain, stool frequency) and sustained remission[e].
Multiple Sclerosis	(*limited evidence*) **Ketogenic diet** may improve health-related quality of life in patients[h]. **Vitamin D supplementation** suppresses adaptive immune response and antigen-presenting process[i]. **Omega-3 supplementation** has been associated with lowered frequency of MS relapse[j], reduced inflammatory markers, and improved quality of life[d]

a. Pocovi-Gerardino G, et al. Rheumatology. 2020;60(1):160-169. doi:10.1093/rheumatology/keaa210; b. Sousa JR, et al. Revista Brasileira de Reumatologia (English Edition). 2017;57(5):466-471. doi:10.1016/j.rbre.2017.08.001; c. de Medeiros MCS, et al. Critical Reviews in Food Science and Nutrition. 2018;59(16):2666-2673. doi:10.1080/10408398.2018.1463966; d. Alammar WA, et al. Nutritional Neuroscience. 2019;24(7):569-579. doi:10.1080/1028415x.2019.1659560; e. Charlebois A, et al. Critical Reviews in Food Science and Nutrition. 2015;56(8):1370-1378. doi:10.1080/10408398.2012.760515; f. van Lanen AS, et al. Eur J Nutr. February 2021. doi:10.1007/s00394-020-02473-0; g. Pedersen N, et al. WJG. 2017;23(18):3356. doi:10.3748/wjg.v23.i18.3356; h. Katz Dand I. Curr Nutr Rep. 2018;7(3):150-160. doi:10.1007/s13668-018-0236-z; i. Present Knowledge in Nutrition. Elsevier; 2020. doi:10.1016/c2018-0-02533-5; j. Farinotti, et al. Cochrane Database of Systematic Reviews. December 2012. doi:10.1002/14651858.cd004192.pub3

Miscellaneous
Original research

Effects of diet on the outcomes of rheumat diseases (RMDs): systematic review and me 2021 EULAR recommendations for lifestyle with RMDs

James M Gwinnutt [1], Maud Wieczorek [2, 3], Javier Rodríguez-Carric Ferrari [3, 7, 8], Annelies Boonen [9, 10], Giulio Cavalli [11], Savia de Souz Dorner [15, 16, 17], Rikke Helene Moe [18], Polina Putrik [9, 10], Lucía Silva-F Walker-Bone [22], Joep Welling [23], Mirjana Zlatković-Švenda [24, 25], Fra Verstappen [1, 22, 27]

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2021 EULAR recommendations regarding lifestyle behaviours and work participation to prevent progression of rheumatic and musculoskeletal diseases

James M Gwinnutt ,[1] Maud Wieczorek,[2] Andra Balanescu,[3] Heike A Bischoff-Ferrari,[4,5,6] Annelies Boonen ,[7,8] Giulio Cavalli ,[9] Savia de Souza ,[10] Annette de Thurah ,[11,12] Thomas E Dorner,[13,14,15] Rikke Helene Moe ,[16] Polina Putrik ,[7,8] Javier Rodríguez-Carrio,[17,18] Lucía Silva-Fernández,[19] Tanja Stamm ,[20,21] Karen Walker-Bone,[22] Joep Welling,[23] Mirjana I Zlatković-Švenda,[24,25] Francis Guillemin,[2,26] Suzanne M M Verstappen[1,22,27]

Handling editor Josef S Smolen

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ABSTRACT

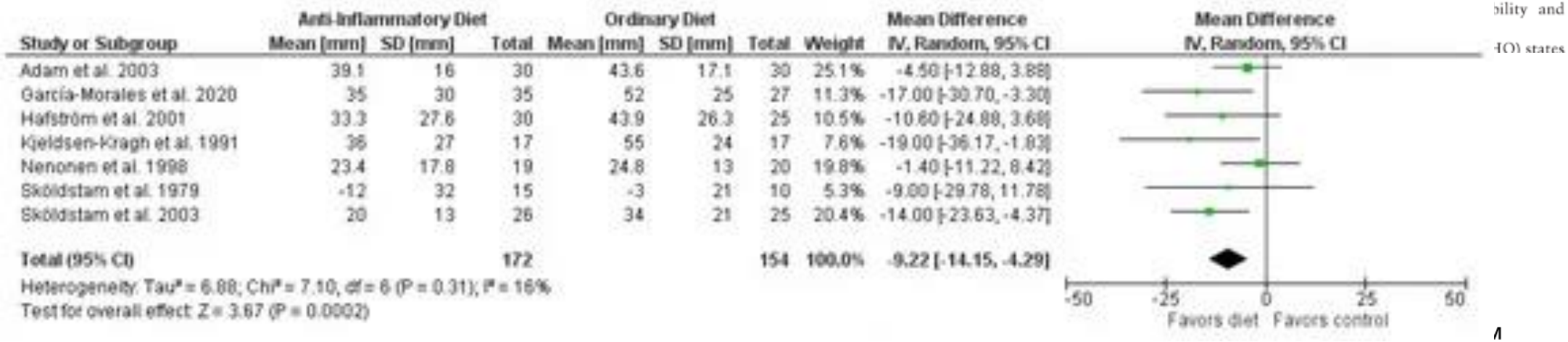
Objectives A European League Against Rheumatism taskforce was convened to review the literature and develop recommendations on lifestyle behaviours for rheumatic and musculoskeletal diseases (RMDs).

Methods Six lifestyle exposures (exercise, diet, weight, alcohol, smoking, work participation) and seven RMDs (osteoarthritis, rheumatoid arthritis, axial spondyloarthritis, psoriatic arthritis, systemic lupus erythematosus, systemic sclerosis, gout) were considered. The taskforce included health professionals in rheumatology, geriatricians, epidemiologists, public

of disability in Europe,[1 2] which in turn negatively affects the quality of life of those people with RMDs. While some RMDs have efficacious pharmacological treatments that reduce disease activity and hence improve disability (eg, rheumatoid arthritis (RA),[3] gout[4]) others do not (eg, osteoarthritis (OA)[5]). In addition to pharmacological interventions, there are increasing requests from patients, health professionals and policy-makers for more information on how changes in lifestyle alongside more effective disease management may prevent progres-

bility and

HO) states



Schonenberger, https://doi.org/10.3390/nu13124221

Seminars in Arthritis and Rheumatism
Volume 47, Issue 5, April 2018, Pages 732-740

A randomized trial of a motivational interviewing intervention to increase lifestyle physical activity and improve self-reported function in adults with arthritis

- Individual counseling based on **motivational interviewing, individualized goal setting, and tailored strategies** for increasing physical activity and monitoring progress.

- The intervention began with an in-person meeting to (1) establish a relationship; (2) complete a structured interview; and (3) establish an individual action plan.
- The structured **interview (45-60m) identified individual-specific facilitators and barriers** to increased physical activity participation including disease status, functional status, lifestyle, and motivation. This was used to **identify key targets for a tailored physical activity intervention.**
- **The participant then set personal short-term goals and established an action plan to achieve these self-identified goals**.
- Subsequent motivational interviewing sessions with the physical activity advocate occurred in-person or by **telephone** at 3, 6, and 12 months and at least two sessions (every 6 months) in the second year, each 10-15 minutes.

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Knowledge that will change your world

(Reimbursement for) Monitoring and Intervening for Obesity and Its Complications

Remote Patient Monitoring

CMS Program Overview and how it works

2019

CMS
CENTERS for MEDICARE & MEDICAID SERVICES

Introduced by Medicare

- $60B program
- Goal is to decrease episodic care / reduce cost
- Health providers continuously monitor patients in need

2020 - 2021

Medicare Expansion

- New reimbursement added
- Goal is to drive further adoption of RPM

COVID 19 Impact

- FDA and Medicare reduce barriers to ensure access
- RPM and telemedicine use grows substantially

How?

1. Doctor recommends RPM to track patient condition
2. Patient receives device / app and stays connected
3. Care Team review data for at least 20 min. per month
4. Care Team ensures patient is compliant

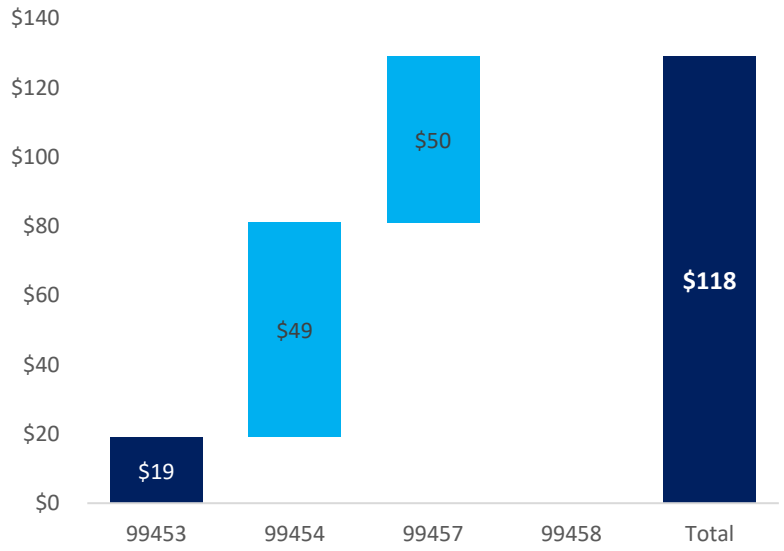
CPT Codes relevant for MSK patients, 2022

CPT Codes (RPM, RTM)	Example Description	Reimbursement (estimated)
99453 **98975**	Remote monitoring of physiologic parameter(s) using a biosensor, and/or Software as a Medical Device (SaMD) (e.g., weight, blood pressure, pulse oximetry, respiratory flow rate), plus initial set-up and patient education on use of equipment.	**$19**
99454 **98977**	Device(s) supply with daily recording(s) or programmed alerts transmission, each 30 days.	**$49**
99457 **98980**	Remote physiologic monitoring treatment management services, clinical staff/physician/other qualified healthcare professional time in a calendar month, requiring interactive communication with the patient/caregiver during the month; first 20 minutes.	**$50**
99458 **98981**	Each additional 20 minutes	**$39**

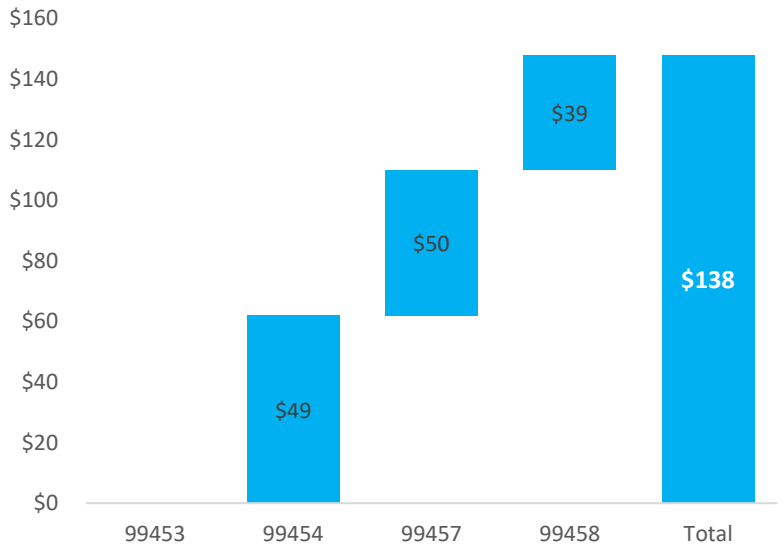
Example Reimbursement (Net Revenue)

First Month	Monthly			
99453	99454	99457	99458	99458
Enrollment	Device/Data Transfer (16 transmissions)	Remote Monitoring (20 minutes)	Remote Monitoring (40 minutes)	Remote Monitoring (60 minutes)
$19	$49	$50	$39	$39

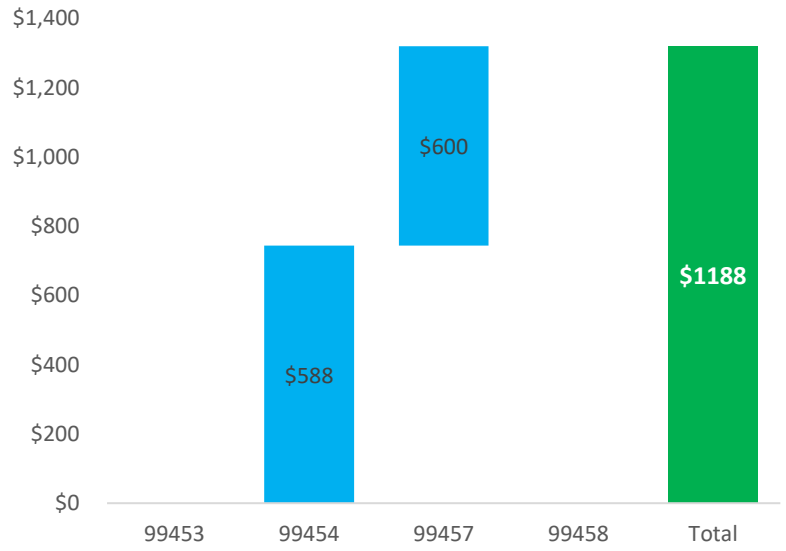
First Month



Monthly (example)



12 Months of Care (ongoing)



Practice Economics of Remote Patient Monitoring and Remote Therapeutic Monitoring

Scenario	Annual	Total Revenue
Net with in-office monitoring (MA or LPN)	5,000 pts * $600/pt/year	$3.0M – staffing costs
Net with outsourced monitoring	5,000 pts * $240/pt/year	$1.2M - no incremental work

SaMD = software as a medical device;
MA = medical assistant; LPN = licensed practical nurse

TECHNOLOGY

Patient Inputs

- **Software as a Medical Device (SaMD)**
- Pathway-based data capture
- Medication Adherence
- PROs (e.g. flare)
- Education
- Pathway-Driven Outcome Measures

Background Inputs

- Medicatio
- Biomet
- Bac
- Cont nfo

RPM as needed
(Biosensor devices
[e.g. Wifi scale, continuous glucose monitoring],
other wearables)

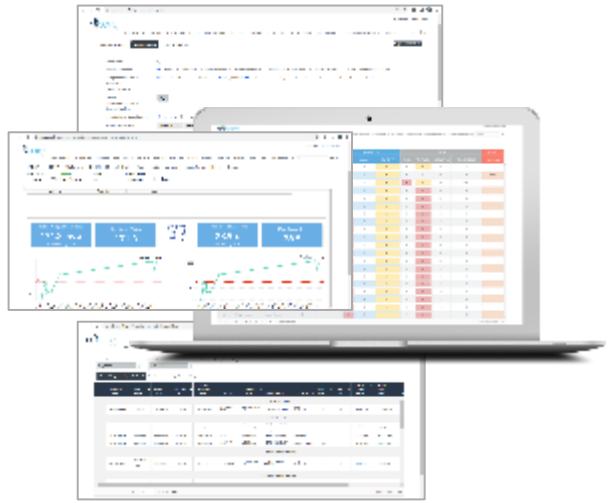
Data Warehouse

Provider Interface

- gest needed data
- Patient and Provider Report Card
- ovider Insights

In office app or EHR system

Monitor Interface



- Ingest needed data
- Clinical Triage Rules
- Clinical Time Documentation
- 2-Way Text Communication
- Billing Logic and Reporting

Remote Patient Monitoring: The Goals

International Journal of Medical Informatics 124 (2019) 78–85

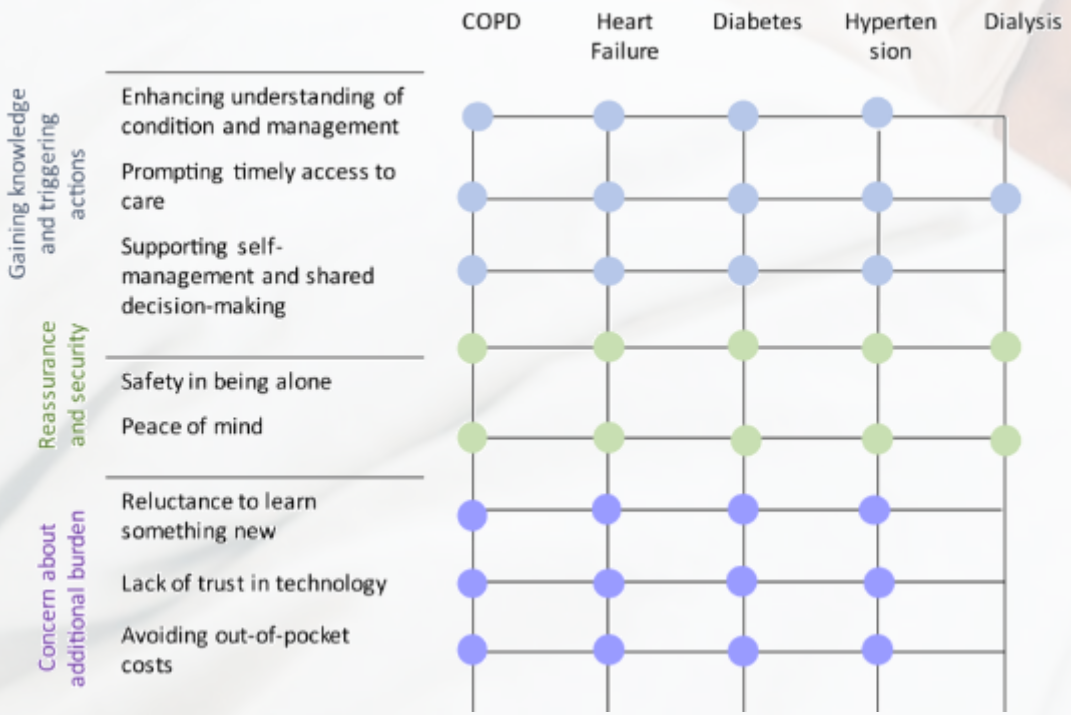
Contents lists available at ScienceDirect

International Journal of Medical Informatics

journal homepage: www.elsevier.com/locate/ijmedinf

Patient expectations and experiences of remote monitoring for chronic diseases: Systematic review and thematic synthesis of qualitative studies

Rachael C. Walker[b,*], Allison Tong[b,c], Kirsten Howard[c], Suetonia C. Palmer[d,e]

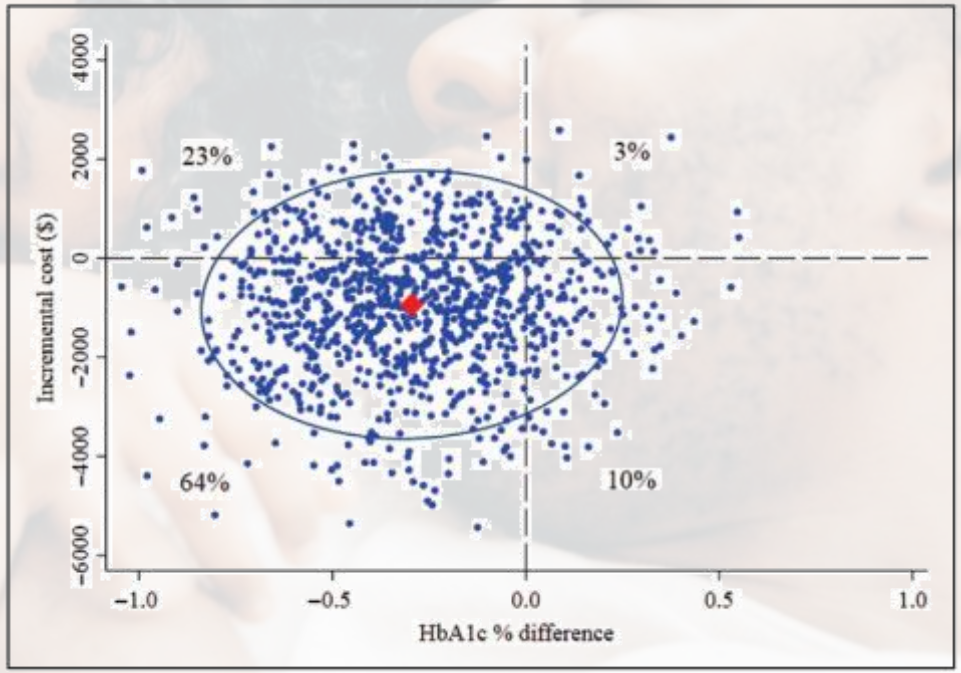


Improved Peace of Mind
Improved Self-Management

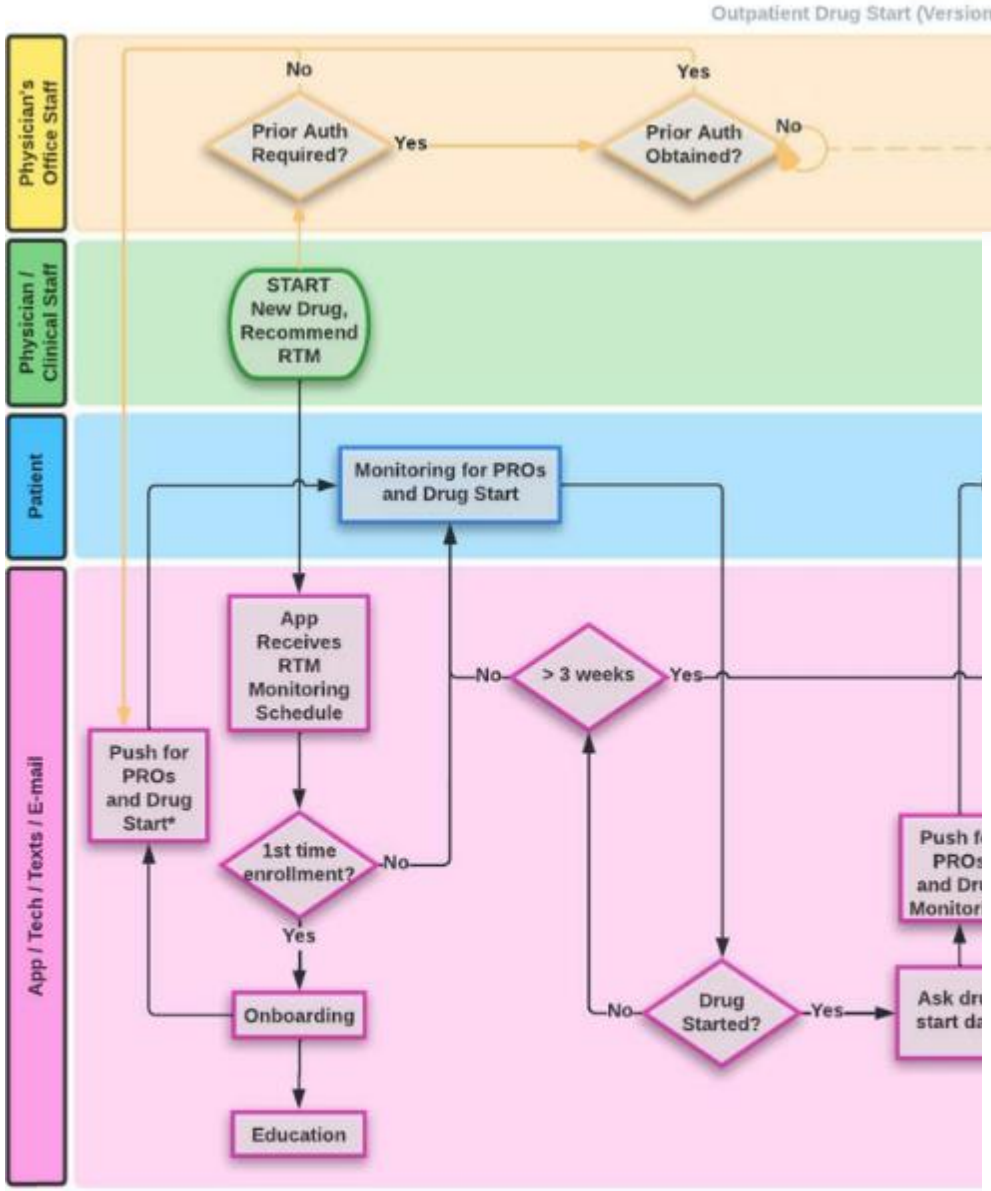
RESEARCH/Original Article

Effects of telemonitoring on glycaemic control and healthcare costs in type 2 diabetes: A randomised controlled trial

Robin Warren[1], Karen Carlisle[1], Gabor Mihala[2] and Paul A Scuffham[2]



Significant Reduction in HbA1c
Significant Cost Savings -> Build into Value Based Care?



*** Examples of when PROs are required:

- Monitoring for drug start
- Monitoring episode refreshed
- New monitoring episode in the year

Connected Care Scenario Name: "IA Drug Start" (includes Outpatient Drug Initiation, Assessment for Adverse Events and Treatment Response)

Disease: Inflammatory Arthritis (e.g., RA, PsA, SpA)

Version 2022.08.09

Letter for Question Series	*PRO Instrument	Frequency	Schedule	**Meaningful Change (Potential Trigger for Intervention)
B	Medication Initiation	Q 4 days	Repeats max of 5 times, through day 20, or until drug start=yes	Drug not initiated within 20 days (see algorithm below)
M	PROMIS Physical Function	Once	Baseline	No monitoring
O	PROMIS Fatigue	Q 1 week	Every week	No monitoring
L	PROMIS Pain Interference	Q 1 week	Every week	No monitoring
I	DLQI (Dermatology Life Quality Index) (Psoriasis Only)	Q 2 weeks	Odd weeks	No monitoring
J	BASDAI (Bath Ankylosing Spondylitis-Disease Activity Index) (SpA only)	Q 2 weeks	Odd weeks	No monitoring
K	RADAI5 (RA only)	Q 2 weeks	Odd weeks	No monitoring
C – D	Medication adherence	Q 2 weeks	Odd weeks	Discontinuation or interruption on 2 consecutive responses (i.e. will encompass at least 2-3 weeks)
H00 (for 0 – 50 score); H007 (for No to Yes)	OMERACT Flare score (0-50 scale)	Q 2 weeks	Even weeks	Change from No to Yes response in the single flare item (may be too sensitive) No monitoring for 0-50 flare score
E	Adverse event or intolerability that makes patient unable to continue treatment	Q 2 weeks	Odd weeks	"Yes" response (drug specific)
N	PROMIS Sleep Disturbance	Q 4 weeks	Week 2	No monitoring
P	PROMIS Discretionary Social Activities	Q 4 weeks	Week 1	No monitoring
F, G	Hospitalization, ED visits	Q 4 weeks	Week 3	"Yes" response
	Patient self-exam for RA (RA only, *deferred at present until pilot-tested is complete*)	Q 4 weeks	Week 4	None

Week	# of Instruments & Items	Estimated Total Time Incurred by Patient
Baseline	1 CAT	1 minute
1	7 items & 3 CATs	5 minutes
2	6 items and 3 CATs	5 minutes
3	6 items, 2 CATs, and Hospitalization/ED screening	5 minutes (if not hospitalized or in ED)
4	6 items, 2 CATs, and in-app patient self-exam module	8 minutes (?) Self-exam module not field tested yet)

CAT = Computer CAT = Computer Adaptive Testing Instrument

Note that all instruments start on day 1 of remote monitoring and this 4 week cycle repeats every 4 weeks

Summary & Conclusions

- **Obesity associated with reduced clinical response to TNFi, perhaps less true for non-TNFi biologics or JAKi**
- **In part, related to difficulties in clinical assessment & obesity-related comorbidities (e.g. generalized pain, fibro)**
- **Obesity confers lower risk for x-ray damage, although validated risk prediction model for x-ray damage has proved elusive in our field**
- **Other diagnostic modalities (e.g. MRI; MSK ultrasound; re-calibrated MBDA, adjusted for leptin) may be useful to improve clinical assessment and predict future x-ray damage**
- **Diet and lifestyle interventions to improve obesity exist, no One-Size-Fits-All panacea**
- **Monitoring for obesity and its complications now reimbursable!**

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