BRIDGE TO UNDERSTANDING

YOUR CONNECTION TO ADVANCEMENTS
IN **PSORIASIS** AND **PsA** TREATMENTS

Faculty and Disclosures

April W. Armstrong, MD, MPH

Professor of Dermatology
Associate Dean for Clinical Research
Director, Psoriasis Program
Keck School of Medicine at
University of Southern California
Los Angeles, California

Allan Gibofsky, MD, JD, MACR, FACP, FCLM

Professor of Medicine, Healthcare Policy and Research
Weill Medical College of Cornell Medicine
Attending Rheumatologist
Hospital for Special Surgery
New York, New York

Jennifer Caudle, DO (Moderator)

Family Physician & Associate Professor
Rowan University School of Osteopathic Medicine
Glassboro, New Jersey

The following individuals have disclosed that they and/or their spouse/partner has had a financial relationship in the past 24 months:

April W. Armstrong, MD, MPH
Consultant: AbbVie, Almirall, Arcutis, Boehringer Ingelheim, Bristol Myers Squibb, Dermavant, Dermira, EPI Health, Janssen, Leo, Lilly, Nimbus, Novartis, Ortho Dermatologics, Pfizer, Regeneron, Sun Pharmaceuticals, UCB

Allan Gibofsky, MD, JD, MACR, FACP, FCLM
Consultant: AbbVie, Amgen, Novartis, Pfizer
Advisor: AbbVie, Amgen, Pfizer
Speaker: AbbVie, Amgen, Lilly, Pfizer
Ownership interest: AbbVie, Amgen, Pfizer, Regeneron, Johnson & Johnson

The following individuals have indicated that neither they nor their spouses/partners have had, in the past 24 months, financial relationship(s) with commercial interests relative to the content of this CME activity:

Moderator:
Jennifer Caudle, DO

Planners (Forefront Collaborative):
Marianna Shershneva, MD, PhD; Megan Ragan

Treatment of Psoriatic Arthritis

EULAR 2019[1]

NSAIDs
<4 weeks if peripheral, only if mild disease, enthesitis, axial

↓

MTX if skin too
sulfasalazine or leflunomide

↓

Any biologic*
anti-TNF, anti–IL-17, anti–IL-12/23

↓

JAKi

↓

Apremilast

ACR/NPF 2018[2]

Anti-TNF†

↓

Alternate anti-TNF‡

↓

Anti–IL-17

↓

Anti–IL-12/23

↓

Tofacitinib/abatacept

Treatment-naïve patients

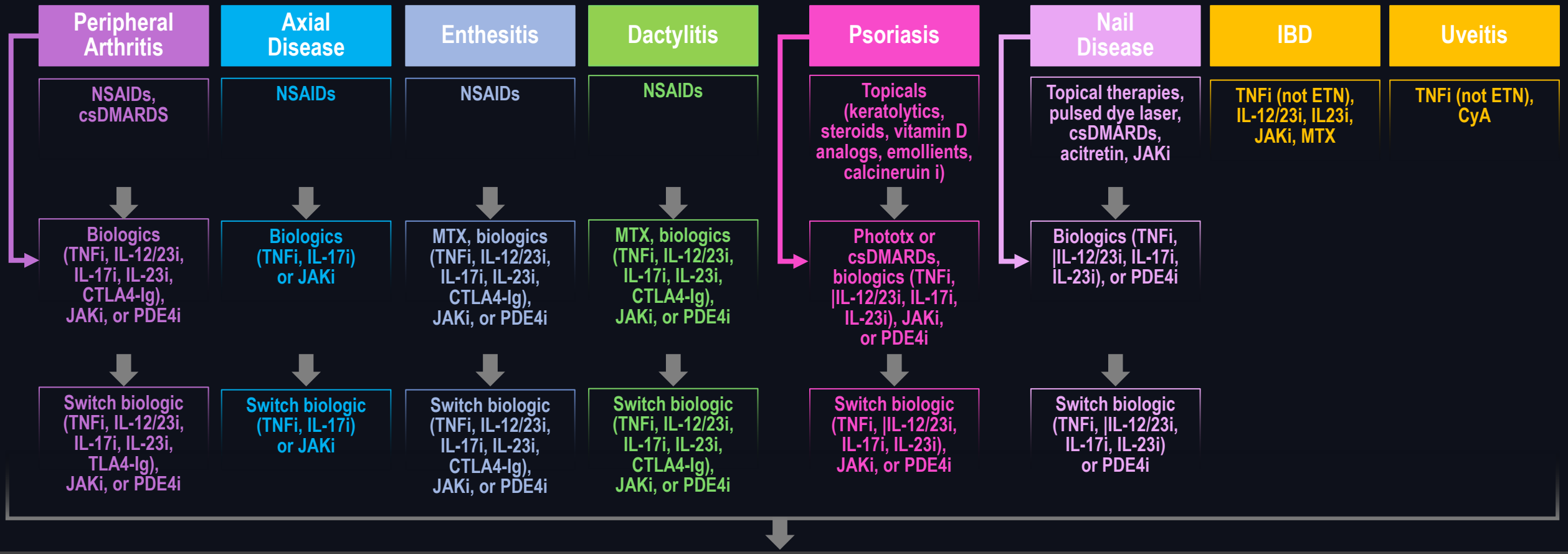
*When relevant skin involvement use in IL-17i or IL-12/23i before TNFi. †If severe PsA, consider IL-17i >IL-12/23i. ‡Oral small molecule may be used instead without severe PsA or severe psoriasis. Differences are discussed in Ogdie A, et al. (2020).[3]

PsA=psoriasis. EULAR=European League Against Rheumatism (European Alliance of Associations for Rheumatology). ACR=American College of Rheumatology. NPF=National Psoriasis Foundation. NSAIDs=nonsteroidal anti-inflammatory drugs. MTX=methotrexate. TNF=tumor necrosis factor. IL=interleukin. JAKi=Janus kinase inhibitor. TNFi=tumor necrosis factor inhibitor.

1. Gossec L, et al. *Ann Rheum Dis*. 2020;79(6):700-712. 2. Singh JA, et al. *Arthritis Rheumatol*. 2019;71(1):5-32. 3. Ogdie A, et al. *Rheumatology (Oxford)*. 2020;59(Suppl 1):i37-i46.

GRAPPA Treatment Recommendations 2021[1,2]

Consider which domains are involved, patient preference, previous/concomitant therapies; choice of therapy should address as many domains as possible.



Comorbidities and associated conditions may impact choice or therapy and/or guide monitoring

Treat, periodically re-evaluate treatment goals, and modify therapy as required

csDMARDs=conventional synthetic disease-modifying antirheumatic drugs. CTLA4-Ig=Immunosuppressive cytotoxic T lymphocyte associated antigen-4 immunoglobulin fusion proteins. CyA=cyclosporine A. ETN=etanercept. GRAPPA=Group for Research and Assessment of Psoriasis and Psoriatic Arthritis. IBD=inflammatory bowel disease. IL-12/23i=interleukin-12/23 inhibitor. IL-17i=interleukin-17 inhibitor. IL-23i=interleukin-23 inhibitor. PDE4i=phosphodiesterase-4 inhibitor.

1. Coates LC, et al. *Ann Rheum Dis*. 2021;80(Suppl 1):139-140. 2. New GRAPPA 2021 PsO and PsA Treatment Recommendations. https://rheumnow.com/news/new-grappa-2021-pso-and-psa-treatment-recommendations. Accessed April 4, 2022.

Overall Treatment Approach for Plaque Psoriasis

IS PsA PRESENT?

NO

WHAT SEVERITY OF PSORIASIS IS PRESENT?

Mild psoriasis
≤3-5% of body surface area (BSA)

Moderate to severe psoriasis
>5% of BSA or special areas* recalcitrant to localized therapy

RECOMMENDED TREATMENTS

- Topical treatments **and/or**
- Targeted phototherapy

If no improvement, consider

RECOMMENDED TREATMENTS

Systemic treatments
- Biologics **and/or**
- Oral medications

and/or
- UV-B/PUVA phototherapy

YES

RECOMMENDED TREATMENTS

Treatments effective for both
- Psoriasis (regardless of severity)
- Psoriatic arthritis

Systemic treatments
- Biologics **or**
- Oral medications

and

Adjunctive therapies as needed
- Topical treatments **and/or**
- Phototherapy

*Special areas include the scalp, palms, soles, genitalia, and nails.
UV-B=ultraviolet B. PUVA=psoralen and ultraviolet A.
Armstrong AW, et al. *JAMA*. 2020;323(19):1945-1960.

FDA-Approved Biologic and New Small Molecule Therapies for Psoriasis and Psoriatic Arthritis

	Psoriasis	PsA
Biologic Therapies		
TNFi	Adalimumab	Adalimumab
	Certolizumab	Certolizumab
	Etanercept	Etanercept
		Golimumab
	Infliximab	Infliximab
IL12/23i	Ustekinumab	Ustekinumab
IL-17i	Brodalumab	
	Ixekizumab	Ixekizumab
	Secukinumab	Secukinumab
IL-23i	Guselkumab	Guselkumab
	Risankizumab	Risankizumab
	Tildrakizumab	
CTLA4		Abatacept
New Small Molecule Therapies		
PDE4i	Apremilast	Apremilast
JAK2/3i		Tofacitinib
		Upadacitinib

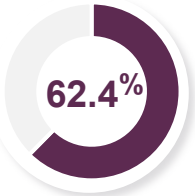
NOTE: Drug Abbreviations Used Moving Forward in This Presentation
Abatacept (ABA)
Adalimumab (ADA)
Apremilast (APR)
Brodalumab (BRD)
Certolizumab (CERT)
Etanercept (ETN)
Golimumab (GOL)
Guselkumab (GUS)
Infliximab (INF)
Ixekizumab (IXE)
Risankizumab (RZB)
Secukinumab (SEC)
Tildrakizumab (TIL)
Tofacitinib (TOFA)
Upadacitinib (UPA)
Ustekinumab (UST)

Bimekizumab

Mechanism of action: Binds to IL-17A, IL-17F, and the IL-17A/F heterodimer and inhibits the activation of the IL-17RA/RC receptor complex the subsequent inflammatory cascade

ANALYSIS OF POOLED DATA

FIVE PHASE 3/3B CLINICAL TRIALS[1]



of 1362 BKZ-treated patients achieved PASI 100 at Week 16 (NRT).

Of those who entered the OLEs,

- **85.1%** (Q4W/Q4W/Q4W; N=316) and
- **83.8%** (Q4W/Q8W/Q8W; N=267) maintained PASI 100 at year two (OLE Week 48, mNRI)

There were no unexpected safety findings.

THREE PHASE 3/3B TRIALS[2]

Patients who achieved PASI 90 at Week 4 and PASI 100 responders at Week 16 achieved a **P-SIM score of 0** for the itching, skin pain, and scaling items for more days during the initial 16-week period compared to the nonresponders.

Additionally, the responders also **achieved DLQI 0/1 for more days** during a 48-week period than nonresponders.

Early PASI 90 and PASI 100 responses with BKZ translated into **greater cumulative benefits** in PROs; on itching, skin pain, and scaling symptoms over 16 weeks and DLQI 0/1 over 48 weeks.

THREE PHASE 3 TRIALS[3]

BKZ **consistently improved** clinical and HRQoL outcomes irrespective of whether patients with plaque psoriasis had previously received systemic nonbiologic or biologic treatment.

Bimekizumab (BKZ) is investigational drug for psoriasis and PsA. NRI=nonresponder imputation. mNRI=modified non-responder imputation. OLE=open label extension. Q4W=every 4 weeks. Q8W=every 8 weeks. PASI=Psoriasis Area and Severity Index. P-SIM=Psoriasis Symptoms and Impacts Measure. DLQI=Dermatology Life Quality Index. HRQoL=health-related quality of life.

1. Gordon KB. Late-breaking presentation 35502 at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. AAD 2022. 2. Poster 31085 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 3. Rosmarin D, et al. Poster 34320 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022.

A

Bimekizumab (Cont.)

BKZ VS SEC IN PATIENTS WITH PSORIASIS (BE RADIANT)

More patients had early response with BKZ vs SEC; differences in responses, measured using PASI scores, were seen as early as Week 1 (PASI 75: BKZ 7.2% vs SEC 1.4%), and in complete skin clearance rates as early as Week 4 (PASI 100: BKZ 13.9% vs SEC 6.2%) (phase 2b and OLE).[1]

Higher levels of complete skin clearance and BSA <1% were observed with BKZ vs SEC, resulting in greater benefits in symptoms and HRQoL (phase 3b).[2]

Patients were treated with BKZ or SEC to Week 48 followed by BKZ to Week 96. **Clinical responses observed with BKZ were maintained** through Week 96 (eg, PASI <2: start of OLE 94.3%, Week 96 94.6% [mNRI]) **and improved for SEC-switched-to-BKZ** patients (eg, PASI <2: start of OLE 83.9%, Week 96 93.4% [mNRI]); during the OLE, serious AE was low.

Common AEs were nasopharyngitis, oral candidiasis, and urinary tract infection (phase 3b and OLE).[3]

BKZ IN PATIENTS WITH PsA (BE ACTIVE, PHASE 2b AND OLE)[4]

During the OLE, patients with PsA received 160 mg BKZ Q4W.

BKZ provided a **robust maintenance of response** across joint and skin manifestations of PsA, over 3 years in patients who initially responded at Week 12.

Responders at Week 12	NRI	OC
ACR70 at Week 152	74.1%	87.0% (20/23)
BSA 0% at Week 152	68.8%	75.9% (22/29)
MDA at Week 152	75.0%	94.7% (36/38)
DAPSA remission at Week 152	75.0%	94.7% (18/19)

Bimekizumab is investigational drug for psoriasis and PsA. DAPSA=Disease Activity Index for Arthritis. MDA=minimal disease activity. BSA=body surface area. AEs=adverse events. OC=observed case.

1. Feldman SR, et al. Poster 34310 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 2. Augustin M, et al. Poster 31069 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 3. Strober B, et al. Poster 34321 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 4. Merola JF, et al. Poster 32937 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022.

Deucravacitinib

Mechanism of action: selectively inhibits TYK2, an enzyme of the JAK protein family

POETYK PSO-1 AND PSO-2 (PHASE 3): DEU IN PATIENTS WITH MODERATE TO SEVERE PSORIASIS

Exposure-response analyses identified that DEU 6 mg QD is the **optimal dose** for moderate to severe psoriasis.[1]

DEU **was efficacious** in patients who had inadequate responses to apremilast at Week 24 and switched to DEU, with improved responses at Week 52, measured by PASI 75/90, sPGA 0/1, and PROs.[2]

Patients treated with deucravacitinib **achieved clinically meaningful PASI outcomes** that were superior to placebo and apremilast at Week 16 and Week 24.[3,4]

DEU **improved DLQI** as early as Week1 vs placebo and Week 4 vs apremilast.[5]

DEU IN PATIENTS WITH PsA

DEU demonstrated **similar efficacy** for the treatment of PsA in patients with and without background csDMARD use; measured by ACR20, change from baseline to ACR components, PASI, and PASDAS (phase 2 trial).[6]

Patients with PsA receiving DEU reported **clinically meaningful and significant improvements** at Week 16, measured by SF-36, including fatigue, social functioning, physical functioning, and pain (phase 2 trial).[7]

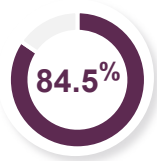
Deucravacitinib (DEU) is investigational drug for psoriasis and PsA. TYK2=Tyrosine kinase 2. PSO=psoriasis. QD=once daily. PROs=patient-reported outcomes. sPGA=Static Physician's Global Assessment. PASDAS=Psoriatic Arthritis Disease Activity Score. SF-36=Short Form Health Survey 36-item questionnaire.

1. Shen J, et al. Poster 34507 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 2. Armstrong AW, et al. Poster 34658 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 3. Lebwohl M, et al. Poster 34660 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 4. Sobell JM, et al. Poster 34668 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 5. Augustin M, et al. Poster 35205 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 6. Deodhar A, et al. Poster 34513 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 7. Strand V, et al. Poster 34517 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022.

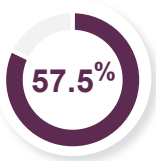
IL-17 Inhibitors: Ixekizumab, Brodalumab, Secukinumab

IXE IN PATIENTS WITH NAIL PSORIASIS (UNCOVER-3)[1]

IXE **achieved and sustained nail psoriasis resolution** regardless of disease severity at baseline.



Adjusted mean improvement in NAPSI scores at Week 264



Complete resolution of nail psoriasis in patients

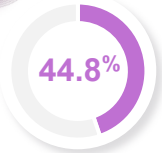
IXE SAFETY IN ADULTS WITH PSORIASIS[2]

Long-term (5 years) safety of IXE was assessed from 15 randomized clinical trials.

No new or unexpected safety events occurred.

The IRs per 100 patient year were: **32.5 for TEAE and 5.4 for SAEs.**

BRD IN PSORIASIS (PHASE 4, OPEN-LABEL)[3]



of patients with inadequate response to at least one previous biologic achieved PASI 100 at Week 26.

SEC IN PATIENTS WITH PSORIASIS, PsA, AND ANKYLOSING SPONDYLITIS (SERENA, OBSERVATIONAL STUDY)[4]

1756 patients; SEC retention after 3 years

The safety profile was consistent with the known SEC safety profile, no new safety signals reported.

SEC VS GUS IN TREATMENT OF UST-RESISTANT PSORIASIS (ARROW, RANDOMIZED, OPEN-LABEL)[5]

TCS for the target plaque was calculated as the sum of erythema, scaling, and infiltration scores, rated according to their severity (range of 0 to 9).

	TCS of 0-2 (Clear or Almost Clear) at Week 16	Joint Pain (VAS)	
		Baseline	Week 16
SEC 300 mg	60%	54.0	31.8
GUS 100 mg	40%	34.6	42.4

P=0.1715

NAPSI=Nail Psoriasis Severity Index. IR=incidence rate. TEAE=treatment-emergent adverse event. SAEs=serious adverse events. TCS=Total Clinical Score. VAS=Visual Analog Scale.

1. Egeberg A, et al. Poster 33108 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 2. Griffiths CE, et al. Poster 32236 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 3. Papp K, et al. Poster 33073 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 4. Augustin M, et al. Poster 33596 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 5. Krueger J, et al. Poster 35098 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022.

IL-23 Inhibitors: Guselkumab

ANALYSIS OF POOLED DATA

GUS IN PATIENTS WITH PSORIASIS (VOYAGE-1&2, N=1839)

Placebo → GUS and adalimumab (ADA) → GUS from VOYAGE-1&2 studies were evaluated.

All patients received open-label GUS 100 mg Q8W during Week 52 to Week 252 in VOYAGE-1 and during Week 76 to Week 252 in VOYAGE-2.

High degree of GUS efficacy among subpopulations of patients with varying disease severity characteristics and previous psoriasis treatments (see table)[1] with or without metabolic syndrome at baseline.[2]

Patients receiving GUS or ADA **reported significantly greater improvement** in social relationships difficulty and sexual difficulty at Week 16 vs placebo; these effects were greater for GUS vs ADA at Week 24.[3]

At Baseline	Achieved IGA 0/1		Achieved PASI 90	
	Week 100	Week 252	Week 100	Week 252
PASI <20	85.3%	85.4%	79.0%	81.1%
PASI ≥20	81.4%	81.4%	82.7%	83.8%
IGA<4	85.4%	85.1%	80.9%	82.7%
IGA=4	77.6%	78.9%	79.7%	81.1%
Never used biologic	84.6%	85.3%	82.2%	83.8%
Used biologic	79.5%	76.7%	74.4%	76.3%

SIX PHASE 2/3 STUDIES: SAFETY OF GUS IN PATIENTS WITH PSORIASIS[4]

The study confirmed the **established safety profile** of guselkumab for patients treated for up to 5 years.

IGA=Investigator's Global Assessment.

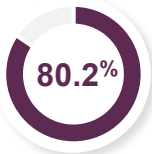
1. Gordon KB, et al. Poster 32953 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 2. Merola JF, et al. Poster 33055 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 3. Armstrong A, et al. Poster 33018 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 4. Lebwohl M, et al. Poster 33150 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022.

IL-23 Inhibitors: Tildrakizumab and Risankizumab

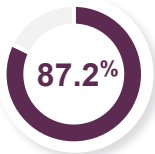
TIL IN PATIENTS WITH PSORIASIS: ANALYSIS OF POOLED DATA (RESURFACE 1 AND RESURFACE 2, PHASE 3 TRIALS)

At Week 64/Week 52, patients with at least a PASI 50 response entered a 4-year extension up to Week 256 (reSURFACE 1)/ Week 244 (reSURFACE 2).

Study population included patients with PASI <3 at Week 28 (PASI <3 responders) who were randomized to continue treatment.



of patients in the TIL 100 mg group **and**



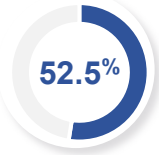
of patients in the TIL 200 mg group

had a PASI <3 in at least 80% of follow-up visits up to Week 244[1]

NNH for TIL 100/200 mg, for 1 adverse event to occur within 5 years

- Severe infection 23.0/20.6 patients
- MACE 58.1/42.2 patients
- Malignancy 41.5/54.6 patients[2]

RZB IN PATIENTS WITH PSORIASIS (LIMMITLESS, OLE TRIAL)[3]



of patients on RZB achieved PASI 100 at 240 weeks (4.5 years); this represents a robust maintenance of efficacy

Rates of adverse events were low and consistent with the base studies.

RZB IN PATIENTS WITH PsA (KEEPsAKE -1 AND -2 TRIALS)[4]

At Week 24: **a significantly higher proportion of patients receiving RZB achieved meaningful (30%), substantial (50%), and 70% improvement** in VAS scores and MCID compared to those receiving placebo.

SAFETY OF RZB IN PATIENTS WITH PSORIATIC DISEASE[5]

Analyses of 17 clinical trials in psoriasis and 4 in PsA

TEAE: 158.3 event/100 patient-years for psoriasis and 160.8 event/100 patient-years for PsA

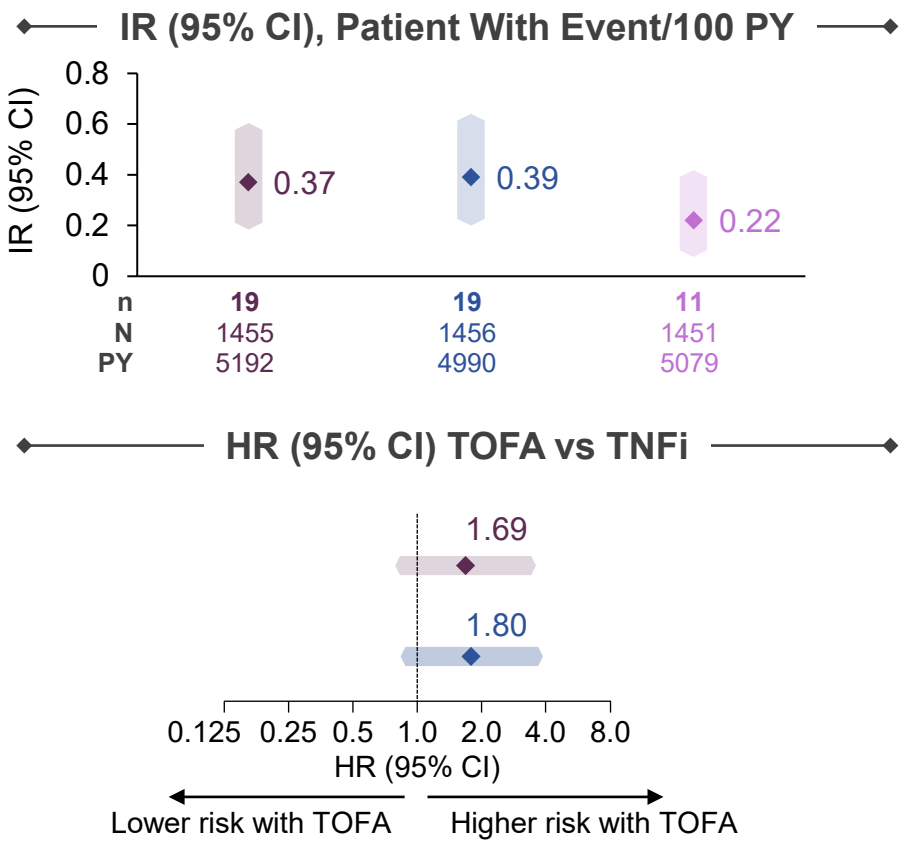
SAEs: 7.6 event/100 patient-years for psoriasis, and 8.4 event/100 patient-years for PsA

MACE=major adverse cardiovascular events. NNH=number needed to harm. MCID=minimal clinically important differences.

1. Thaçi D, et al. Poster 33025 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 2. Pinter A, et al. Poster 33124 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 3. Papp K, et al. Poster 33270 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 4. Ostor A, et al. Poster 33065 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022. 5. Gordon KB, et al. Poster 34914 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022.

ORAL Surveillance: Risk of CV Disease With Tofacitinib vs TNF Inhibitors

INCIDENCE AND RISK OF MYOCARDIAL INFARCTION

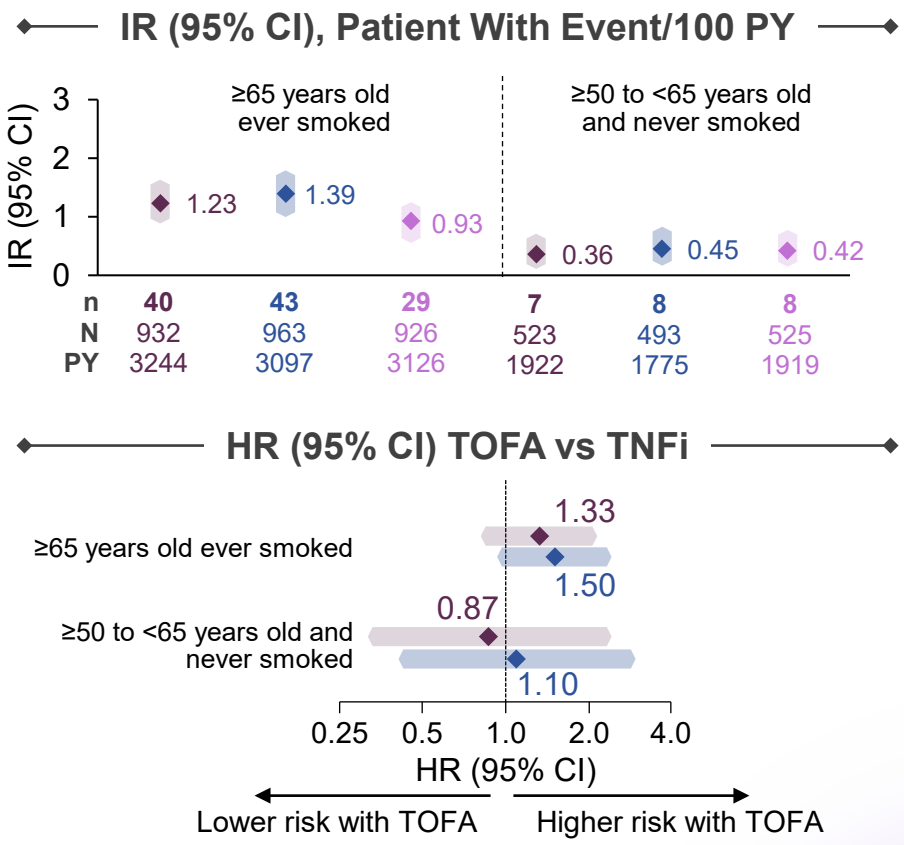


TOFA 5 mg bid

TOFA 10 mg bid*

TNFi

INCIDENCE AND RISK OF MACE BY AGE AND SMOKING STATUS

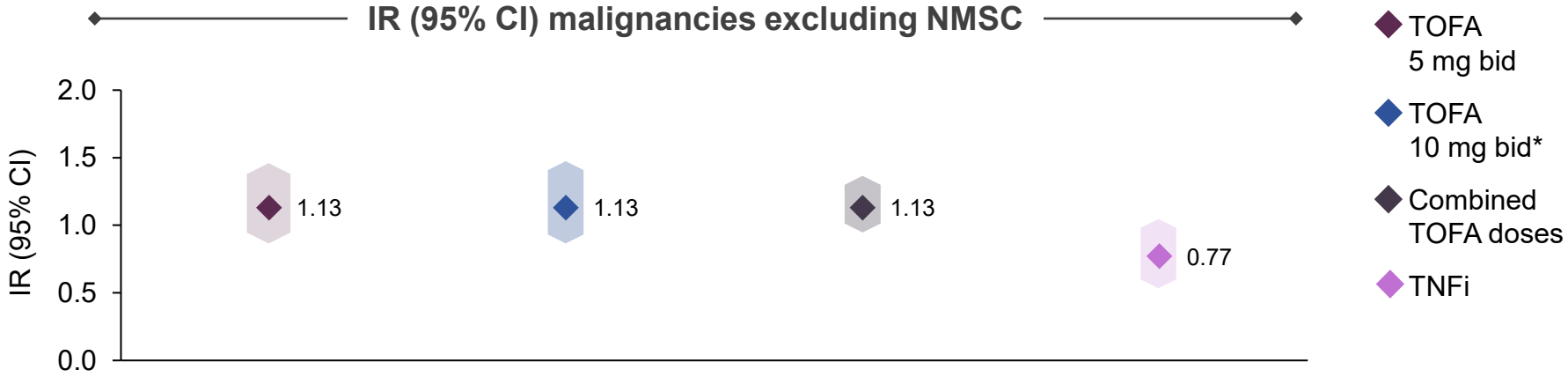


MACE risk driven by MI; numerically higher MACE with TOFA vs TNFi in older patients and smokers

*TOFA 10 mg bid group included patients who switched from 10 to 5 mg bid as a result of 2019 protocol modification.
CV=cardiovascular. CI=confidence interval. PY=patient year. HR=hazard ratio. MI=myocardial infarction.
Charles-Schoeman C, et al. Abstract 0958 presented at: ACR Convergence 2021. November 5-9, 2021.

ORAL Surveillance: Risk of Malignancy With Tofacitinib vs TNF Inhibitors

MULTIVARIABLE RISK FACTORS: AGE ≥65 YEARS OLD AND CURRENT/PAST SMOKING



n	62	60	122	42
N	1455	1456	2911	1451
PY	5491	5312	10,803	5482
NNH vs TNFi	**276**	**275**	**275**	**ref**
HR vs TNFi (95% CI)	1.47 (1.00, 2.18)	1.48 (1.00, 2.19)	1048 (1.04, 2.09)	ref

Numerical increase in some malignancies with TOFA vs TNF inhibitors

*Includes patients who switched from 10 to 5 mg bid as a result of 2019 protocol modification. NNH (95% CI) defined as the reciprocal of the IR difference (not shown) between TOFA and TNFi and interpreted as PY of exposure to TOFA required to have 1 more event relative to TNFi. If the 95% CI: of the IR difference includes 0, the 95% CI: of the NNH is disjointed.

Curtis J, et al. Abstract 1940 presented at: ACR Convergence 2021. November 5-9, 2021.

Principles of Shared Decision Making[1-3]

CREATE

a supportive environment for open discussion

CLARIFY

the timeline needed for the decision, including the opportunity to revisit at subsequent visits, and engage family or others as appropriate

IDENTIFY

decision options and the outcomes affected by those options

CHECK

the patient's understanding of everything involved in each option and outcome, and provide basic patient information as needed

OBTAIN

evidence about the outcomes of different options and translate the evidence to the individual patient's situation

1. Elwyn G, *BMJ*. 2017;359:j4891. 2. Legare F, et al. *Cochrane Database Syst Rev*. 2014;9(9):CD006732. 3. Legare F, et al. *Health Aff (Millwood)*. 2013;32(2):276-284.

Principles of Shared Decision Making[1-3] (Cont.)

SELECT

the options and outcomes most relevant to the patient

COMMUNICATE

the expected probabilities of different outcomes for the decision options

ENGAGE

the patient in a discussion of his/her values and preferences

OFFER

advice as the patient requests it to inform the decision

SUPPORT

the patient in the selection of an option

1. Elwyn G, *BMJ*. 2017;359:j4891. 2. Legare F, et al. *Cochrane Database Syst Rev*. 2014;9(9):CD006732. 3. Legare F, et al. *Health Aff (Millwood)*. 2013;32(2):276-284.

Case Selected for Discussion

CASE 1: KANG CHEN

A 44-year-old Asian man with extensive plaque psoriasis, nail psoriasis, and joint pain

CASE 2: JACK DAVIS

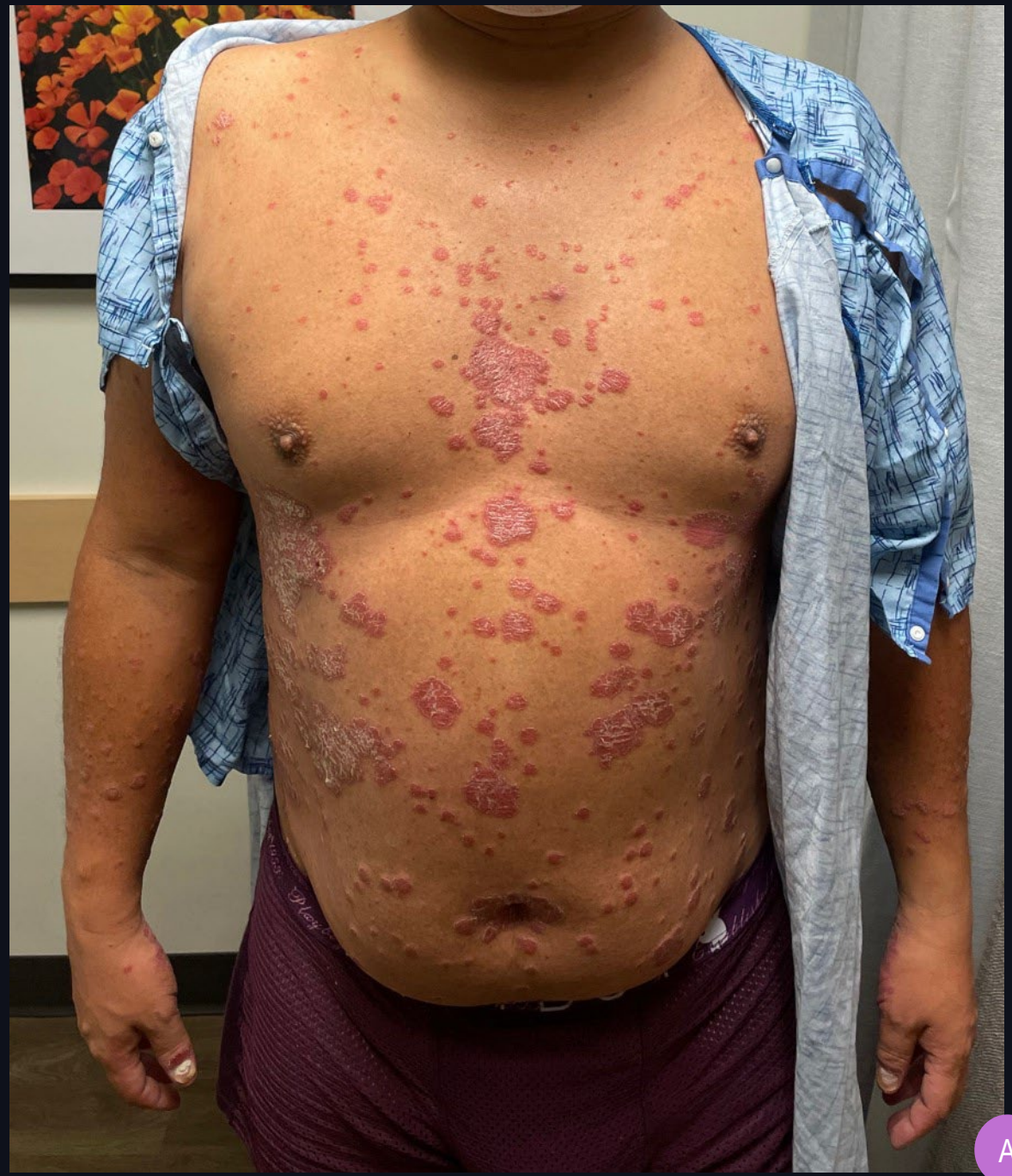
A 31-year-old White man with pain in multiple small joints and skin rash

CASE 3: JOAN SMITH

A 33-year-old Black woman with low back pain and a two-year history of mild psoriasis

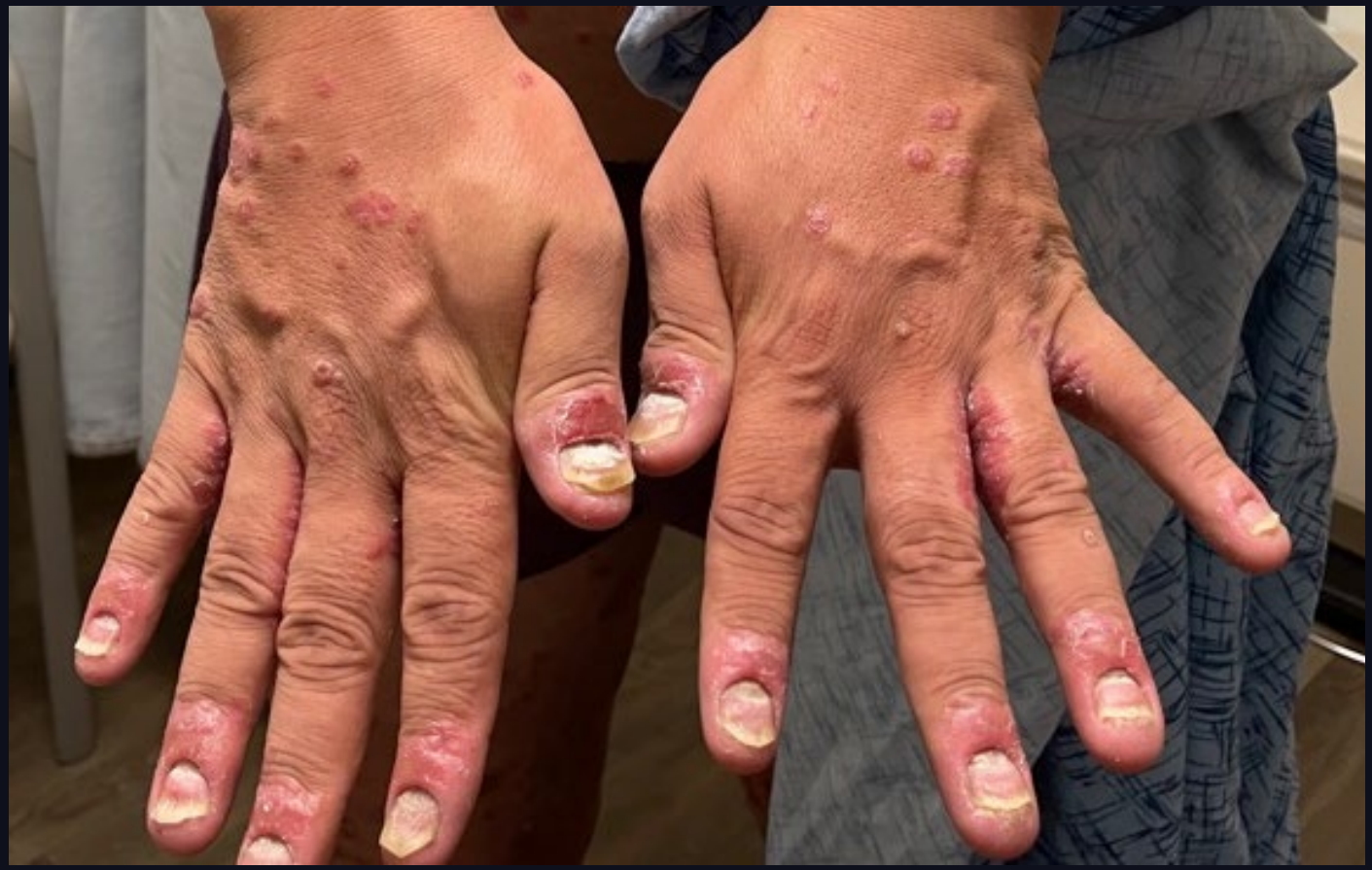
Case 1: Kang Chen

A 44-year-old Asian man with extensive plaque psoriasis, nail psoriasis, and joint pain



Images: Courtesy of Dr. April Armstrong.

A



Images: Courtesy of Dr. April Armstrong.

Case 1: Kang Chen (Cont.)

- 44-year-old Asian man presents with extensive plaque psoriasis and nail psoriasis
- BSA 60%, PASI 31, PGA 4
- Extensive nail disease
- Reports joint pain and mild stiffness in the fingers

PGA=Physician's Global Assessment.

Question 1

Given the extensive nail disease, which of the following is the best agent to effectively address both the patient's nail and cutaneous findings?

A. Topical clobetasol twice daily

B. Topical betamethasone and tazarotene combination

C. Methotrexate

D. Ixekizumab

E. Tildrakizumab

A

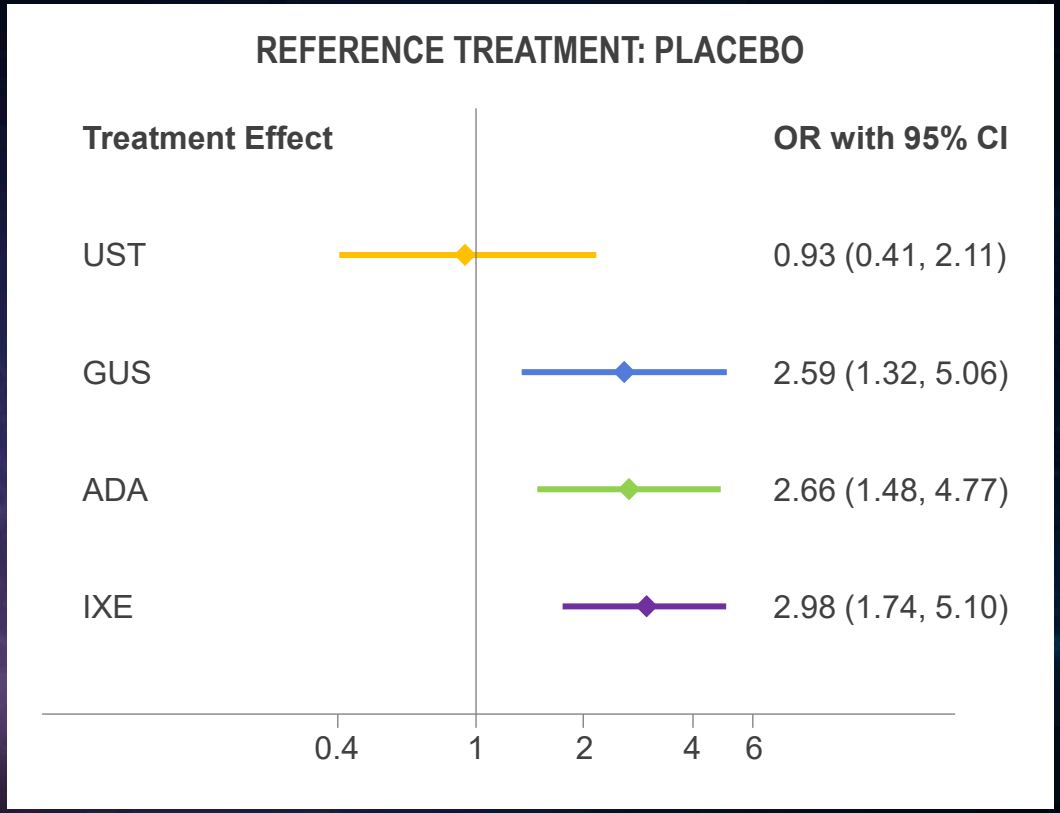
Question 1

Correct answer: **D. Ixekizumab**

EXPLANATION:

Based on a systematic review and network meta-analysis to evaluate the efficacy of systemic medications in treating nail psoriasis, among the biologic medication evaluated, ixekizumab presented the best efficacy for treating nail psoriasis in 10 to 16 weeks and 24 to 26 weeks, respectively.

Because this patient has both psoriasis and nail psoriasis, ixekizumab will confer the best efficacy among the choices to address both skin and nail psoriasis.



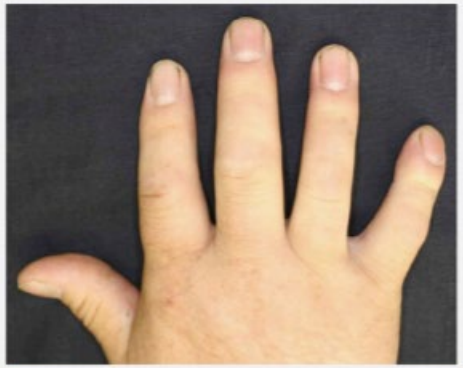
Huang IH,et al. *J Am Acad Dermatol*. 2021;85(1):135-143.

A

PSA Mnemonic: Symptoms Indicating Increased Risk for Developing Psoriatic Arthritis

P

Pain in joints



S

Stiffness (after waking in the morning, or after a period of inactivity of > 30 minutes

Swelling/Sausage digit (dactylitis)

A

Axial/spine involvement (back pain associated with stiffness, improves with activity)

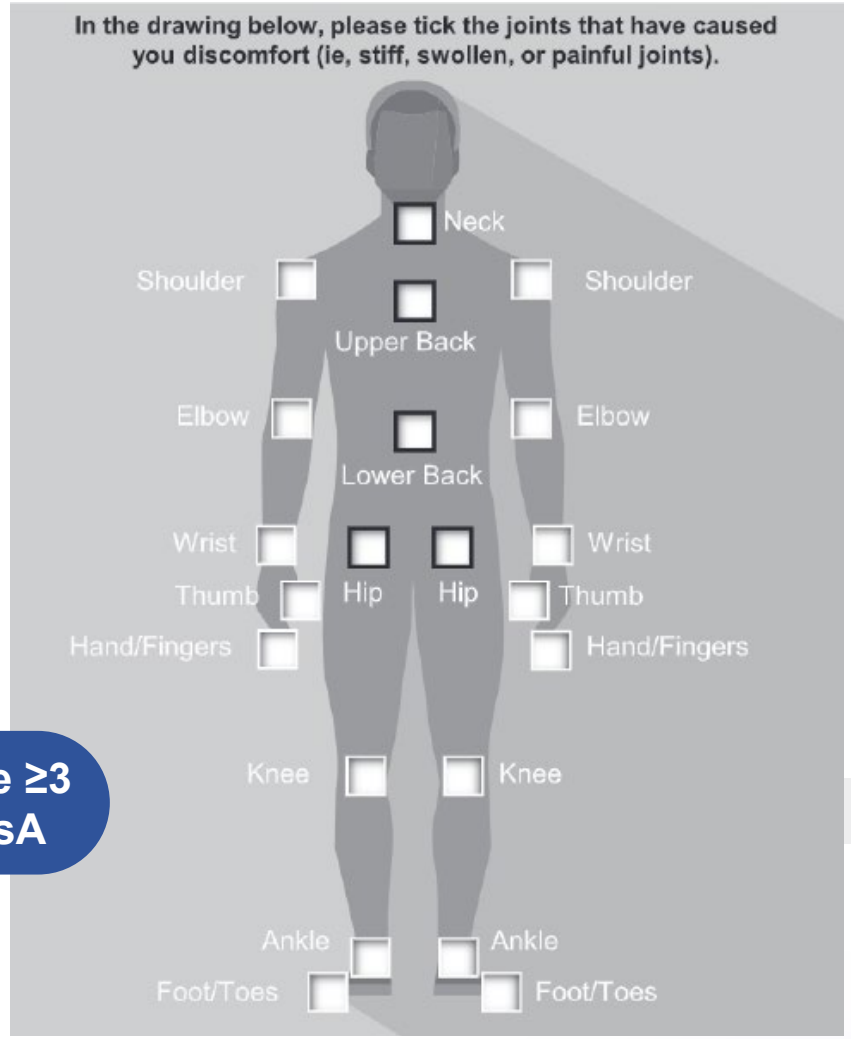
If ≥2 present, formal screening and/or referral to a rheumatologist should be completed

Gottlieb AB, et al. *J Am Acad Dermatol*. 2021; 84(1):92-101.

PEST Screening Tool Is Widely Used by Dermatologists

	No	Yes
Have you ever had a swollen joint (or joints)?		
Has a doctor ever told you that you have arthritis?		
Do your finger nails or toe nails have holes or pits?		
Have you had pain in your heel?		
Have you had a finger or toe that was completely swollen and painful for no apparent reason?		

PEST total score ≥3 indicative of PsA



ADVANTAGES

Simple, easy to perform

DISADVANTAGES

No questions on cutaneous or axial manifestations

- Developed in **2009** in **93 psoriasis patients** from two large general practices in the United Kingdom
- Scores range from 0 to 5 | Sensitivity=**92%**; Specificity=**78%**

PEST=Psoriatic Arthritis Screening Test.

Gottlieb AB, et al. *J Am Acad Dermatol*. 2021; 84(1):92-101.

Patient Reports

- Pain and swelling in the PIP joints of three fingers
- Joint stiffness lasting approximately 30 minutes in the morning
- No swelling of the entire digit
- No heel pain
- No backpain

PIP=proximal interphalangeal.

ClASsification of **P**soriatic **AR**thritis: CASPAR Criteria

To meet the CASPAR criteria for PsA, a patient must have inflammatory articular disease (joint, spine, or entheseal) and score ≥3 points based on these categories:

	Points
1. Evidence of psoriasis	
Current psoriasis	2 or
Personal history of psoriasis	1 or
Family history of psoriasis	1
2. Psoriatic nail dystrophy	
Pitting, onycholysis, hyperkeratosis	1
3. Negative test result for rheumatoid factor	**1**
4. Dactylitis	
Current swelling of an entire digit	1 or
History of dactylitis	1
5. Radiologic evidence of juxta-articular new bone formation	
Ill-defined ossification near joint margins on plain X-rays of hand and foot	1

Taylor W, et al. *Arthritis Rheum*. 2006;54:2665-2673.

Laboratory Tests

- No laboratory test provides sufficient information to establish a definitive diagnosis
- Laboratory results should be considered in conjunction with clinical features and imaging

RF AND ANTI-CCP ANTIBODIES

Negative in 95% of PsA patients

Seropositivity of RF or anti-CCP in patients with signs and symptoms of PsA does not exclude diagnosis of PsA

ESR AND CRP

Elevated in 40-50% of patients with PsA

Most common lab abnormality in PsA

More useful for follow-up rather than diagnosis

HLA-B27

Positive in 25% of patients with PsA

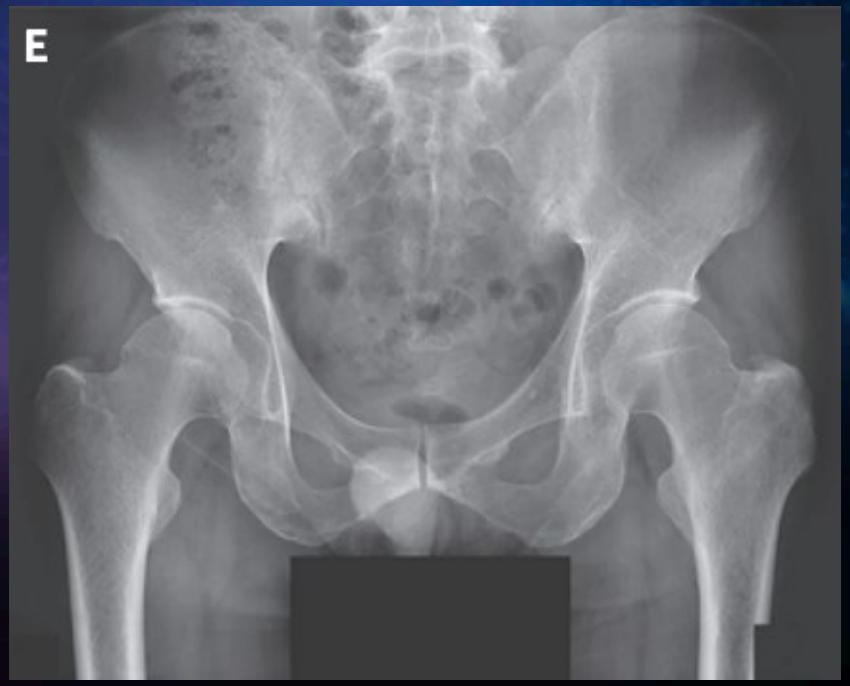
Associated with inflammatory axial pain

RF=rheumatoid factor. Anti-CCP=anticyclic citrullinated peptide. ESR=erythrocyte sedimentation rate. CRP=C-reactive protein. HLA-B27=human leukocyte antigen B27.

Coates LS, et al. *Clin Med (Lond)*. 2017;17(1): 65-70.

Imaging Findings—Radiography

- Bone and cartilage destruction with pathologic new bone formation is distinctive of PsA
- Peripheral PsA (hands + feet)
  - New bone formation → periostitis, bony ankylosis, and enthesophytes[1,2]
  - Bone loss → eccentric erosive changes, joint-space narrowing, osteolysis (see B)
  - "Pencil in Cup Deformity" is due to erosions/osteolysis
- Axial PsA
  - Unilateral sacroiliitis (see E)
  - Bulky paramarginal and vertical syndesmophytes



1. Ritchlin CT, et al. *N Eng J Med*. 2017;376:957-970. 2. Matthew AJ, et al. *Best Pract Res Clin Rheumatol*. 2021: 35(2):101690.

A

Question 2

Kang Chen with psoriasis, nail psoriasis, and psoriatic arthritis reports improvement with ixekizumab over the next six months; however, due to insurance issues, he is no longer able to receive ixekizumab.

Assuming the patient can have access to any of the following medications, which one of the following is the best therapy?

A. Methotrexate

B. Apremilast

C. Ustekinumab

D. Adalimumab

E. Risankizumab

A

Question 2

Correct Answer: **E. Risankizumab**

EXPLANATION:

Risankizumab is approved for psoriasis and psoriatic arthritis. Among the options, risankizumab has the best efficacy on skin and has good efficacy in the nails and joints as well.

Gordon, KB, et al. *Lancet*. 2018;392(10148):650-661. Kristensen LE, et al. *Ann Rheum Dis*. 2022;81(2):225-231.

Case 2: Jack Davis

A 31-year-old White man with pain in multiple small joints and skin

Case 2: Jack Davis (cont.)

Jack is a 31-year-old White man referred for evaluation of pain in multiple small joints, believed by his PCP to be rheumatoid arthritis. For the last six months, he has been managed with methotrexate and rotating NSAIDs, neither of which provided significant relief. He reports that in the last month, he has had difficulty putting on and wearing shoes, because several toes on both feet have become swollen and tender. There is no family history of arthritis or inflammatory bowel disease.

His general physical examination is normal, but he has swollen MCP joints on both hands and bilateral wrist tenderness and swelling. In addition, you note a scaly rash in his natal cleft and umbilicus.

Lab studies reveal a normal chemistry profile and normal CBC. His ESR is 30 (0-20 mm/hr), RF negative, ANA+, Anti-CCP-, CRP 8 mg/dL (nl 0-5 mg/hr), serum uric acid (7.8 mg/dL).

PCP=primary care physician. NSAIDs=nonsteroidal anti-inflammatory drugs. MCP=metacarpophalangeal. CBC=complete blood count.
ESR=erythrocyte sedimentation rate. RF=rheumatoid factor. ANA=antinuclear antibody. CCP=cyclic citrullinated peptide.
CRP=c-reative protein. nl=neutrophil-lymphocyte ratio.

Question 1

Given that you have diagnosed psoriatic arthritis, which therapy at this point should be recommended to Jack?

A. Corticosteroids
B. JAK inhibitor
C. PDE4 inhibitor
D. TNF inhibitor
E. Sulfasalazine

Question 1

Correct Answer: **D. TNF inhibitor**

EXPLANATION:

The GRAPPA guidelines were developed to promote the optimal care of patients with PsA. Having taken methotrexate for three months without relief, Jack would be considered a patient with peripheral arthritis who has had an inadequate response to a conventional, synthetic DMARD. The recommendation for a PDE4 inhibitor, another conventional synthetic DMARD (eg, sulfasalazine), oral corticosteroids is only conditional. Of the choices listed, the guidelines have a strong recommendation for TNF inhibitors or a JAK inhibitor.

Currently, however, the label of the two JAK inhibiters approved for PsA state that they should only be given AFTER the patient is an inadequate responder to a TNF inhibitor. Thus, the best answer is to prescribe a TNF inhibitor.

Coates LC, et al. *Ann Rheum Dis*. 2021;80(Suppl 1):139-140.

Case 2: Jack Davis (Cont.)

- X-rays of Jack's hands and feet show extensive soft tissue swelling and early erosive changes of the MCP's and DIP joints, consistent with PsA
- He returns after three months, stating that on the TNF inhibitor, the rash you noted previously has cleared, however there has been no improvement with his pain or swelling of his hands or feet
- You note that the joints are still swollen and tender

DIP=distal interphalangeal.

Question 2

The LEAST appropriate therapeutic choice at this point is:

A. Switch to another TNF inhibitor
B. Add a JAK inhibitor
C. Switch to a JAK inhibitor
D. Start an IL-17 inhibitor
E. Start an IL-12/23 inhibitor

Question 2: Explanation

Correct Answer: **B. Add a JAK inhibitor**

EXPLANATION:

As previously noted, the GRAPPA guidelines were developed to promote the optimal care of patients with PsA. Having taken a TNF inhibitor for three months without relief of his joint symptoms, Jack would be considered a patient with peripheral arthritis who has had an inadequate response to a TNF inhibitor. While another TNF inhibitor can be prescribed, the likelihood of a response is lower. The other mechanisms of action listed are appropriate choices as well.

The label of the two JAK inhibitors approved for PsA state that they should only be given AFTER the patient is an inadequate responder to a TNF inhibitor, so this is also an appropriate choice, However under **NO** circumstances should a JAK inhibitor be used concurrently with any other biologic agent.

Coates LC, et al. *Ann Rheum Dis*. 2021;80(Suppl 1):139-140.

Case 3: Joan Smith

A 33-year-old Black woman with low back pain and a two-year history of mild psoriasis

Case 3: Joan Smith (Cont.)

- Joan is a 33-year-old Black woman in good health with no active medical problems
- She has a two-year history of mild psoriasis, limited to the scalp and controlled with topical shampoos; she is actively employed as an accountant
- At her most recent annual physical, Joan reports experiencing intermittent low back pain with difficulty when picking up toys her kids have left out, or when doing light cleaning in the house; Joan notes the pain began about four months ago, is intermittent, but seems worse in the mornings
- There is no history of trauma; Joan was a runner in college and still likes to jog occasionally but finds it more difficult; she attributes her pain to normal "wear and tear"
- She denies fever, swelling or pain in other joints or worsening of her scalp psoriasis

Case 3: Joan Smith (Cont.)

- Joan's general physical exam is normal
- Her joint exam is unremarkable, but she does have limitation on forward flexion and mild tenderness to percussion over the lower back
- Joan states she is aware that she is at risk for psoriatic arthritis, but she is surprised because she has no joint swelling and her scalp psoriasis has not changed, nor has she experienced any swelling or worsening skin rash
- You explain PsA may present as spondylitis and can be difficult to diagnose
- An X-ray shows grade 2 sacroiliitis and early ankyloses of L3-4 and L4-5

Question 1

Given that Joan has had no response to NSAIDs and has axial disease, the recommended treatment is:

A. TNF inhibitor
B. Apremilast (PDE4 inhibitor)
C. Corticosteroids
D. Abatacept (CTLA4 inhibitor)
E. IL-12/23 inhibitor

Question 1: Explanation

Correct Answer: **A. TNF inhibitor**

EXPLANATION:

While all are indicated for the treatment of PsA, the 2021 GRAPPA recommendations suggest that in a patient with axial disease and no peripheral involvement that has failed to respond to a course of NSAIDs, the best choice would be a TNF inhibitor. There are five agents in that class, and any of them may be used in this patient.

Coates LC, et al. *Ann Rheum Dis*. 2021;80(Suppl 1):139-140.

Case 3: Joan Smith (Cont.)

- You confirm that Joan has the axial phenotype of psoriatic arthritis; you bring her back into your consulting office and inform her that she has “psoriatic arthritis in her back”
- You let your staff know to not disturb you and review the treatment options available with the patient, the routes of administration, the frequency of administration of each agent, and the risks, benefits, and alternatives to each
- You pause after each medication discussed and ask Joan if she understands, and if she has any questions
- When you are finished, Joan indicates that she would prefer to inject herself at home as infrequently as possible rather than come in for an infusion; you arrange for your office administrator to check Joan’s insurance plan coverage and provide her with samples of an appropriate drug until a prescription can be filled for her
- Joan thanks you for providing her with a supportive environment to learn about her diagnosis and treatment options

Question 2

Your interaction with Joan best exemplifies:

A. Physician paternalism
B. Informed consent
C. Shared decision making
D. Social justice
E. Precision medicine

Question 2: Explanation

Correct Answer: **C. Shared decision making**

EXPLANATION:

While you did fulfill the required elements of informed consent (ie, providing information about risks, benefits and alternatives), your extended interaction went beyond that. You provided Joan with information she needed to make a decision about the alternatives available, consistent with her own preferences, which you respected. The environment was supportive, and you did not impose a decision. Rather, you did all you could to support the patient in her selection of an option and were respectful of the choice she made. This is an example of shared decision making.

Elwyn G, *BMJ*. 2017;359:j4891.

Posttest With Explanations

Question 1

A 28-year-old woman with worsening plaque psoriasis is interested in starting a biologic therapy for the first time.

Prior to starting a biologic for psoriasis, which of the following should be evaluated in this patient, as well as all other patients being considered for a biologic based on the 2019 AAD-NPF guidelines for psoriasis management?

A. Coccidioidomycosis

B. Histoplasmosis

C. Hypertension

D. Hyperlipidemia

E. Tuberculosis

AAD=American Academy of Dermatology.

Question 1

Correct Answer: **E. Tuberculosis**

EXPLANATION:

The 2019 AAD-NPF guidelines state that all psoriasis patients should receive the following baseline evaluation prior to starting a biologic: tuberculosis (TB) evaluation, CBC, comprehensive metabolic panel (CMP), and hepatitis B&C.

For ongoing evaluation, the guidelines recommend yearly tuberculosis evaluation in the high-risk groups—those in contact with people with active TB, traveling to areas endemic to TB, and those on TNF inhibitors. Ongoing CBC and CMP are not supported by evidence and are to be assessed at the discretion of each physicians' criteria except in cases involving patients treated with infliximab.

Menter A, et al. *J Am Acad Dermatol*. 2019;80(4):1029-1072.

Question 2

According to the 2018 ACR/NPF guidelines, which of the following factors ARE NOT used to determine the optimal choice of therapies for a patient with PsA?

A. Disease location
B. Disease activity
C. Previous therapy
D. Disease duration
E. Comorbidities

Question 2

Correct Answer: **D. Disease duration**

EXPLANATION:

The 2018 ACR/NPF guidelines begin with assessing disease activity, whether or not there has been prior therapy, and the response to previous therapy. Disease location and domains affected (eg, enthesopathy) is a major consideration, as is the presence or absence of comorbidities (eg, adult-onset diabetes mellitus). Only disease duration is not considered.

Singh JA, et al. *Arthritis Rheumatol*. 2019;71(1):5-32.

Question 3

Based on the long-term data presented at the 2022 AAD Annual Meeting, approximately what proportion of patients on risankizumab achieved PASI 100 at 240 weeks (4.5 years), based on the mNRI analysis?

A. 30%

B. 40%

C. 50%

D. 60%

E. 70%

Question 3

Correct Answer: **C. 50%**

EXPLANATION:

Based on “LIMMitless: Long-term efficacy and safety of risankizumab for the treatment of moderate-to-severe plaque psoriasis through 4.5 years”, 52.5% of patients on risankizumab achieved PASI 100 at 240 weeks (4.5 years). This represents a robust maintenance of efficacy for risankizumab through 4.5 years.

Papp K, et al. Poster 33270 presented at: 2022 AAD Annual Meeting. Boston, MA; March 25-29, 2022.

Question 4

Which of the following is NOT an element of patient-provider shared decision making?

A. Creating a supportive environment for open discussion

B. Identifying decision options and the potential risks and benefits of each outcome

C. Providing the patient with several brochures about different medications, and telling them to return after they have reached a decision

D. Checking the patient's understanding of all the factors involved in each therapeutic option, and asking if the patient needs more information on any of them

E. Engage the patient in an active discussion of his/her values and preferences

Question 4

Correct Answer: **C. Providing the patient with several brochures about different medications and telling them to return after they have reached a decision**

EXPLANATION:

Choice C is NOT an element of shared decision making. Shared decision making is an interactive, two-way process between the patient and provider, best achieved in a supportive atmosphere of mutual respect. The patient is provided with all information they need to make an informed decision among the best available alternatives, after the provider understands that the patient has received information at their own level of health literacy. Merely providing the patient with printed information and telling them to read it on their own is inconsistent with the principles of shared decision making.

Elwyn G, et al. *BMJ*. 2017;359:j4891. Legare F, et al. *Cochrane Database Syst Rev*. 2014;9(9):CD006732.

References

Armstrong A, Liu Y, Yang YW, et al. Social relationships, sexual difficulty, and the impact of treatment with guselkumab versus adalimumab in men and women with psoriasis: Results from VOYAGE 1 and 2. [Poster 33018]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Armstrong AW, Read C. Pathophysiology, clinical presentation, and treatment of psoriasis: a review. *JAMA*. 2020;323(19):1945-1960.

Armstrong AW, Warren RB, Sofen H, et al. Deucravacitinib, an oral, selective tyrosine kinase 2 (TYK2) inhibitor, in patients with moderate to severe plaque psoriasis who had inadequate responses to apremilast at week 24 in the phase 3 POETYK PSO-1 and PSO-2 trials. [Poster 34658]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Augustin M, Gooderham M, Gottlieb AB. Bimekizumab versus secukinumab in plaque psoriasis: reduction in body surface area affected by psoriasis translates into benefits in patient-perceived itching, skin pain, and scaling and health-related quality of life in the BE RADIANT phase 3b trial. [Poster 31069]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Augustin M, Strober B, Armstrong AW, et al. Deucravacitinib improves Dermatology Life Quality Index (DLQI) in patients with moderate to severe psoriasis: results from the phase 3 POETYK PSO-1 and PSO-2 trials. [Poster 35205]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Augustin M, von Kiedrowski R, Rigopoulos D, et al. Secukinumab demonstrated sustained retention and safety in a real-world setting in patients with moderate to severe plaque psoriasis: long-term results from an interim analysis of the SERENA study. [Poster 33596]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Behrens F, Cañete JD, Olivieri I, van Kuijk AW, McHugh N, Combe B. Tumour necrosis factor inhibitor monotherapy vs combination with MTX in the treatment of PsA: a systematic review of the literature. *Rheumatology (Oxford)*. 2015;54(5):915-926.

Charles-Schoeman C, Buch M, Dougados M, et al. Risk factors for major adverse cardiovascular events in patients aged ≥ 50 years with RA and ≥ 1 additional cardiovascular risk factor: results from a phase 3b/4 randomized safety study of tofacitinib vs TNF inhibitors. [Abstract 0958]. American College of Rheumatology (ACR) Convergence 2021. November 5-9, 2021.

References (Cont.)

Coates LC, Soriano E, Corp N, Bertheussen H, Callis-Duffin K, al. e. OP0229 The Group for Research and Assessment of Psoriasis and Psoriatic Arthritis (GRAPPA) treatment recommendations 2021. *Ann Rheum Dis*. 2021;80(Suppl 1):139-140.

Coates LC, Helliwell PS. Psoriatic arthritis: State of the Art Review. *Clin Med (Lond).* 2017;17(1):65-70.

Combe B, Tsai TF, Huffstutter JE, et al. Ixekizumab, with or without concomitant methotrexate, improves signs and symptoms of PsA: week 52 results from Spirit-P1 and Spirit-P2 studies. *Arthritis Res Ther*. 2021;23(1):41.

Curtis J, Yamaoka K, Chen YH, et al. Malignancies in patients aged ≥ 50 years with RA and ≥ 1 additional cardiovascular risk factor: Results from a phase 3b/4 randomized safety study of tofacitinib vs TNF inhibitors. [Abstract 1940]. American College of Rheumatology (ACR) Convergence 2021. November 5-9, 2021.

Dean O, Tausk F, Singh P. Adoption of newly FDA-approved targeted immunomodulatory therapies for plaque psoriasis by dermatologists: an analysis of Medicare Part D claims from 2013-2018 [Poster 32359]. Poster presented at: Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Deodhar A, Nowak M, Ye J, et al. Deucravacitinib efficacy in psoriatic arthritis by baseline DMARD use: exploratory analysis from a phase 2 study. [Poster 34513]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Egeberg A, Kristensen LE, Vender R, et al. Ixekizumab achieved and sustained nail psoriasis resolution regardless of disease severity through 5 years: Results from Uncover-3. [Poster 33108]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Elmamoun M, Chandran V. Role of methotrexate in the management of psoriatic arthritis. *Drugs*. 2018;78(6):611-619.

Elmets CA, Korman NJ, Prater EF, et al. Joint AAD-NPF Guidelines of care for the management and treatment of psoriasis with topical therapy and alternative medicine modalities for psoriasis severity measures. *J Am Acad Dermatol*. 2021;84(2):432-470.

Elmets CA, Leonardi CL, Davis DMR, et al. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with awareness and attention to comorbidities. *J Am Acad Dermatol*. 2019;80(4):1073-1113.

References (Cont.)

Elmets CA, Lim HW, Stoff B, et al. Joint American Academy of Dermatology-National Psoriasis Foundation guidelines of care for the management and treatment of psoriasis with phototherapy. *J Am Acad Dermatol*. 2019;81(3):775-804.

Elwyn G, Durand MA, Song J, et al. A three-talk model for shared decision making: multistage consultation process. *BMJ*. 2017;359:j4891.

Feldman SR, Gottlieb AB, Soung J, et al. Bimekizumab early responses in patients with plaque psoriasis: results from the multicenter, randomized, double-blinded phase 3b BE RADIANT trial. [Poster 34310]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Gordon KB, Blauvelt A, Bachelez H, et al. Long-term safety of risankizumab in patients with psoriatic disease: findings from integrated analyses of 17 clinical trials in psoriasis and 4 in psoriatic arthritis. [Poster 34914]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Gordon KB, Merola JF, Foley P, et al. Efficacy responses across disease severity and treatment history subgroups of patients with moderate to severe plaque psoriasis treated with guselkumab: pooled results from VOYAGE 1&2 through 5 years. [Poster 32953]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Gordon KB, Sebastian M, Feldman SR, et al. Bimekizumab early treatment response translates into cumulative benefits in health-related quality of life in patients with moderate to severe plaque psoriasis: pooled results from three multicenter, randomized, double-blinded phase 3 trials. [Poster 31085]. 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Gordon KB. Bimekizumab efficacy and safety through two years in patients with moderate to severe plaque psoriasis: analysis of pooled data from five phase 3/3b clinical trials. [Late-breaking presentation 35502]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Gordon, KB, Strober B, Lebwohl M, et al. Efficacy and safety of risankizumab in moderate-to-severe plaque psoriasis (UltIMMa-1 and UltIMMa-2): results from two double-blind, randomised, placebo-controlled and ustekinumab-controlled phase 3 trials. *Lancet*. 2018;392(10148):650-661.

Gossec L, Baraliakos X, Kerschbaumer A, et al. EULAR recommendations for the management of psoriatic arthritis with pharmacological therapies: 2019 update. *Ann Rheum Dis*. 2020;79(6):700-712.

References (Cont.)

Gottlieb AB, Merola JF. Axial psoriatic arthritis: an update for dermatologists. *J Am Acad Dermatol*. 2021; 84(1):92-101.

Griffiths CE, Gooderham M, Colombel JF, et al. Safety of ixekizumab in adult patients with moderate-to-severe psoriasis: data from 15 clinical trials with over 18,000 patient-years of exposure. [Poster 32236]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Huang IH, Wu PC, Yang TH, et al. Small molecule inhibitors and biologics in treating nail psoriasis: a systematic review and network meta-analysis. *J Am Acad Dermatol*. 2021;85(1):135-143.

Kavanaugh A, Coates LC, van der Windt DA, Corp N, Soriano ER. GRAPPA treatment recommendations: updates and methods. *J Rheumatol* Suppl. 2020;96:41-45.

Kristensen LE, Keiserman M, Papp K, et al. Efficacy and safety of risankizumab for active psoriatic arthritis: 24-week results from the randomised, double-blind, phase 3 KEEPsAKE 1 trial. *Ann Rheum Dis*. 2022;81(2):225-231.

Krueger J, Langley R, Nigen S, et al. Secukinumab versus guselkumab in the treatment of ustekinumab-resistant psoriatic plaques: 16-week randomized, open-label, multicenter ARROW study. [Poster 35098]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Lebwohl M, Gooderham M, Warren RB, et al. Deucravacitinib, an oral, selective tyrosine kinase 2 (TYK2) inhibitor, versus placebo and apremilast in moderate to severe plaque psoriasis: achievement of absolute PASI thresholds in the phase 3 POETYK PSO-1 and PSO-2 trials. [Poster 34660]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Lebwohl M, Rowland K, Miller M, et al. Safety of guselkumab in patients with moderate-to-severe psoriasis: pooled analyses across Clinical Studies. [Poster 33150]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Legare F, Stacey D, Turcotte S, et al. Interventions for improving the adoption of shared decision making by healthcare professionals. *Cochrane Database Syst Rev*. 2014;9(9):CD006732.

Legare F, Witteman HO. Shared decision making: examining key elements and barriers to adoption into routine clinical practice. *Health Aff (Millwood)*. 2013;32(2):276-284

References (Cont.)

Matthew AJ, Østergaard M, Eder L. Imaging in psoriatic arthritis: status and recent advances. *Best Pract Res Clin Rheumatol*. 2021;35(2):101690.

Mease PJ, Gladman DD, Collier DH, et al. Etanercept and methotrexate as monotherapy or in combination for psoriatic arthritis: primary results from a randomized, controlled phase III trial. *Arthritis Rheumatol*. 2019;71(7):1112-1124.

Menter A, Cordoro KM, Davis DMR, et al. Joint American Academy of Dermatology-National Psoriasis Foundation guidelines of care for the management and treatment of psoriasis in pediatric patients. *J Am Acad Dermatol*. 2020;82(1):161-201.

Menter A, Gelfand JM, Connor C, et al. Joint American Academy of Dermatology-National Psoriasis Foundation guidelines of care for the management of psoriasis with systemic nonbiologic therapies. *J Am Acad Dermatol*. 2020;82(6):1445-1486.

Menter A, Strober BE, Kaplan DH, et al. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with biologics. *J Am Acad Dermatol*. 2019;80(4):1029-1072.

Merola JF, Asahina A, Ritchlin CT. Bimekizumab treatment response is maintained up to 3 years in patients with psoriatic arthritis: responder analyses from BE ACTIVE, a phase 2b dose-ranging study, and its open-label extension. [Poster 32937]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Merola JF, Thaçi D, Choi O, et al. Guselkumab efficacy and safety through 5 years among psoriasis patients with and without metabolic syndrome at baseline: results from VOYAGE 1 and VOYAGE 2. [Poster 33055]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Nash P, Behrens F, Orbai AM, et al. Ixekizumab is efficacious when used alone or when added to conventional synthetic disease-modifying antirheumatic drugs (cDMARDs) in patients with active psoriatic arthritis and previous inadequate response or intolerance to tumour necrosis factor inhibitors. RMD Open. 2018;4(2):e000692.

New GRAPPA 2021 PsO and PsA Treatment Recommendations. Tate R. https://rheumnow.com/news/new-grappa-2021-pso-and-psa-treatment-recommendations. Accessed April 4, 2022.

Ogdie A, Coates LC, Gladman DD. Treatment guidelines in psoriatic arthritis. *Rheumatology (Oxford)*. 2020;59(Suppl 1):i37-i46.

References (Cont.)

Ostor A, Kwatra S, Nduaka C, et al. Effects of treatment with risankizumab on reducing pain and inflammation in patients with psoriatic arthritis: an analysis of the KEEPsAKE -1 and -2 trials. [Poster 33065]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Papp K, Lebwohl MG, Puig L, et al. Long-term efficacy and safety of risankizumab (RZB) for the treatment of moderate to-severe plaque psoriasis: interim analysis of results from the LIMMitless open-label extension trial beyond 4 years of follow-up. [Poster 33270]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Papp K, Prajapati VH, Maari C, et al. Efficacy of brodalumab in moderate-to-severe plaque psoriasis after failure of previous biologic therapies: a phase IV, multicentre, open-label study. [Poster 33073]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Pinter A, Lacour JP, Egeberg A, et al. Severe infections, confirmed extended major adverse cardiovascular events, and malignancies over 5 years of treatment with tildrakizumab in terms of number needed to harm: pooled analyses from the reSURFACE 1 and reSURFACE 2 Phase 3 trials. [Poster 33124]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Ritchlin CT, Colbert RA, Gladman DD. Psoriatic arthritis. *N Engl J Med*. 2017;376(10):957-970.

Rosmarin D, Lebwohl M, Feldman SR, et al. Bimekizumab efficacy in subgroups defined by prior systemic treatment in patients with moderate to severe plaque psoriasis. [Poster 34320]. 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Shen J, Lovern M, Maloney M, et al. Deucravacitinib exposure-response analyses in patients with moderate to severe psoriasis. [Poster 34507]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Singh JA, Guyatt G, Ogdie A, et al. Special Article: 2018 American College of Rheumatology/National Psoriasis Foundation guideline for the treatment of psoriatic arthritis. *Arthritis Rheumatol*. 2019;71(1):5-32.

Smolen JS, Sebba A, Ruderman EM, et al. Efficacy and safety of ixekizumab with or without methotrexate in biologic-naïve patients with psoriatic arthritis: 52-week results from SPIRIT-H2H study. *Rheumatol Ther*. 2020;7(4):1021-1035.

References (Cont.)

Sobell JM, Eyerich K, Blauvelt A, et al. Deucravacitinib, a selective tyrosine kinase 2 (TYK2) inhibitor, versus placebo and apremilast in psoriasis: Reductions in individual component scores and body regions of the Psoriasis Area and Severity Index in the phase 3 POETYK PSO-1 and PSO-2 trials. [Poster 34668]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Strand V, Mease PJ, Deodhar A, et al. The impact of deucravacitinib on health-related quality of life measured by the Short Form Health Survey 36-Item Questionnaire: analysis of a phase 2 trial in patients with Active PsA. [Poster 34517]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Strober B, Paul C, Blauvelt A, et al. Bimekizumab efficacy and safety through 96 weeks in patients with moderate to severe plaque psoriasis: results from the open-label extension period of the BE RADIANT phase 3b trial. [Poster 34321]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Taylor W, Gladman D, Helliwell P, et al; CASPAR Study Group. Classification criteria for psoriatic arthritis: development of new criteria from a large international study. *Arthritis Rheum*. 2006;54(8):2665-2673.

Thaçi D, Piaserico S, Du Jardin KJ, et al. Stability of PASI <3 response to tildrakizumab through 5 years: pooled analyses from reSURFACE 1 and reSURFACE 2 Phase 3 trials. [Poster 33025]. Presented at: 2022 American Academy of Dermatology (AAD) Annual Meeting. Boston, MA; March 25-29, 2022.

Thomas ML, Shaddick G, Charlton R, et al. Tumor necrosis factor inhibitor monotherapy versus combination therapy for the treatment of psoriatic arthritis: combined analysis of European biologics databases. *J Rheumatol*. 2021;48(1):48-57.

Tofacitinib Tested as Monotherapy for Psoriatic Arthritis. Bender K website. https://www.hcplive.com/view/tofacitinib-tested-monotherapy-psoriatic-arthritis. Accessed October 25, 2021.

Vivekanantham A, McGagh D, Coates LC. Current treatments and recommendations for psoriatic arthritis. *Best Pract Res Clin Rheumatol*. 2021;35(2):101680.

Xie Y, Liu Y, Liu Y. Are biologics combined with methotrexate better than biologics monotherapy in psoriasis and psoriatic arthritis: a meta-analysis of randomized controlled trials. *Dermatol Ther*. 2021;34(3):e14926.