Supplementary Materials

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Supplementary Methods

Discrete-choice conjoint analysis exercise: Using a multi-criterion decision analysis (MCDA) approach, members of the Combined Expert Committee undertook a discrete-choice conjoint analysis exercise using 1000Minds (http://www.1000minds.com) Potentially All Pairwise RanKings of all possible Alternatives (PAPRIKA) software, guided by an experienced facilitator (AH) over four 2-hour virtual meetings. This process involves decision science theory and computer adaptive technology to enable forced-choice trade-offs using pairwise rankings based on 'partial-profiles' of two criteria at a time. Results from pairwise rankings are extended using transitivity principles to reduce cognitive burden from an excessive number of decisions. Using the pairwise ranking results, mathematical methods are used to calculate item weights, representing their relative importance (1).

References

1. Hansen P, Ombler F. A new method for scoring additive multi-attribute value models using pairwise rankings of alternatives. Journal of Multi-Criteria Decision Analysis. 2008;15(3-4):87-107.

Supplementary Results

Assigning relative weights to domains and categories. The Steering Committee reviewed initial item weights for face validity. All weights were initially zero or positive. Domain C (site of typical episodes of inflammatory arthritis) was re-zeroed to maintain face validity such that absence of typical episode(s) scores 0 points rather than 6 points; 6 points were subtracted from all other items in that domain (**Table S10**). This method of subtracting a constant from all values in a domain preserves the relative weight within a domain and does not affect the relative ordering of one patient versus another in terms of likelihood of CPPD disease. Similarly, domain E (synovial fluid analysis) was re-zeroed such that absence of arthrocentesis was re-assigned 0 points and absence of CPP crystals once or twice were re-assigned with -1 and -7 points respectively.

For the domain regarding imaging of a symptomatic joint (domain G), the Steering Committee agreed that absence of imaging evidence of CPPD on advanced imaging modalities (US, CT, or DECT) influences negatively on the likelihood of CPPD given that these modalities are more sensitive than CR and should be able to detect early CPPD. Given concerns about the low sensitivity of CR for CPPD, it was agreed that absence of CPPD on CR should carry no weight. Consequently, the absence of CPPD on advanced imaging was weighted -4 points. Advanced imaging modalities were initially considered separately from CR in this domain; however, item weights differed by <1% so advanced imaging and CR were combined.

Figure S1: Distribution of median rank of 30 patient profiles by 22 members of the Combined Expert Committee (CEC). Patient profile pseudonyms are listed in the first column; each patient profile is represented by one row of data. Within a given row, numbers in the orange shaded boxes indicate the number of CEC members that ranked the patient profile with that particular rank (e.g., 15 CEC members ranked "Charlotte" as most likely to have CPPD disease; 5 CEC members ranked "Charlotte" as 2nd most likely to have CPPD disease; 1 CEC member ranked "Charlotte" as 3rd most likely to have CPPD disease; etc.) Rank 1 indicates most likely to have CPPD disease; rank 30 is least likely.

Patient vs Median Rank	Range Rank Difference	Median	Mean	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Charlotte	7	1	2	15	5	1				1																							
John	12	4	5	2	1	7	6	1	1			2	1		1																		
Benjamin	18	3	5	3	6	3	4	2			1				1	1					1												
Jennifer	17	5	5	2	4	2	1	6	3	2					1					1													
Paul	14	4	6		4	3	5	1		2	1	1		2			2		1														
Sandra	17	7	7		1	3	1	2	3	3	4	1	1			1				1		1											
Lupa	13	8	9					3	3	4	4	2	1		1		1	1		1	1												
Jack	15	9	9		1	1		4	1		1	4	4	1		1		3		1													
Nolan	16	11	12					1	2	1	4	2	1		1	1	1	1	1	1	1	2	1	1									
Barbara	24	14	13			1	1			1	2		2	2		2	4		2	1		1		1			2						
Olivia	21	12	13						2	2		2	1	2	4	1		3		1	1				1			1		1			
Joe	21	14	14					1	2		1	1	2	2	1		2	1	3	1		1	2	1				1					
Victoria	20	12	14				1		1		2	3	1	3		1		1	2		1			2	1	2	1						
Irene	24	17	15				1		1	2			1	3			2		1	4	1	2	1				2			1			
Vincent	22	16	15				1		1	3					1	1	1	3	3	1	1	1		2			2		1				
Marshall	17	16	16						2						2	2	3	2	1	2	1		3	3		1							
Adam	23	18	16			1	1						1	3	1	1		2	1			2	4	1	1		2		1				
Mary	22	16	17								2		2	1	2	2	1		2		4						2	1		2			1
Elizabeth	19	18	18									2	1	1	2	1	1	1	1	1	1	1			1	2	2	1	2		1			
Cassandra	19	19	18							1						2		1	3	1	2	5	1	2	1	2			1					
Janet	23	20	19					1				1	1	1	1	1				1	1	1	4		5	1				1	2			
Arthur	19	20	19									1	1			2		2			1	3	2	5	2	2		1					
Robin	14	20	19											1	2	1	2	1		2	1	1	2		1	6		2					
Bella	17	21	20										1		1	1	2		1	1	2			3			4	2	1	3			
Philomena	8	25	24																				1		3	4	3	6	2	2	1		
James	13	26	25																	1	1			2	2	1		3	2	5	2	2	1
Peter	11	26	26																			1			2	1	1	3	4	5	4		1
Britney	12	27	27																		1			1				2	6	4	4	2	2
Henry	10	29	28																				1						1	1	3	11	5
Samantha	6	30	29																								1				2	7	12

Kendall's W of patient rankings = 0.721, from which the mean Spearman rank correlation can be calculated as approximately 0.711

			# Experts Rank 1	# Experts Rank 2	# Experts Rank 3	# Experts Rank 4	# Experts Rank 5	# Experts Rank 6	# Experts Rank 7	# Experts Rank 8	# Experts Rank 9	# Experts Rank 10	# Experts Rank 11	# Experts Rank 12	# Experts Rank 13	# Experts Rank 14	# Experts Rank 15	# Experts Rank 16	# Experts Rank 17	# Experts Rank 18	# Experts Rank 19	# Experts Rank 20	# Experts Rank 21	# Experts Rank 22	# Experts Rank 23	# Experts Rank 24	# Experts Rank 25	# Experts Rank 26	# Experts Rank 27	# Experts Rank 28	# Experts Rank 29	# Experts Rank 30

Table S1: Schematic for patient profile adjudication in the derivation and validation cohorts.

Synovial fluid CPP crystal status	**Submitting clinician's rating of likelihood of CPPD disease**	**Ratings of two blinded adjudicators**	**Final case-control status (case, control, or uncertain)**
Absent, or not done, or not available	-2 or -3	Not adjudicated	Control
	-1, 0, or +1	Not adjudicated	Uncertain
	+2 or +3	Both ≤ -1	Control
		Both ≥ +2	Case
		Otherwise	Uncertain
Present	≤+1	Both ≤ -1	Control
		Both ≥ +2	Case
		Otherwise	Uncertain
	+2 or +3	Not adjudicated	Case

Table S2: Case control study of association between candidate clinical and laboratory items and Calcium Pyrophosphate Deposition (CPPD) disease status.

	CPPD disease n=172	Controls n=141	Odds Ratio (95% Confidence Interval)
Age of onset of symptoms			
≤50 years	14 (8.1)	31 (22.1)	1
51-60 years	31 (18.0)	33 (23.6)	2.08 (0.94-4.63)
61-70 years	33 (19.2)	45 (32.1)	1.62 (0.75-3.52)
71-80 years	58 (33.7)	17 (12.1)	7.55 (3.29-17.34)
≥81 years	36 (20.9)	14 (10.0)	5.69 (2.36-13.77)
Acute inflammatory arthritis at the knee (ever)			
No	56 (32.7)	84 (59.6)	1
Yes	115 (67.3)	57 (40.4)	3.03 (1.90-4.81)
Acute inflammatory arthritis at the wrist (ever)			
No	92 (54.1)	76 (54.3)	1
Yes	78 (45.9)	64 (45.7)	1.0 (0.64-1.58)
Acute inflammatory arthritis at the 1st MTP[1] joint (ever)			
No	157 (91.8)	99 (70.2)	1
Yes	14 (8.2)	42 (29.8)	0.21 (0.11-0.40)
Episodes of acute inflammatory arthritis			
One typical episode			
No	134 (80.7)	123 (89.1)	1
Yes	32 (19.3)	15 (10.9)	1.96 (1.01-3.79)
More than one typical episode			
No	79 (47.0)	108 (78.3)	1
Yes	89 (53.0)	30 (21.7)	4.06 (2.45-6.72)
Persistent inflammatory polyarthritis			
No	131 (77.1)	80 (57.1)	1
Yes	39 (22.9)	60 (42.9)	0.40 (0.24-0.65)
Metabolic or inherited risk factors			
No	133 (77.3)	129 (91.5)	1
Yes	39 (22.7)	12 (8.5)	3.15 (1.53-6.90)
Synovial fluid crystal analysis negative for intracellular and/or extracellular Calcium Pyrophosphate (CPP) crystals*	n=6	n=58	
Absent once	5 (83.3)	49 (72.1)	1
Absent twice	1 (16.7)	19 (27.9)	0.52 (0.01-5.11)

Data are presented as n (%). Data from the first 313 cases and controls were used in this analysis.[1]MTPJ: metatarsophalangeal joint
*All patients with crowned dens syndrome and/or synovial fluid CPP crystals were classified as cases. This row only includes patient profiles for which joint aspiration was performed and CPP crystals were not seen.

Table S3: Case control study of association between radiographic osteoarthritis in hands and Calcium Pyrophosphate Deposition (CPPD) disease in patients that had imaging of at least one hand.

	CPPD disease	Controls	Odds Ratio (95% Confidence Interval)
Number of MCP[1] joints affected	n=104	n=80	
0	58 (55.7)	54 (67.5)	1
1	13 (12.5)	7 (8.8)	1.73 (0.64-4.66)
2	9 (8.7)	9 (11.3)	0.93 (0.34-2.52)
3	2 (1.9)	2 (2.5)	0.93 (0.13-6.84)
4	22 (21.2)	8 (10)	2.56 (1.05-6.23)
Number of Scapho-trapezium joints affected	n=105	n=81	
0	52 (49.5)	48 (59.3)	1
1	9 (8.6)	12 (14.8)	0.69 (0.27-1.79)
2	44 (41.9)	21 (25.9)	1.93 (1.01-3.71)
Number of wrists affected	n=105	n=81	
0	62 (59.0)	52 (64.2)	1
1	10 (9.5)	7 (8.6)	1.20 (0.43-3.37)
2	33 (31.4)	22 (27.2)	1.26 (0.65-2.42)
Number of SLAC[2] wrists	n=108	n=82	
0	96 (88.9)	77 (93.9)	1
1	9 (8.3)	3 (3.7)	2.41 (0.63-9.20)
2	3 (2.8)	2 (2.4)	1.20 (0.20-7.38)

[1]MCPJ: metacarpophalangeal; [2]SLAC: scapho-lunate advanced collapse; Data are presented as n (%). Data from the first 313 cases and controls were used in this analysis. The number of cases and controls with imaging data reported for each radiographic finding are noted in each column.

Table S4: Case control study of association between right knee calcification and Calcium Pyrophosphate Deposition Disease (CPPD) disease in patients that had imaging of the right knee.

	CPPD disease	Controls	Odds Ratio (95% Confidence Interval)
Plain radiographs			
Calcification in fibro or hyaline cartilage	n=132	n=90	
No	34 (25.8)	81 (90.0)	1
Yes	98 (74.2)	9 (10.0)	25.94 (11.75-57.24)
Calcification of synovial membrane/capsule/tendon	n=130	n=90	
No	82 (63.1)	83 (92.2)	1
Yes	48 (36.9)	7 (7.8)	6.94 (2.97-16.23)
Computerised Tomography (CT)			
Calcification in fibro or hyaline cartilage	n=28	n=25	
No	5 (17.9)	14 (56.0)	1
Yes	23 (82.1)	11 (44.0)	5.85 (1.68-20.41)
Calcification of synovial membrane/capsule/tendon	(n=27)	(n=25)	
No	7 (25.9)	19 (76.0)	1
Yes	20 (74.1)	6 (24.0)	9.05 (2.57-31.84)
Ultrasonography			
Calcification in fibro or hyaline cartilage	n=41	n=30	
No	9 (22.0)	27 (90.0)	1
Yes	32 (78.0)	3 (10.0)	32.0 (7.86-130.21)
Calcification of synovial membrane/capsule/tendon	n=41	n=29	
No	31 (75.6)	29 (100.0)	1
Yes	10 (24.4)	0 (0.0)	-/-
Magnetic Resonance Imaging			
Calcification in fibro or hyaline cartilage	n=8	n=6	
No	4 (50.0)	6 (100.0)	1
Yes	4 (50.0)	0 (0.0)	-/-
Dual-energy CT			
Calcification in fibro or hyaline cartilage	n=16	n=18	
No	2 (12.5)	14 (77.8)	1
Yes	14 (87.5)	4 (22.2)	24.5 (3.84-156.13)
Calcification of synovial membrane/capsule/tendon	n=16	n=18	
No	3 (18.8)	15 (83.3)	1
Yes	13 (81.2)	3 (16.7)	21.67 (3.71-126.47)
Calcification of right knee using any imaging modality	n=146	n=105	
No	33 (22.6)	85 (81.0)	1
Yes	113 (77.4)	20 (19.0)	14.55 (7.81-27.12)

Data are presented as n (%). Data from the first 313 cases and controls were used in this analysis. The number of cases and controls with imaging data reported for each radiographic finding are noted in each column.

Table S5: Case control study of association between left knee calcification and Calcium Pyrophosphate Deposition (CPPD) disease in patients that had imaging of the left knee.

	CPPD disease	Controls	Odds Ratio (95% Confidence Interval)
Plain radiographs			
Calcification in fibro or hyaline cartilage	n=123	n=87	
No	31 (25.2)	81 (93.1)	1
Yes	92 (74.8)	6 (6.9)	40.06 (15.91-100.91)
Calcification of synovial membrane/capsule/tendon	n=122	n=87	
No	78 (63.9)	80 (92.0)	1
Yes	44 (36.1)	7 (8.0)	6.45 (2.74-15.18)
Computerised Tomography (CT)			
Calcification in fibro or hyaline cartilage	n=29	n=26	
No	6 (20.7)	17 (65.4)	1
Yes	23 (79.3)	9 (34.6)	7.24 (2.16-24.24)
Calcification of synovial membrane/capsule/tendon	n=29	n=26	
No	11 (37.9)	20 (76.9)	1
Yes	18 (62.1)	6 (23.1)	5.45 (1.67-17.77)
Ultrasonography			
Calcification in fibro or hyaline cartilage	n=48	n=30	
No	13 (27.1)	28 (93.3)	1
Yes	35 (72.9)	2 (6.7)	37.69 (7.85-181.07)
Calcification of synovial membrane/capsule/tendon	n=46	n=30	
No	37 (80.4)	30 (100.0)	1
Yes	9 (19.6)	0 (0.0)	-/-
Magnetic Resonance Imaging			
Calcification in fibro or hyaline cartilage	n=11	n=10	
No	9 (81.8)	10 (100.0)	1
Yes	2 (18.2)	0 (0.0)	-/-
Dual-energy CT			
Calcification in fibro or hyaline cartilage	n=19	n=20	
No	4 (21.1)	16 (80.0)	1
Yes	15 (78.9)	4 (20.0)	15.0 (3.17-71.0)
Calcification of synovial membrane/capsule/tendon	n=19	n=20	
No	5 (26.3)	16 (80.0)	1
Yes	14 (73.7)	4 (20.0)	11.2 (2.50-50.08)
Calcification of left knee using any imaging modality	n=137	n=103	
No	26 (19.0)	87 (84.5)	1
Yes	111 (81.0)	16 (15.5)	23.2 (11.72-45.96)

Data are presented as n (%). Data from the first 313 cases and controls were used in this analysis.
The number of cases and controls with imaging data reported for each radiographic finding are noted in each column.

Table S6: Case control study of association between right wrist calcification and Calcium Pyrophosphate Deposition (CPPD) disease in patients that had imaging of right wrist.

	CPPD disease	Controls	Odds Ratio (95% Confidence Interval)
Plain radiographs			
Calcification in fibro or hyaline cartilage	n=118	n=87	
No	45 (38.1)	84 (96.6)	1
Yes	73 (61.9)	3 (3.4)	45.42 (13.5-152.3)
Calcification of synovial membrane/capsule/tendon	n=118	n=87	
No	79 (66.9)	82 (94.3)	1
Yes	39 (33.1)	5 (5.7)	8.10 (3.34-21.59)
Computerised Tomography (CT)			
Calcification in fibro or hyaline cartilage	n=19	n=11	
No	8 (42.1)	8 (72.7)	1
Yes	11 (57.9)	3 (27.3)	3.67 (0.73-18.33)
Calcification of synovial membrane/capsule/tendon	n=19	n=11	
No	12 (63.2)	8 (72.7)	1
Yes	7 (36.8)	3 (27.3)	1.56 (0.31-7.87_
Ultrasonography			
Calcification in fibro or hyaline cartilage	n=39	n=42	
No	5 (12.8)	38 (90.5)	1
Yes	34 (87.2)	4 (9.5)	64.6 (16.03-260.35)
Calcification of synovial membrane/capsule/tendon	n=37	n=42	
No	22 (59.5)	41 (97.6)	1
Yes	15 (40.5)	1 (2.4)	27.95 (3.46-225.88)
Magnetic Resonance Imaging			
Calcification in fibro or hyaline cartilage	n=3	n=3	
No	2 (66.7)	3 (100.0)	1
Yes	1 (33.3)	0 (0.0)	-/-
Dual-energy CT			
Calcification in fibro or hyaline cartilage	n=12	n=5	
No	4 (33.3)	3 (60.0)	1
Yes	8 (66.7)	2 (40.0)	3.0 (0.35-25.87)
Calcification of synovial membrane/capsule/tendon	n=12	n=5	
No	8 (66.7)	3 (60.0)	1
Yes	4 (33.3)	2 (40.0)	0.75 (0.09-6.47)
Calcification of right wrist using any imaging modality	n=128	n=101	
No	30 (23.4)	92 (91.1)	1
Yes	98 (76.6)	9 (8.9)	33.39 (15.04-74.12)

Data are presented as n (%). Data from the first 313 cases and controls were used in this analysis. The number of cases and controls with imaging data reported for each radiographic finding are noted in each column.

Table S7: Case control study of association between left wrist calcification and Calcium Pyrophosphate Deposition (CPPD) disease in patients that had imaging of left wrist.

	CPPD disease	Controls	Odds Ratio (95% Confidence Interval)
Plain radiographs			
Calcification in fibro or hyaline cartilage	n=113	n=86	
No	40 (35.4)	80 (93.0)	1
Yes	73 (64.6)	6 (7.0)	24.33 (9.75-60.74)
Calcification of synovial membrane/capsule/tendon	n=112	n=86	
No	73 (65.2)	82 (95.3)	1
Yes	39 (34.8)	4 (4.7)	10.95 (3.73-32.13)
Computerised Tomography (CT)			
Calcification in fibro or hyaline cartilage	n=16	n=9	
No	4 (25.0)	6 (66.7)	1
Yes	12 (75.0)	3 (33.3)	6.0 (1.0-35.91)
Calcification of synovial membrane/capsule/tendon	n=17	n=9	
No	10 (58.8)	6 (66.7)	1
Yes	7 (41.2)	3 (33.3)	1.4 (0.26-7.58)
Ultrasonography			
Calcification in fibro or hyaline cartilage	n=39	n=41	
No	8 (20.5)	37 (90.2)	1
Yes	31 (79.5)	4 (9.8)	35.84 (9.85-130.42)
Calcification of synovial membrane/capsule/tendon	n=37	n=41	
No	21 (56.8)	40 (97.6)	30.48 (3.78-245.95)
Yes	16 (43.2)	1 (2.4)	
Magnetic Resonance Imaging			
Calcification in fibro or hyaline cartilage	n=5	n=1	
No	3 (60.0)	1 (100.0)	1
Yes	2 (40.0)	0 (0.0)	-/-
Dual-energy CT			
Calcification in fibro or hyaline cartilage	n=10	n=3	
No	4 (40.0)	1 (33.3)	1
Yes	6 (60.0)	2 (66.7)	0.75 (0.05-11.31)
Calcification of synovial membrane/capsule/tendon	n=10	n=3	
No	5 (50.0)	1 (33.3)	1
Yes	5 (50.0)	2 (66.7)	0.50 (0.33-7.45)
Calcification of left wrist using any imaging modality	n=127	n=100	
No	25 (19.7)	90 (90.0)	1
Yes	102 (80.3)	10 (10.0)	36.72 (16.73-80.60)

Data are presented as n (%). Data from the first 313 cases and controls were used in this analysis. The number of cases and controls with imaging data reported for each radiographic finding are noted in each column.

Table S8: Case control study of association between calcification at other affected site and Calcium Pyrophosphate Deposition (CPPD) disease.

	CPPD	Controls	Odds Ratio (95% Confidence Interval)
Plain radiographs			
Calcification in fibro or hyaline cartilage	n=55	n=47	
No	31 (56.4)	47 (100.0)	1
Yes	24 (43.6)	0 (0.0)	-/-
Calcification of synovial membrane/capsule/tendon	n=54	n=47	
No	37 (68.5)	42 (89.4)	1
Yes	17 (31.5)	5 (10.6)	3.86 (1.30-11.50)
Computerised Tomography (CT)			
Calcification in fibro or hyaline cartilage	n=26	n=19	
No	7 (26.9)	17 (89.5)	1
Yes	19 (73.1)	2 (10.5)	23.07 (4.21-126.6)
Calcification of synovial membrane/capsule/tendon	n=27	n=19	
No	8 (29.6)	17 (89.5)	1
Yes	19 (70.4)	2 (10.5)	20.19 (3.75-108.53)
Ultrasonography			
Calcification in fibro or hyaline cartilage	n=26	n=19	
No	10 (38.5)	19 (100.0)	1
Yes	16 (61.5)	0 (0.0)	-/-
Calcification of synovial membrane/capsule/tendon	n=25	n=19	
No	16 (64.0)	16 (84.2)	1
Yes	9 (36.0)	3 (15.8)	3.0 (0.68-13.17)
Magnetic Resonance Imaging			
Calcification in fibro or hyaline cartilage	n=3	n=0	
No	3 (100.0)	0 (0.0)	1
Yes	0 (0.0)	0 (0.0)	-/-
Dual-energy CT			
Calcification in fibro or hyaline cartilage	n=4	n=5	
No	2 (50.0)	5 (100.0)	1
Yes	2 (50.0)	0 (0.0)	-/-
Calcification of synovial membrane/capsule/tendon	n=5	n=5	
No	3 (60.0)	5 (100.0)	1
Yes	2 (40.0)	0 (0.0)	-/-
Any imaging modality	n=76	n=55	
No	14 (18.4)	46 (83.6)	1
Yes	62 (81.6)	9 (16.4)	22.63 (9.02-56.81)

Data are presented as n (%). Data from the first 313 cases and controls were used in this analysis. The number of cases and controls with imaging data reported for each radiographic finding are noted in each column.

Table S9: Number of affected sites with Calcium Pyrophosphate Deposition (CPPD) disease on imaging among patient profiles that had at-least one joint imaged

Number	CPPD n=172	Controls n=141	Odds Ratio (95% Confidence Interval)
0	15 (8.7)	108 (76.6)	1
1	30 (17.4)	14 (9.9)	15.43 (6.71-35.49)
2	25 (14.5)	11 (7.8)	16.36 (6.71-39.90)
3	30 (17.4)	4 (2.8)	54.0 (16.68-174.82)
4	44 (25.6)	4 (2.8)	79.20 (24.90-251.96)
5	28 (16.3)	0 (0.0)	-/-

Data are presented as n (%). Data from the first 313 cases and controls were used in this analysis. The number of cases and controls with imaging data reported for each radiographic finding are noted in each column.

Table S10: Evolution of Calcium Pyrophosphate Deposition (CPPD) disease classification criteria items and weights

	Domains and levels	Raw weights	Re-zeroed weights	Adjust items with diff. <1	Final weights
A	Age at onset of joint symptoms				
	≤60 years	0	0	0	0
	>60 years	4	4	4	4
B	Time-course and symptoms of inflammatory arthritis				
	No persistent or typical inflammatory arthritis	0	0	0	0
	Persistent inflammatory arthritis	9	9	9	9
	1 typical episode	12.4	12.4	12.4	12
	More than 1 typical episode	15.8	15.8	15.8	16
C	Sites of typical episode(s) of inflammatory arthritis				
	1st MTPJ	0	-5.9	-5.9	-6
	No typical episode(s)	5.9	0	0	0
	Joint(s) other than wrist, knee or 1st MTPJ	10.6	4.7	4.7	5
	Wrist	13.5	7.6	7.6	8
	Knee	15.2	9.3	9.3	9
D	Related metabolic diseases[1]				
	None	0	0	0	0
	Present	6.5	6.5	6.5	6
E	Synovial fluid crystal analysis from a symptomatic joint				
	CPP crystals absent on ≥2 occasions	0	-7.1	-7.1	-7
	CPP crystals absent on 1 occasion	5.9	-1.2	-1.2	-1
	Not performed	7.1	0	0	0
F	OA of hand/wrist on imaging				
	None of the following findings	0	0	0	0
	No wrist/hand imaging performed	0.6	0.6		
	Bilateral radio-carpal joints	2.2	2.2	2.2	2
	≥2 of following: STTJ OA without 1st CMCJ OA; 2nd or 3rd MCPJ OA	6.5	6.5	6.5	7
G	Imaging evidence of CPPD in symptomatic joint(s)				
	None on US, CT, or DECT (and absent on CR or CR not performed)	0	-3.7	-3.7	-4
	None on CR (and US, CT, DECT not performed)	3.7	0	0	0
	Present on US, CT, or DECT	19.3	15.6	16.2	16
	Present on CR	19.9	16.2		
H	Number of peripheral joints with evidence of CPPD on any imaging modality regardless of symptoms				
	None	0	0	0	0
	1	16.1	16.1	16.1	16
	2-3	23.3	23.3	23.3	23
	≥4	24.8	24.8	24.8	25

[1] These included hereditary hemochromatosis, primary hyperparathyroidism, hypomagnesemia, Gitelman syndrome, hypophosphatasia, or familial history of CPPD disease. Abbreviations: MTPJ metatarsophalangeal joint; CPP calcium pyrophosphate; STTJ scaphotrapezio-trapezoid joint; CMCJ carpometacarpal joint; OA, osteoarthritis; MCPJ metacarpophalangeal joint. US ultrasound; CT computed tomography; DECT dual-energy computed tomography; CR conventional radiography.

Table S11: Performance characteristics in the derivation cohort (n=60 definite cases and n=148 mimickers) around the preliminary threshold score of >56.

Threshold score	Sensitivity	Specificity
>49	94.1	87.3
>55	92.2	87.3
>56	92.2	87.9
>61	90.2	88.5
>62	88.2	88.5

Table S12: Performance characteristics across submitting expert's rating for likelihood of Calcium Pyrophosphate Deposition (CPPD) disease.

Submitting expert's rating for likelihood of CPPD disease							
	-3	-2	-1	0	+1	+2	+3
Derivation cohort							
Number of cases	99	50	16	26	20	60	147
N (%) classified as CPPD	9 (9.1%)	5 (10.0%)	6 (37.5%)	15 (57.8%)	15 (75.0%)	46 (76.7%)	145 (98.7%)
Validation cohort							
Number of cases	71	90	37	43	105	116	155
N (%) classified as CPPD	2 (2.8%)	11 (12.2%)	9 (24.3%)	25 (58.1%)	79 (75.2%)	102 (88.0%)	149 (96.1%)