

User Guide for `sparc_scores()` Function

Crohn's and Colitis Foundation

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Contents

Overview	2
Requirements.....	2
Output Table	3

Overview

Sparc_scores() is a function that reads in SPARC data from IBD Plexus, and calculates diagnosis, phenotype, disease, and endoscopy scores at a specific ("index") date.

Requirements

- R Version 4.0.0 or above
- The following R packages are required and can be installed using `install.packages("package name")`
 - reshape2
 - plyr
 - tidyverse
 - lubridate
 - DT
 - readxl
 - openxlsx
- `datadir` = the directory where the unzipped SPARC data from IBD Plexus is saved
 - .csv and .txt format are acceptable
 - If multiple extracts are saved in the same folder, the most recent files will be selected
- `Index_info` = a data frame with `DEIDENTIFIED_MASTER_PATIENT_ID` and a variable named `index_date`.
 - The default `index_date` is the `DATE_OF_CONSENT`
- `Filename` = the name of the output file.
 - Must be in .xlsx format
 - The default is `SPARC_SCORES.xlsx`
- `Index_range` = the number of days to look out from index date.
 - The default is 14 days
 - For example, to see scores within +/- 30 days of enrollment, the `index_range` = "30".

Output Table

The output file “SPARC_SCORES.xlsx” included the following columns. If more than the DEIDENTIFIED_MASTER_PATIENT_ID and index_date is in the index_info data.frame, those columns will be included as well. Unless otherwise specified, the closest value to the index date is used if there are multiple reported values within the index range. All values in the Smartform (SF_SPARC) can be pulled forward if there is no update reported. Clinicians only record data in the SF if there are changes.

Column Header	Derived Variable (Y/N)	DDM Table	DDM Data Source	Other DDM Filters	DDM Variable	Notes
DEIDENTIFIED_MASTER_PATIENT_ID	N	Demographics	ECRF_SPARC		DEIDENTIFIED_MASTER_PATIENT_ID	
INDEX_DATE	Y					A date of interest specified by the user.
DATE_OF_CONSENT	N	Demographics	ECRF_SPARC		DATE_OF_CONSENT	
DATE_OF_CONSENT_WITHDRAWN	N	Demographics	ECRF_SPARC		DATE_OF_CONSENT_WITHDRAWN	
BIRTH_YEAR	N	Demographics	ECRF_SPARC		BIRTH_YEAR	
GENDER	N	Demographics	ECRF_SPARC		GENDER	
DIAGNOSIS	N	Diagnosis	SF_SPARC > ECRF_SPARC	DIAG_CONCEPT_NAME equals Crohn’s Disease, Ulcerative Colitis or IBD Unclassified. For SF only, DIAG_STATUS_CONCEPT_CODE equals Yes.	DIAG_CONCEPT_NAME	Chose diagnosis reported closest to index date from SF first, then ECRF. Use ECRF_QORUS if consented to both studies. The closest diagnosis was selected.
CROHN'S DISEASE PHENOTYPE	N	Observations	SF_SPARC	For Crohn’s Disease patients only. OBS_TEST_CONCEPT_NAME equals “Crohn’s Disease Phenotype”.	DESCRIPTIVE_SYMPTEST_RESULTS	Inflammatory, non-penetrating, non-stricturing phenotype can be pulled backward. All phenotypes can be pulled forward to the next reported phenotype. The closest phenotype to index date was selected.
EXTENT OF MACROSCOPIC	N	Observations	SF_SPARC	For Ulcerative Colitis patients only. OBS_TEST_CONCEPT_N	DESCRIPTIVE_SYMPTEST_RESULTS	Ulcerative proctitis (rectum only) can be pulled backward. All phenotypes can be pulled forward

ULCERATIVE COLITIS				AME equals “Extent of Macroscopic Ulcerative Colitis”		to the next reported phenotype. The closest phenotype to index date was selected.
EXTENT OF MACROSCOPIC IBD UNCLASSIFIED	N	Observations	SF_SPARC	For IBD unclassified patients only. OBS_TEST_CONCEPT_N AME equals “Extent of Macroscopic IBD Unclassified”	DESCRIPTIVE_SYMP_TE ST_RESULTS	Ulcerative proctitis (rectum only) can be pulled backward. All phenotypes can be pulled forward to the next reported phenotype. The closest phenotype to index date was selected.
ADALIMUMAB	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.
CERTOLIZUMAB PEGOL	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.
CORTICOSTEROIDS	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.
GOLIMUMAB	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.
INFLIXIMAB	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.
MESALAMINE	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.
METHOTREXATE	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.
NATALIZUMAB	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.
OTHER BIOLOGIC	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINIS TRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.

SULFASALAZINE	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINISTRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.	
THIOPURINE	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINISTRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.	
TOFACITINIB	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINISTRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.	
USTEKINUMAB	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINISTRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.	
VEDOLIZUMAB	N	Prescriptions	SF_SPARC	MEDICATION_NAME	MEDICATION_ADMINISTRATED_CODE	Reports of “Never” used medication after index_date can be pulled backward. Otherwise only data up until the index date was used.	
ABDOMINAL.PAIN.SCORE	N	Observations	SF_SPARC; ECRF_SPARC	FOR SF, OBS_TEST_CONCEPT_NAME equals Abdominal Pain-Pain Scale; For ECRF, OBS_TEST_CONCEPT_NAME equals Abdominal Pain	DESCRIPTIVE_SYMP_TEST_RESULTS	Use to calculate A for sCDAI equation.	
						DESCRIPTIVE_SYMP_TEST_RESULTS	A
						None	0
						Mild	1
						Moderate	2
Severe	3						
DAILY.BM	N	Observations	SF_SPARC; ECRF_SPARC	FOR SF, OBS_TEST_CONCEPT_NAME equals Current Average Number of Daily Bowel Movements or Current Maximum Number of Daily Bowel Movements. For ECRF, OBS_TEST_CONCEPT_NAME equals Current Average Number of Daily Bowel Movements or Current Average Number of	TEST_RESULT_NUMERIC; DESCRIPTIVE_SYMP_TEST_RESULTS	This is B for the sCDAI equation. This is N/A for anyone with an ostomy. 20+ was treated as 20 in the sCDAI equation.	

				Daily Liquid Bowel Movements. For ECRF, if OBS_TEST_RESULT_DATE before August 1, 2018 use Current Average Number of Daily Bowel Movements.			
DAILY.BM.VERSION	Y					Refers to the question used to determine the daily.bm variable in the sCDAI equation.	
						1	Current Average Number of Daily Bowel Movements
						2	Current Average Number of Daily Liquid Bowel Movements
						3	Current Maximum Number of Daily Bowel Movements
GENERAL.WELL.BEING.SCORE	N	Observations	SF_SPARC; ECRF_SPARC	FOR SF, OBS_TEST_CONCEPT_NAME equals Constitutional - General Well-Being; For ECRF, OBS_TEST_CONCEPT_NAME equals General Well-Being	DESCRIPTIVE_SYMP_TEST_RESULTS	Use to calculate G for sCDAI equation.	
						DESCRIPTIVE_SYMP_TEST_RESULTS	G
						Generally well	0
						Slightly under par	1
						Poor	2
						Very poor	3
						Terrible	4
SCDAI.DATE	N	Observations	SF_SPARC; ECRF_SPARC		OBS_TEST_RESULT_DATE		
SCDAI.SCORE ¹	Y	[Calculated]	SF_SPARC; ECRF_SPARC			Crohn’s Disease Only. Only use SF or ECRF to calculate; Do not combine from multiple sources to calculate. If one variable	

¹ Henao MP, Bewtra M, Osterman MT, Aberra FN, Scott FI, Lichtenstein GR, Kraschnewski J, Lewis JD. Measurement of Inflammatory Bowel Disease Symptoms: Reliability of an Abbreviated Approach to Data Collection. Inflamm Bowel Dis. 2015 Oct;21(10):2262-71. doi: 10.1097/MIB.0000000000000496. PMID: 26193348; PMCID: PMC4567473.

						is missing from equation, leave blank for that source. $sCDAI = 44 + (2 \times 7 \times B) + (5 \times 7 \times A) + (7 \times 7 \times G)$										
SCDAI.SOURCE	Y		SF_SPARC; ECRF_SPARC			If SF variables used, then put SF, if ECRF variables used then put ECRF.										
GLOBAL.ASSESSMENT.SCORE	N	Observations	SF_SPARC	OBS_TEST_CONCEPT_NAME equals Physician's Global Assessment of Current Disease Status	DESCRIPTIVE_SYMP_T EST_RESULTS	This is <i>T</i> for the UCDAI.9.SCORE. <table><tr><td>DESCRIPTIVE_SYMP_T EST_RESULTS</td><td>T</td></tr><tr><td>Quiescent</td><td>0</td></tr><tr><td>Mild</td><td>1</td></tr><tr><td>Moderate</td><td>2</td></tr><tr><td>Severe</td><td>3</td></tr></table>	DESCRIPTIVE_SYMP_T EST_RESULTS	T	Quiescent	0	Mild	1	Moderate	2	Severe	3
DESCRIPTIVE_SYMP_T EST_RESULTS	T															
Quiescent	0															
Mild	1															
Moderate	2															
Severe	3															
RECTAL.BLEEDING.SCORE	Y	Observations	SF_SPARC; ECRF_SPARC;	FOR SF, OBS_TEST_CONCEPT_NAME Blood in Stool - Recent Change in Rectal Bleeding Amount For ECRF, OBS_TEST_CONCEPT_NAME equals Blood in Stool and/or Blood Passed Alone	DESCRIPTIVE_SYMP_T EST_RESULTS	If from both sources at baseline separate by semicolon. This is <i>R</i> for the UCDAI.6 & UCDAI.9 SCORE. <table><tr><td>DESCRIPTIVE_SYMP_T EST_RESULTS</td><td>R</td></tr><tr><td>None; No blood seen</td><td>0</td></tr><tr><td>Visible blood in stool less than half the time; Blood less than 50% of the time</td><td>1</td></tr><tr><td>Visible blood in stool half the time or more; Blood 50% or more of the time</td><td>2</td></tr><tr><td>Passing blood alone; ECRF: Blood Passed Alone = Yes</td><td>3</td></tr></table>	DESCRIPTIVE_SYMP_T EST_RESULTS	R	None; No blood seen	0	Visible blood in stool less than half the time; Blood less than 50% of the time	1	Visible blood in stool half the time or more; Blood 50% or more of the time	2	Passing blood alone; ECRF: Blood Passed Alone = Yes	3
DESCRIPTIVE_SYMP_T EST_RESULTS	R															
None; No blood seen	0															
Visible blood in stool less than half the time; Blood less than 50% of the time	1															
Visible blood in stool half the time or more; Blood 50% or more of the time	2															
Passing blood alone; ECRF: Blood Passed Alone = Yes	3															
STOOL.FREQ.SCORE	N	Observations	SF_SPARC; ECRF_SPARC;	FOR SF, OBS_TEST_CONCEPT_NAME equals Recent Change in Daily Stool	DESCRIPTIVE_SYMP_T EST_RESULTS	If from both sources at baseline separate by semicolon. This is <i>S</i> for the UCDAI.6 & UCDAI.9 SCORE. <table><tr><td>DESCRIPTIVE_SYMP_T EST_RESULTS</td><td>S</td></tr></table>	DESCRIPTIVE_SYMP_T EST_RESULTS	S								
DESCRIPTIVE_SYMP_T EST_RESULTS	S															

				Frequency . For ECRF, OBS_TEST_CONCEPT_NAME equals Recent Change in Daily Stool Frequency		<table><tr><td>Normal</td><td>0</td></tr><tr><td>1-2 stools/day more than normal</td><td>1</td></tr><tr><td>3-4 stools/day more than normal</td><td>2</td></tr><tr><td>>4 stools/day more than normal; 5 or more stools per day more than normal</td><td>3</td></tr></table>	Normal	0	1-2 stools/day more than normal	1	3-4 stools/day more than normal	2	>4 stools/day more than normal; 5 or more stools per day more than normal	3
Normal	0													
1-2 stools/day more than normal	1													
3-4 stools/day more than normal	2													
>4 stools/day more than normal; 5 or more stools per day more than normal	3													
UCDAI.6.SCORE	Y	[Calculated]				Ulcerative Colitis Only. Only use SF or ECRF to calculate; Do not combine from multiple sources to calculate. If one variable is missing from equation, leave blank for that source. $UCDAI.6.SCORE = S + R$								
UCDAI.9.SCORE	Y	[Calculated]				Ulcerative Colitis Only. Only use SF or ECRF to calculate; Do not combine from multiple sources to calculate. If one variable is missing from equation, leave blank for that source. $UCDAI.9.SCORE = S + R + T$								
UCDAI.DATE	N	Observations	SF_SPARC; ECRF_SPARC		OBS_TEST_RESULT_DATE									
UCDAI.SOURCE	Y		SF_SPARC; ECRF_SPARC			If SF variables used, then put SF, if ECRF variables used then put ECRF.								
ILEUM	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	LOCATION									
DESCENDING COLON	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	LOCATION									
LEFT COLON	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals	LOCATION									

				Colonoscopy/Sigmoidoscopy		
RECTUM	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	LOCATION	
RIGHT COLON	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	LOCATION	
SIGMOID COLON	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	LOCATION	
TRANSVERSE COLON	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	LOCATION	
SES_SCORE	Y	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	SES.CD_Subscore	Sum of SES.CD_Subscore from each location from same colonoscopy. If segment is “Not reached” then treated as 0. For Crohn’s Disease patients only.
SES.DATE	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	PROC_START_DATE	Date of colonoscopy with SES scoring.
MAX_EXTENT_ACTIVE_DISEASE	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	MAX_EXTENT_ACTIVE_DISEASE	Units = cm
MAYO_ENDOSCOPY_SCORE²	Y	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	MAYO_ENDOSCOPIC_SUBSCORE	Maximum MAYO_ENDOSCOPIC_SUBSCORE from each location from same colonoscopy. For Ulcerative Colitis patients only.

² Triana Lobatón, Talat Bessissow, Gert De Hertogh, Bart Lemmens, Chelsea Maedler, Gert Van Assche, Séverine Vermeire, Raf Bisschops, Paul Rutgeerts, Alain Bitton, Waqqas Afif, Victoria Marcus, Marc Ferrante, The Modified Mayo Endoscopic Score (MMES): A New Index for the Assessment of Extension and Severity of Endoscopic Activity in Ulcerative Colitis Patients, *Journal of Crohn's and Colitis*, Volume 9, Issue 10, October 2015, Pages 846–852, <https://doi.org/10.1093/ecco-jcc/jjv111>

MODIFIED_MAYO_SCORE²	Y	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	MAYO_ENDOSCOPIC_SUBSCORE	Sum of MAYO_ENDOSCOPIC_SUBSCORE from each location from same colonoscopy. For Ulcerative Colitis patients only.
EXTENDED_MODIFIED_MAYO_SCORE²	Y	[Calculated]				$EMS = \frac{MODIFIED_MAYO_SCORE}{MAX_EXTENT_ACTIVE_DISEASE/10}$
MODIFIED_MAYO_ENDOSCOPIC_SCORE²	Y	[Calculated]				$= \frac{Modified\ Mayo\ Endoscopic\ Score}{EMS}$ <i>Number of Segments with Active Disease</i>
MES.DATE	N	Procedures	ECRF_SPARC	PROC_CONCEPT_NAME equals Colonoscopy/Sigmoidoscopy	PROC_START_DATE	Date of colonoscopy with Mayo Scoring.
OSTOMY	N	Procedures & Observations	SF_SPARC, ECRF_SPARC	For SF, PROC_CONCEPT_NAME equals Ileostomy/colostomy ; For ECRF, OBS_TEST_CONCEPT_NAME equals Baseline Number of Daily Bowel Movements or Current Average Number of Daily Bowel Movements or Recent Change in Daily Stool Frequency or Current Average Number of Daily Liquid Bowel Movements equals Not applicable, I have an ostomy	DESCRIPTIVE_SYMP_TEST_RESULTS	Only populated for those missing sCDAI or UCDAI scores.