National STAR File User Guide

V1.0

Contents

Feedback and Questions

National STAR file: STARFile@unos.org
General data request questions: datarequest@unos.org

Overview

STAR (Standard Transplant Analysis and Research) files are datasets that contain OPTN patient-level information about transplant recipients, deceased and living donors, and waiting list candidates.

National STAR File vs. Center STAR File

The National STAR file contains information on all waiting list registrations and transplants that have been listed or performed in the United States and reported to the OPTN since October 1, 1987. It contains limited datasets including data from all U.S. transplant hospitals. The standard version of the National STAR file is distributed free of charge to any researcher that submits a request and signs the required Data Use Agreement and is delivered securely via an electronic method. It is updated quarterly.

Note: For transplant follow-up data, if a follow-up occurs or is expected within 30 days of the end of the quarter when the file is generated, it will be included in the current update. If a follow-up is expected beyond 30 days of the end of the quarter, it will be included in the next update.

The Center STAR file is provided to each transplant hospital in the Data Services portal and contains datasets of information related to a specific hospital's waiting list registrations and transplants. Center STAR file datasets are patient-identified and therefore contain PHI and PII and are only available to the relevant transplant hospital.

A Center STAR file is essentially a subset of the National STAR file for a particular hospital, including patient identifiers.

This user guide pertains to the National STAR file only. For instructions on how to use the Center STAR files, see the Center STAR Files User Guide which can be found in the Documentation section of the Data Services portal in Secure Enterprise℠.

How to Obtain the National STAR File

To obtain the national STAR file submit a data request on the OPTN website by navigating to the following page: https://optn.transplant.hrsa.gov/data/view-data-reports/request-data/.

A UNOS staff member will respond via email within five (5) business days with a Data Use Agreement (DUA) to be completed and signed. By signing the DUA the recipient agrees to use the data for statistical analysis and reporting purposes only, not release the data to any other person without written approval, and not to attempt to learn the identity of any person whose information is contained in the data.
UNOS staff will coordinate via email or phone on the specifics of the request. Once the signed DUA is received by the OPTN, the STAR file will be delivered securely via an electronic method within 30 days.

For more information visit the following page:
https://optn.transplant.hrsa.gov/data/view-data-reports/request-data/data-request-instructions/.

How to Use the National STAR File

The National STAR file contains the following file types:

- Delimited text file (.DAT extension) – Tab-delimited file
- SAS dataset (.sas7bdat extension) – SAS raw file
- SAS export to STATA (.DTA extension) – SAS file exported to STATA
- SAS transport file (.CPT extension) – SAS data sets, catalogs, libraries to sequential file formats

If you have access to SAS software, the SAS dataset files located within the folder named “SAS Datasets” are recommended. If you are using SPSS, it is recommended to import the SAS dataset files into SPSS. The lookup values and SAS formats are located within subfolders as tab-delimited text files under the main folder “CODE DICTIONARY – FORMATS”.

When using the data for the first time, you will note that all of the folders (one for each of the three formats described in the paragraph above) have been compressed (zipped) to fit into a single folder. If you are using WINZIP or PKZIP, you can access the data directly in the appropriate folder structure. If you are using SecureZIP, you will need to “extract” the data prior to using it in order to maintain the desired folder structure. The SecureZIP wizard can walk you through that process. It is recommended to extract all data before use.

Standard Datasets – Summary Descriptions

All Organs

ADDTL_HLA	Details of recipient and donor (if retyped) HLA from recipient histocompatibility forms.
MALIG_FOLLOWUP_DATA	Details of reported post-transplant malignancies. May contain multiple records per transplant event if malignancies were reported on multiple follow-up forms.
PRA_CROSSMATCH_DATA	Details of recipient PRA and crossmatch information from recipient histocompatibility forms.
WLHISTORY_DATA	Details of all modifications to waiting list record while registrations listed. Includes changes to medical urgency status, LAS scores, etc. Contains multiple records per waiting list registration, with one record per waiting list modification.
IMMUNO_DISCHARGE_DATA	Recipient immunosuppression information at discharge. One record per transplant. Includes induction, maintenance, and anti-rejection medications.
IMMUNO_FOLLOWUP_DATA	Recipient immunosuppression at each follow-up. Includes maintenance and anti-rejection medications. One record per follow-up, may contain multiple records per transplant event.
FOLLOWUP_DATA	Follow-up information for transplant recipients. Follow-up data are collected at 6 months and then annually until death, graft failure, or the patient is lost to follow-up. For this reason, there are multiple records for most transplant events. ***Note:*** If the patient received a kidney-pancreas transplant prior to January 27, 2003, their follow-up data prior to that date will be found in both the kidney and pancreas follow-up datasets, not the KIDPAN follow-up dataset. The KIDPAN dataset contains follow-up information for kidney-pancreas transplants after January 27, 2003.

Deceased Donors

DECEASED_DONOR_DATA	Includes one record per deceased donor (at least one organ recovered for transplant) recovered since October 1, 1987.
DECEASED_DONOR_INOTROPIC_MEDS	Includes one record per each inotropic medication given to the deceased donor at the time of cross-clamp and recorded on the DDR. May contain multiple records per individual donor.
DCD_MEASURES	Includes one record per each observation of controlled DCD measures. May contain multiple records per individual donor.

Kidney-Pancreas

KIDPAN_DATA	Includes one record per kidney, pancreas, or kidney-pancreas waiting list registration and/or transplant. If the patient received a living donor transplant without being placed on the waiting list, there will be transplant information, but no waiting list information. If the patient was listed for transplant but not transplanted as a result of that registration, there will be waiting list information but no transplant data. Multiple listings (KI, KP, PA) may be present if a candidate indicated a willingness to accept the organs separately. PT_CODE, CTR_CODE, and INIT_DATE can be used to identify those listings.

Liver

LIVER_DATA	Includes one record per liver waiting list registration and/or transplant. Includes livers used in multivisceral transplants. If the patient received a living donor transplant without being placed on the waiting list, there will be transplant information but no waiting list information. If the patient was listed for transplant but not transplanted as a result of that registration, there will be waiting list information but no transplant data.
LIVER_EXPLANT_DATA	Liver explant data is available for transplants beginning April 12, 2012, where the recipient had an approved HCC exception at the time of transplant.
LIVER_EXCEPTION_DATA	Information from liver exception[1] data collected while listed for transplant. Includes additional information collected regarding HCC, etc. May contain multiple records per waiting list registration.

[1] If a candidate's transplant program believes that a candidate's current status does not appropriately reflect the candidate's medical urgency for transplant, the transplant program may register a candidate at an exceptional status. See OPTN Policies for more information.

Thoracic

THORACIC_LAS_AUDIT_DATA	Contains at least one record per day per registration on the waiting list as the LAS is recalculated once per day based on candidate age. LAS data collection began on 5/4/2005.
THORACIC_LAS_HISTORY_DATA	Contains one record per modification to inputs to LAS. Each waiting list registration may have multiple records, one for each modification to the LAS inputs. LAS data collection began on 5/4/2005. ***Note:*** THORACIC_LAS_HISTORY_DATA dataset contains fewer records than THORACIC_LAS_AUDIT_DATA dataset because it is updated only when changes to inputs occur.
THORACIC_STAT1A	Additional data collected on patients with heart status 1A justification form.
THORACIC_STAT1B	Additional data collected on patients with heart status 1B justification form.
THORACIC_STAT1	Additional data collected on adult patients with heart status 1 justification form. Data collection began on 10/18/2018.
THORACIC_STAT2	Additional data collected on adult patients with heart status 2 justification form. Data collection began on 10/18/2018.
THORACIC_STAT3	Additional data collected on adult patients with heart status 3 justification form. Data collection began on 10/18/2018.
THORACIC_STAT4	Additional data collected on adult patients with heart status 4 justification form. Data collection began on 10/18/2018.
THORACIC_DATA	Includes one record per heart, lung, or combined heart-lung waiting list registration and/or transplant. If the patient received a living donor transplant without being placed on the waiting list, there will be transplant information, but no waiting list information. If the patient

	was listed for transplant but not transplanted, there will be waiting list information but no transplant data.
THORACIC_MCS_DEVICE	Mechanical Circulatory Support device data collected at waitlist removal for any devices ever in place (removals on or after January 6, 2011). May contain multiple records if multiple devices are listed.

Intestine

INTESTINE_DATA	Includes one record per intestine waiting list registration and/or transplant. This includes intestines used in multivisceral transplants. If a patient received a living donor transplant without being placed on the waiting list, there will be transplant information but no waiting list information. If a patient was listed for transplant, but not transplanted as a result of that registration, there will be waiting list information but no transplant data.

Living Donor

LIVING_DONOR_DATA	One record per living donor recovered since October 1, 1987.
LIVING_DONOR_FOLLOWUP_DATA	Follow-up information on living donors recovered since October 25, 1999. Follow-up data are currently collected at 6 months, one year, and two years post-donation. Therefore, there may be multiple records per living donor.

VCA

VCA_DATA	Includes one record per VCA waiting list registration and/or transplant. If a patient was listed for transplant but not transplanted as a result of that registration, there will be waiting list information but no transplant data.

Additional Datasets

A standard STAR file is delivered by default. The following datasets are available upon request.

Center ID Data

The center ID dataset consists of 5 additional datasets with unencrypted center identifiers and some location data for all donors, candidates, and recipients.

DONOR_CTR_IDS

Contains one record per DONOR_ID, for both living and deceased donors.

For living donors, includes:

- Donor recovery facility code and name
- Donor workup facility code

Note: Donor workup facility is the name of the hospital that entered the living donor data. Donor recovery facility is typically the same but can be different if the organ was recovered at a different hospital.

For deceased donors, includes:

- Donor hospital CMS provider number
- Donor hospital type, name, and ZIP code
- OPO code and name

INTESTINE_CTR_IDS, KIDPAN_CTR_IDS, LIVER_CTR_IDS, THORACIC_CTR_IDS

Organ-specific datasets that contain records for waiting list registrations and transplants for the specified organs (KIDPAN includes KI, PA, and KP; THORACIC includes HR, LU, and HL). These files contain one record per waiting list registration (WL_ID_CODE) and/or transplant (TRR_ID_CODE), similar to the main datasets.

For each waiting list registration, includes:

- Listing hospital code, name, and ZIP code
- Listing hospital DSA code and name

For transplants, includes:

- Transplant hospital code, name, and ZIP code
- Transplant hospital DSA code and name

These files also include all the fields from DONOR_CTR_IDS (above) for each transplant record.

DonorNet® Data

This dataset consists of nine additional datasets containing serial data from DonorNet® donor management records entered during the allocation process. In instances where the same data were entered from multiple time points, each dataset will contain multiple records for a single DONOR_ID.
***Note*:** Test results and free text entries that contain patient-identified information are excluded.

ABGS	Serial arterial blood gas (ABG) and ventilator settings data. Includes: ○ Date/time of measurement ○ pH ○ paO2 ○ pCO2 ○ HCO3 ○ SaO2 ○ FiO2 ○ Vent mode ○ Flow rate ○ Tidal volume ○ PEEP settings
CBC	Serial complete blood count (CBC) data. Includes: ○ Sample collection date ○ WBC ○ RBC ○ Hemoglobin ○ Hematocrit ○ Platelet count ○ Band neutrophil percentage
CULTURES	Serial culture/microbiology testing data. Includes: ○ Sample collection date ○ Culture type (blood, urine, sputum gram stain, sputum culture, CSF, other) ○ Result (positive, negative, pending)
INDICATORS	Serial donor management indicators data. Includes: ○ Blood pressure (high, low, average) ○ Pulse rate ○ Body temperature ○ Cardiac index (CI) ○ Cardiac output (CO) ○ Central venous pressure (CVP) ○ Pulmonary artery pressure ○ Pulmonary capillary wedge pressure ○ Urine output
INOMEDS	Date listing for any inotropic medications given during donor management. Includes: ○ Medication type (dopamine, epinephrine, etc.) ○ Begin and end date/time ○ Dosage with units ○ Duration of administration

LABPANELS Serial lab panel results. Includes specimen date/time and results for the following:

- Albumin
- Alkaline phosphatase (ALP)
- Amylase
- Bilirubin (total, direct, and indirect)
- Blood urea nitrogen (BUN)
- Chloride
- Bicarbonate (CO2)
- Creatinine
- Globulin
- Glucose
- INR
- Lactate dehydrogenase (LDH)
- Lipase
- Potassium
- Total protein
- Prothrombin time
- Partial thromboplastin time (PTT)
- Aspartate aminotransferase (AST/SGOT)
- Alanine aminotransferase (ALT/SGPT)
- Sodium

LABVALUES Serial data for other lab testing performed. Includes specimen date/time and results for the following:

- Creatine kinase-MB (CK-MB)
- Creatine phosphokinase (CPK)
- Hemoglobin A1c (HbA1c)
- Toxicology screen (yes/no)
- Troponin I

PUMPVALUES Serial kidney pump data for donor kidneys which were pumped post-recovery. Includes:

- Date/time
- Kidney laterality
- Flow rate
- Resistance
- Pressure

URINALYSIS Serial urinalysis results. Includes specimen collection date/time and results for the following:

- Appearance
- Bacteria
- Blood
- Casts
- Color
- Epithelial cells
- Glucose
- Leukocyte esterase
- pH
- Urine protein
- RBCs
- Specific gravity
- WBCs

Unacceptable Antigens Data

Unacceptable antigens dataset consists of four datasets containing the history of all unacceptable antigens entered on the waiting list for each waiting list registration, organized by desired organ. THORACIC includes HR, LU, and HL. KIDPAN includes KI, KP, and PA.

UNACC_ANTIGENS_INTESTINE, UNACC_ANTIGENS_LIVER, UNACC_ANTIGENS_KIDPAN, UNACC_ANTIGENS_THORACIC

Each dataset will contain multiple records per waiting list registration if more than one unacceptable antigen was ever entered for the registration. Use WL_ID_CODE to link to organ specific waitlist or transplant datasets.

Each file may contain multiple records per WLREG_AUDIT_ID_CODE, since there can be multiple loci with multiple unacceptable antigens for each locus. Use WLREG_AUDIT_ID_CODE to link to waitlist history data.

For each locus-specific antigen, the formatted values are provided on the formats tab in the STAR File Data Dictionary.

Standard Datasets – Detailed Descriptions

The files in the standard datasets do not include any patient or transplant hospital identifiers. However, there is an encrypted patient identification number (PT_CODE), unique to each patient that allows you to track the patient through multiple waiting list and transplant events. Also, there are encrypted transplant and donor hospital/OPO identifiers for tracking purpose (CTR_CODE, OPO_CTR_CODE, LISTING_CTR_CODE, INIT_OPO_CTR_CODE, END_OPO_CTR_CODE, RECOV_FACILITY_CODE).

Refer to the Linking Datasets Diagram for a visual overview of navigating between datasets.

Included in the data files provided are the results of the linkage between the OPTN database and additional external sources of deaths. If the patient was reported as deceased from OPTN data or by a verified external source, the COMPOSITE_DEATH_DATE will be populated with that date of death. This additional death information is included in the calculated time in days of patient survival, PTIME. The variables PX_STAT and PX_STAT_DATE provide the most recent patient information for that transplant event as reported by the transplant hospital that followed the patient at the time of the STAR file copy date. The COMPOSITE_DEATH_DATE may be different from PX_STAT_DATE. For example, if the last patient status from the center was reported as January 1, 2014, and the patient was reported as alive, but the COMPOSITE_DEATH_DATE reports the patient death date on June 30, 2014, then all additional

variables in the files will reflect the patient status reported as alive on January 1, 2014, according to the OPTN data and not the external sources death date provided. However, the variables COMPOSITE_DEATH_DATE, PSTATUS, and PTIME will all reflect the death date reported for the patient as deceased as verified by external sources.

Organ-specific Files

Each main organ-specific file (i.e., KIDPAN_DATA, LIVER_DATA, etc.) contains information on all waiting list registrations and transplants of that organ type that have been listed or performed in the United States since October 1, 1987. It includes both deceased and living donor transplants. There is one record per waiting list registration/transplant event, and each record includes the most recent follow-up information (including patient and graft survival) reported to the OPTN as of the date the file was created. If a patient was listed for a transplant, but was removed prior to a transplant related to that registration, or is still waiting, all the transplant information for that patient is null (i.e., there are waiting list records in the dataset with no transplant information). Similarly, if a patient received a living donor transplant, and was never on the waiting list, all of the waiting list-specific information for that patient is null (i.e., there are transplant records in the dataset with no waiting list information). Waiting list registrations can be selected by choosing records where WL_ID_CODE is not null, and transplants performed can be selected by choosing records where TRR_ID_CODE is not null. If there was a waiting list registration that resulted in a transplant event, neither WL_ID_CODE nor TRR_ID_CODE will be null. Recently introduced variables VAL_DT_TCR and VAL_DT_TRR provide information about when the Transplant Candidate Registration and Transplant Recipient Registration were validated. These variables might be null for more recent registrations and transplants.

Follow-up Files

The follow-up portion of the STAR File (i.e., KIDPAN_FOLLOWUP_DATA, LIVER_FOLLOWUP_DATA, etc.) contains one record per follow-up (TRF form) per transplant event. Therefore, in most cases, you will find multiple records per transplant. For instance, if a patient received a transplant in January 2001, the graft has not failed, and the patient has not been reported lost to follow-up, you should find multiple follow-up records (a record at 6 months, and one at each year after 2001) with the same transplant identification number (TRR_ID_CODE). In the same example, if the patient received a simultaneous kidney-pancreas transplant, you should find follow-up records recorded for kidney alone and follow-up records recorded for pancreas alone until January 2003, and then a single kidney-pancreas follow-up record for each year onward. On follow-ups generated since January 2003, a single kidney-pancreas follow-up is generated in place of the kidney alone and pancreas alone forms. These more recent data are found in the kidney-pancreas follow-up file. Similar to the reporting for registration and transplant information, the data files created in October 2021 include follow-up data where the follow-up forms were expected to be completed prior to October 1, 2021.

The variable VAL_DT_TRF provides information about when the Transplant Recipient Follow-up was validated. This variable might be null for more recent follow-ups where the form is not yet validated by the hospital.

Each follow-up record has a unique TRR_FOL_ID_CODE. Use FOL_CD to identify the specific follow-up form time point (e.g., FOL_CD = 10 means one year follow-up). Look-up values for FOL_CD can be found in the Data Dictionary on the formats tab.

The variable for linking all the follow-up data to the main datasets is TRR_ID_CODE. See Linking Datasets Diagram for more information.

Waiting List History Files

Waiting list history files contain additional waiting list information, similar to the follow-up information described above. Additional waiting list information can be linked by WL_ID_CODE to the main dataset. See Linking Datasets Diagram for more information.

Deceased Donor Files

The organ-specific transplant files include most of the pertinent donor information collected on the corresponding organ donor (living or deceased) such as donor age, donor gender, donor history of hypertension, etc. Additionally, the dataset "DECEASED_DONOR_DATA" contains more detailed information on all deceased donors in the United States (one record per donor) where at least one organ was transplanted or recovered for transplant and reported to the OPTN since October 1, 1987. This allows the researcher to obtain additional information about each transplanted organ, and to examine other issues, such as deceased donor organ recovery and utilization. Additional data about the donor can be found in the supplemental DonorNet® files. The data can be linked to the corresponding transplants using the field DONOR_ID. The recently introduced variable VAL_DT_DDR provides information about when the Deceased Donor Registration was validated. This variable might be null for more recent registrations where the form is not yet validated.

Living Donor Files

The "LIVING_DONOR_DATA" file contains information on all living donors recovered in the United States since October 1, 1987. For living donors recovered prior to October 25, 1999, there are limited medical and demographic fields available, with more detailed information collected for donors recovered after that date. The living donor data can be linked to the

corresponding transplants using DONOR_ID. Additionally, we've introduced a new variable; VAL_DT_LDR, providing information about when the Living Donor Registration was validated. This variable might be null for more recent registrations.

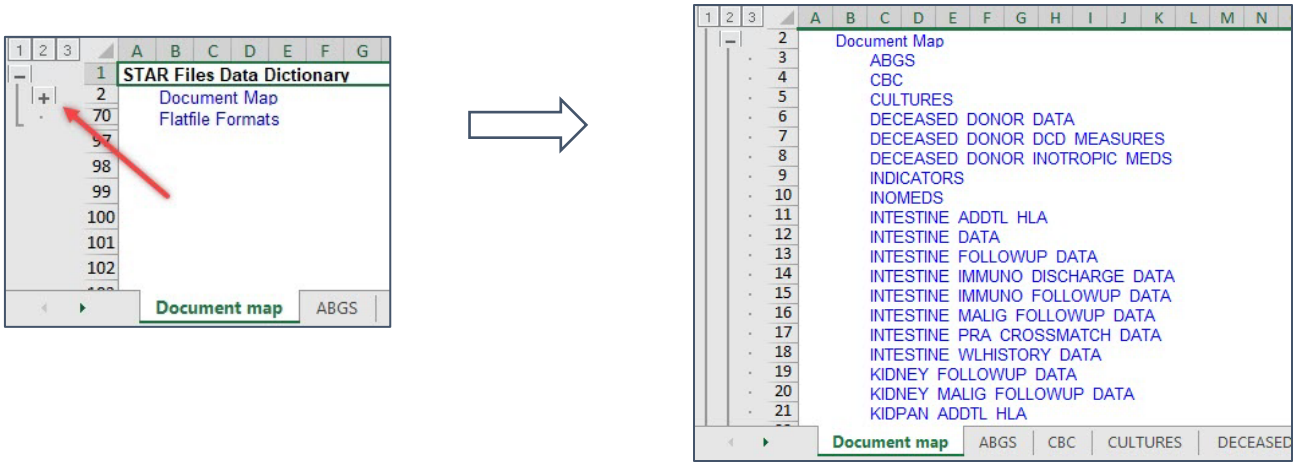
The “LIVING_DONOR_FOLLOWUP_DATA” file contains one record per follow-up visit for living donors recovered since October 25, 1999. Prior to that date, living donor follow-up information was not collected by the OPTN. For living donors recovered since then, there will be the potential for a 6-month and one-year follow-up on donors recovered from October 25, 1999, to February 29, 2008, with the additional two-year follow-up form added for donors recovered since March 1, 2008. The recently introduced variable VAL_DT_LDF provides information about when the Living Donor Follow-up was validated. This variable might be null for more recent follow-ups where the form was not yet validated.

Data Dictionary

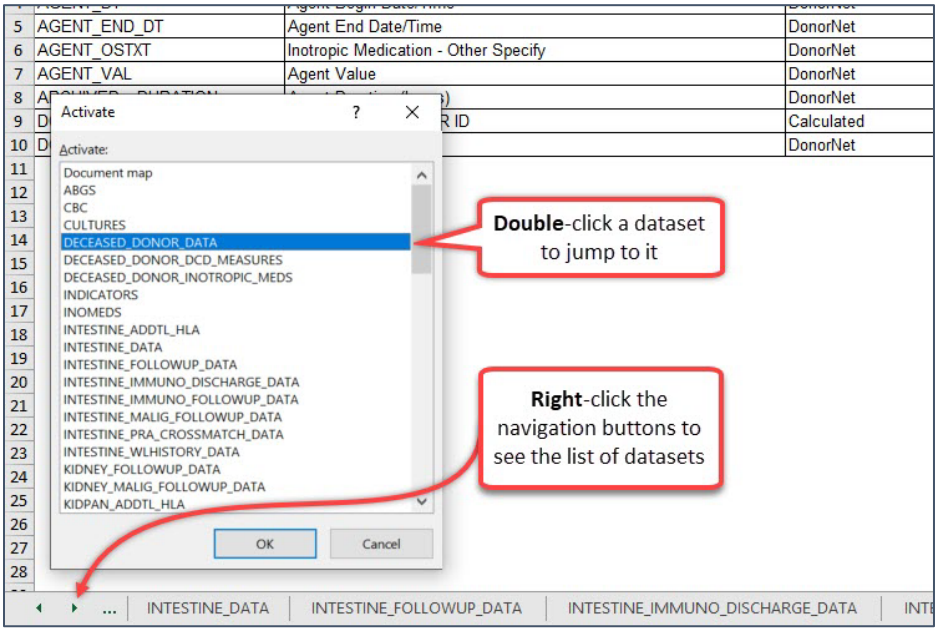
A data dictionary can be found in the “IMPORTANT DOCUMENTATION” folder.

Navigation Tips

When you open the data dictionary file in Excel, the **Document map** tab will display. If the map is not already expanded, click on the **+** sign on the top left to expand the index page.
Click on the hyperlink to navigate to the data dictionary for that dataset.

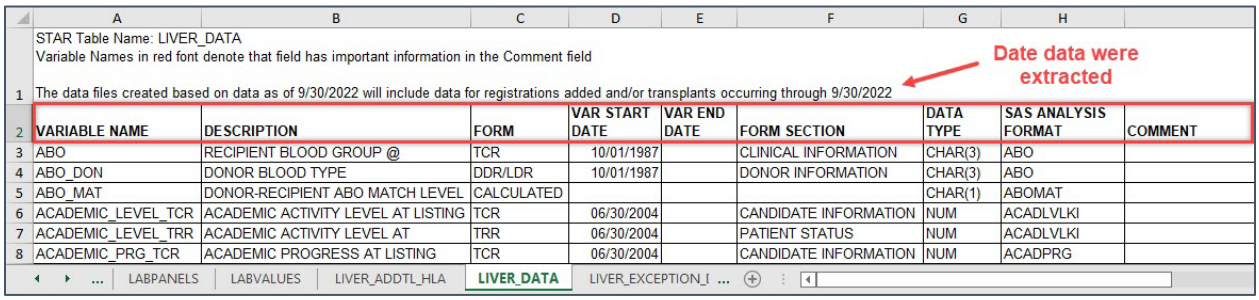


Right-click the tab navigation buttons to see a list of datasets. Double-click on a dataset to jump to it.



Using Formats and Lookups

Data dictionary variables are listed at the top of each tab. The date data were extracted is noted in the title row.



STAR Table Name: LIVER_DATA
Variable Names in red font denote that field has important information in the Comment field

The data files created based on data as of 9/30/2022 will include data for registrations added and/or transplants occurring through 9/30/2022

Date data were extracted

VARIABLE NAME	DESCRIPTION	FORM	VAR START DATE	VAR END DATE	FORM SECTION	DATA TYPE	SAS ANALYSIS FORMAT	COMMENT
ABO	RECIPIENT BLOOD GROUP @	TCR	10/01/1987		CLINICAL INFORMATION	CHAR(3)	ABO	
ABO_DON	DONOR BLOOD TYPE	DDR/LDR	10/01/1987		DONOR INFORMATION	CHAR(3)	ABO	
ABO_MAT	DONOR-RECIPIENT ABO MATCH LEVEL	CALCULATED				CHAR(1)	ABOMAT	
ACADEMIC_LEVEL_TCR	ACADEMIC ACTIVITY LEVEL AT LISTING	TCR	06/30/2004		CANDIDATE INFORMATION	NUM	ACADLVLKI	
ACADEMIC_LEVEL_TRR	ACADEMIC ACTIVITY LEVEL AT	TRR	06/30/2004		PATIENT STATUS	NUM	ACADLVLKI	
ACADEMIC_PRG_TCR	ACADEMIC PROGRESS AT LISTING	TCR	06/30/2004		CANDIDATE INFORMATION	NUM	ACADPRG	

LABPANELS | LABVALUES | LIVER_ADDTL_HLA | LIVER_DATA | LIVER_EXCEPTION_I ...

- **VAR START DATE** and **VAR END DATE** columns contain the dates when data collection for a variable began and ended (if applicable), respectively.
- Information in the **FORM** and **FORM SECTION** columns indicates on which form and form section the data variable is collected.
- 'TRR>TCR' value for DIAG variables indicates that if a candidate has been transplanted, the value is reported from the TRR form, if available. If TRR is not yet submitted, a value from the TCR is displayed. However, if the candidate has not been transplanted the variable is not reported and will be null.
- Variable names in red denote that the field has important information in the comment section (column I).

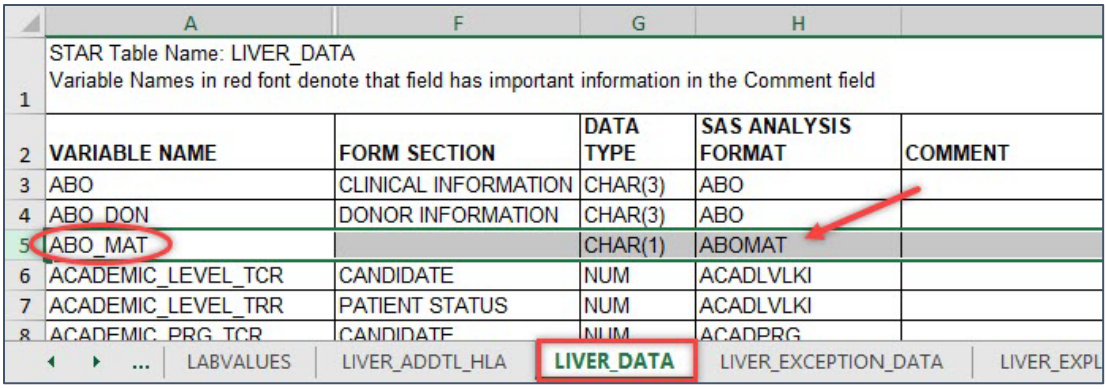
The example below illustrates how to find out the meaning of fields that have coded values in the dataset.

Example Scenario: You are interested in performing an analysis on liver donor-recipient ABO match level (ABO_MAT).

To find out the meaning of the **ABO_MAT** coded values found in the **LIVER_DATA** dataset:

1. Go to the **LIVER_DATA** tab in the STAR Files Data Dictionary file.

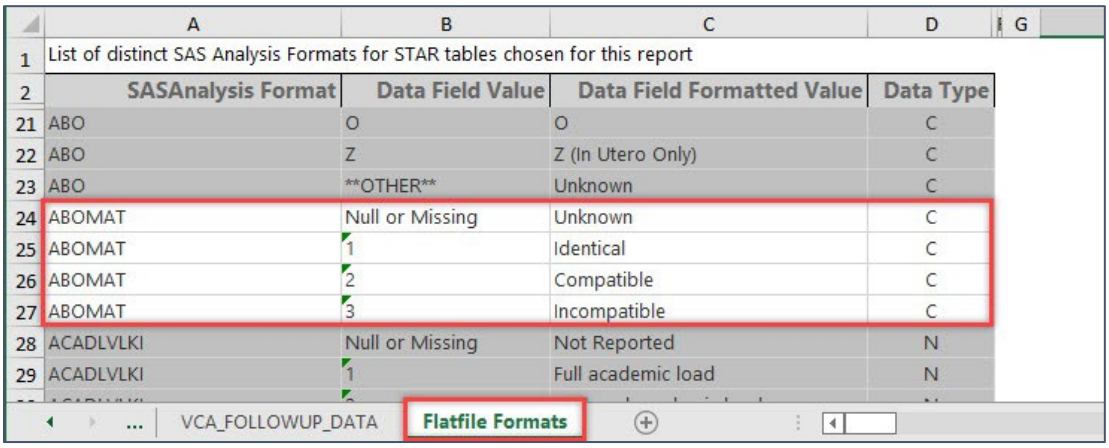
2. Look up the **SAS ANALYSIS FORMAT** for **ABO_MAT** (column H).



	A	F	G	H	
1	STAR Table Name: LIVER_DATA Variable Names in red font denote that field has important information in the Comment field				
2	**VARIABLE NAME**	**FORM SECTION**	**DATA TYPE**	**SAS ANALYSIS FORMAT**	**COMMENT**
3	ABO	CLINICAL INFORMATION	CHAR(3)	ABO	
4	ABO_DON	DONOR INFORMATION	CHAR(3)	ABO	
5	ABO_MAT		CHAR(1)	ABOMAT	
6	ACADEMIC_LEVEL_TCR	CANDIDATE	NUM	ACADLVLKI	
7	ACADEMIC_LEVEL_TRR	PATIENT STATUS	NUM	ACADLVLKI	
8	ACADEMIC_PRG_TCR	CANDIDATE	NUM	ACADPRG	

... LABVALUES | LIVER_ADDTL_HLA | **LIVER_DATA** | LIVER_EXCEPTION_DATA | LIVER_EXPL

3. Navigate to the **Flatfile Formats** tab.



	A	B	C	D	G
1	List of distinct SAS Analysis Formats for STAR tables chosen for this report				
2	**SASAnalysis Format**	**Data Field Value**	**Data Field Formatted Value**	**Data Type**	
21	ABO	O	O	C	
22	ABO	Z	Z (In Utero Only)	C	
23	ABO	**OTHER**	Unknown	C	
24	ABOMAT	Null or Missing	Unknown	C	
25	ABOMAT	1	Identical	C	
26	ABOMAT	2	Compatible	C	
27	ABOMAT	3	Incompatible	C	
28	ACADLVLKI	Null or Missing	Not Reported	N	
29	ACADLVLKI	1	Full academic load	N	

... VCA_FOLLOWUP_DATA | **Flatfile Formats** | ⊕

4. Locate the SAS Analysis Format (**ABOMAT**) in column A.

5. The data field formatted values appear in column C. Data type is indicated in column D (C = character; N = numeric).

Frequently Asked Questions

Q: How do I identify and analyze data on multi-organ transplants?
A: Data for multi-organ transplants such as heart-kidney, kidney-liver, or heart-kidney-liver are included in each organ-specific dataset. Each dataset includes the following variables:

MULTIORG	Multi-organ transplant
TXHRT	Simultaneous heart
TXINT	Simultaneous intestine
TXKID	Simultaneous kidney
TXLIV	Simultaneous liver
TXLNG	Simultaneous lung
TXPAN	Simultaneous pancreas
TXVCA	Simultaneous VCA

For example, for heart-kidney transplant, THORACIC_DATA dataset will contain variables collected on heart TCR and TRR. If your analysis requires variables from kidney TCR and TRR, you need to merge the data with the KIDPAN_DATA dataset using variables PT_CODE and DONOR_ID. PT_CODE is unique per recipient or candidate and DONOR_ID is unique per donor. Using these variables together will help you obtain data for multi-organ transplants.

Q: How do I get donor-specific variables that are not included in organ-specific datasets?
A: If you cannot find donor variables in the organ-specific dataset, check DECEASED_DONOR or LIVING_DONOR datasets. You can link these datasets using DONOR_ID. See the Linking Datasets Diagram for more information.

Q: How do I analyze or format multi-select fields?
A: Numerous fields collected by the OPTN are multi-select fields; that is, there are multiple options to select from, and users can select one or more of those options. Data from these fields is often stored in a single variable as a binary array. Binary arrays store numerous yes/no or true/false values in a single numeric value. Each option is assigned a value of a power of 2, and the sum of the selected values is stored in the variable. Each combination of selected values has a unique numeric value.

Examples of fields stored as binary arrays include:

- Previous malignancies for transplant candidates (PREV_MALIG_TY, format MALMULTIPED)
- Crossmatch tests performed (B_CELL_DONE, H_CELL_DONE, T_CELL_DONE, format XMATMULT)
- Crossmatch cell source (CELL_SRC, format CSRCMULT)
- Living liver donor complications (COMPLICATIONS_LI_STATUS, format COMPLIF)

You can identify multi-select fields when their formats have values that are all powers of 2 (i.e., 1, 2, 4, 8, 16, 32, etc.), or when they have a large number of values that are systematic combinations of powers of 2 (i.e., 1 = A; 2 = B; 3 = A and B; 4 = C; 5 = A and C; 6 = B and C; etc.).

Binary arrays can be analyzed for the presence or absence of specific selected values using a bitwise AND operator or function. Using bitwise AND to compare a variable value to the value of a specific selection will return that value if it is selected, or 0 otherwise.

For example:
You want to know if a particular living liver donor experienced liver failure as a complication during the follow-up period. This value is one of the options stored in COMPLICATIONS_LI_STATUS in the LIVING_DONOR_FOLLOWUP dataset. The 'Liver Failure' option for this variable, in the COMPLIF format, has a value of 8.

In Excel, use the BITAND function to perform a bitwise AND between the variable value and the value of the selected option: BITAND(complications_li_status, 8). This function will return 8 if the specified option is selected (i.e., the living donor reported having liver failure as a complication during the follow-up period). If the option was not selected, the function returns 0.

Below are some selected bitwise AND operators/functions in commonly used software packages:

Software/platform	Bitwise and function/operator
Microsoft Excel	BITAND(A,B)
SAS	band(A,B)
SQL	A & B
SPSS	A && B
Python	A & B
R	bitwAnd(A,B)

There are two main approaches to format all selected values of a particular variable:

1) Use bitwise AND to check for each possible value and create simple yes/no variables for each option, or
2) Use a loop to check all possible values and concatenate the formatted selected values into a single string value.

***Note*:** It is possible for any multi-select field to have all possible options selected, though in practice most will only have one or a few options selected.

Documentation

A Data Dictionary within the file “STAR File Data Dictionary” is included in accompanying folders. This is the guide to using the STAR files and includes extensive documentation about each dataset and each variable.

The most current OPTN data collection forms for TIEDI® are available online at https://unos.org/data/. These forms change frequently, with significant changes since the beginning of OPTN data collection in 1987. They will continue to change with the addition, removal, and modification of fields, lookup values, and labels.

List of Abbreviations

CMS – Centers for Medicare & Medicaid Services
DCD – Donation after Cardiac Death
DDR – Deceased Donor Registration
DSA – Donation Service Area
DUA – Data Use Agreement
HCC – Hepatocellular Carcinoma
HL – Heart-lung
HR – Heart
KI – Kidney
KIDPAN – Kidney-pancreas
KP – Kidney-pancreas
LAS – Lung Allocation Score
LU – Lung
OPO – Organ Procurement Organization
OPTN – Organ Procurement and Transplantation Network
PA – Pancreas
PHI – Patient Health Information
PII – Personally Identifiable Information
PRA – Panel Reactive Antibody
STAR – Standard Transplant Analysis and Research
TCR – Transplant Candidate Registration
TIEDI – Transplant Information Electronic Data Interchange
TRF – Transplant Recipient Follow-up
TRR – Transplant Recipient Registration
UNOS – United Network for Organ Sharing
VCA – Vascularized Composite Allografts
WL – Waiting List

Linking Datasets Diagram