

---

**Data Recipient Report for the  
Janssen Clinical Trial Data Set  
28431754DIA3008**

“CANVAS - CANagliflozin cardioVascular Assessment Study”

<b>Product Name</b>	INVOKANA
<b>Active Substance</b>	Canagliflozin
<b>Dataset Type</b>	SDTM
<b>Other Study Identifier</b>	CANVAS
<b>Study Code</b>	28431754DIA3008
<b>NCT Number</b>	NCT01032629
<b>Reporting Effort</b>	Final
<b>Version</b>	7.0
<b>Date</b>	September 6, 2023

---

# Contents

<b>Contents</b>	<b>2</b>
<b>1 Introduction</b>	<b>3</b>
1.1 Data Set Model . . . . .	3
1.2 Definitions . . . . .	3
<b>2 Anonymization Process</b>	<b>4</b>
2.1 Use of Software . . . . .	4
2.2 Supporting Documentation . . . . .	4
2.3 Output Format of Anonymized Datasets . . . . .	4
2.4 Transformations . . . . .	4
2.5 Implemented Transformation Types . . . . .	5
<b>3 Conclusions</b>	<b>7</b>
<b>References</b>	<b>8</b>
<b>A Definitions</b>	<b>9</b>
A.1 Acronyms . . . . .	9
A.2 Identifiers . . . . .	9
A.3 Glossary . . . . .	9
<b>B Datasets Delivered in 28431754DIA3008</b>	<b>10</b>

---

# 1 Introduction

The purpose of this project was to perform anonymization of the Janssen 28431754DIA3008 clinical trial data set.

The anonymization of this data set was performed to allow the data to be shared with external research teams. Access to clinical trial data provides opportunities to conduct further research that can help advance medical science and improve patient care. This helps ensure the data provided by study participants are used to maximum effect in the creation of knowledge and improving patient care. The data release is subject to certain criteria being met, including a requirement to effectively anonymize the data.

Statistical anonymization was used to preserve the utility required by recipients, while accounting for the context of the data sharing scenario [2]. Unlike a rules-based framework that removes dates (except years) and aggregates all ages over 89 as 90 or older, such as HIPAA Safe Harbor, this approach is adaptive to population distributions, sample size, and the desired utility of the anonymized data.

The data sharing environment and contracts in place with the data recipient are assumed to be at a level which would result in a Privacy and Security Context Assessment score of High and a Recipient Trust Context Assessment score of Medium.

This report describes the anonymization approach used for the study 28431754DIA3008, based on the re-identification risk determination that was performed on the data.

## 1.1 Data Set Model

The data set described in this report for study 28431754DIA3008 was received in the Study Data Tabulation Model (SDTM) standard. For more information on this standard see <https://www.cdisc.org/standards/foundational/sdtm>

## 1.2 Definitions

Definitions of key terms (such as the different types of identifiers) and acronyms are provided in Section A *Definitions*. Additional terms and definitions are provided elsewhere [1].

---

## 2 Anonymization Process

### 2.1 Use of Software

The analysis described in this report was performed using a re-identification risk measurement software application.

### 2.2 Supporting Documentation

The following documents were provided to assist with the analysis:

- 28431754DIA3008 Transformation Summary
- acrf\_mod
- define

### 2.3 Output Format of Anonymized Datasets

All dataset anonymization was performed within the SAS (Statistical Analysis System) native data file format (extension “.sas7bdat”). Datasets received in SAS version 5 (V5) or version 8 (V8) transport file format (extension “.xpt”) must first be converted to .sas7bdat for processing. Following de-identification, all datasets are converted from .sas7bdat to .xpt for delivery. For datasets originally received in .xpt format, this conversion should not pose a problem. However, for datasets received in non-xpt format, inherent limitations in the .xpt format may require modifications.

Based on the definition of the format, conversion of a dataset to XPT transport file format may require modification of the following in the anonymized datasets:

1. Shortening the dataset names,
2. Shortening variable names in the datasets,
3. Shortening dataset or variable labels,
4. Splitting long character values into new variables.

### 2.4 Transformations

In order to bring the risk of re-identification below the determined threshold, some transformations were required on the dataset. The transformations are described based on the indirect identifiers used in the risk measurement. In all cases, modifications to these indirect identifiers are applied to all other linked fields, e.g. where country is suppressed, fields containing brand- or region-specific drug names will also be suppressed as they are linked to geography.

The anonymization strategy required the following modifications to the original datasets:

---

Identifier	Transformation
Subject IDs (USUBJID)	Masked
Site IDs (SITEID)	Suppressed
Patient dates	PHUSE shifted
Free text	Suppressed
Age	Generalized to 4-year intervals
Date of birth	Suppressed

## 2.5 Implemented Transformation Types

The following data transformations have been applied in this dataset:

**Masking** Masking of the unique subject ID was performed using Format-Preserving Encryption (FPE). This type of encryption creates an encrypted value that has the same length as the original ID.

**Generalization** Reduce the precision of a field.

For this specific project, the age of subjects was generalized to 4-year intervals. Table 1 summarizes the mapping of age to generalized age for age greater or equal to 0 years.

Age (Years)	Generalized Age Value (Years) (AGE)
$0 \leq \text{Age} < 4$	0
$4 \leq \text{Age} < 8$	4
$8 \leq \text{Age} < 12$	8
$12 \leq \text{Age} < 16$	12
...	...
$76 \leq \text{Age} < 80$	76
$80 \leq \text{Age} < 84$	80
$84 \leq \text{Age} < 88$	84
$88 \leq \text{Age} < 92$	88

**Table 1:** Age generalization

**PHUSE date shifting** Offset a date value according to the scheme defined in the Pharmaceutical Users Software Exchange (PHUSE) CDISC SDTM anonymization standard [3]. This scheme determines a delta

---

for each patient based on a difference between a date in the trial available for all patients (in this case the first visit date) and an anchor date (in this case, 16 November 2009).

**Suppression** The original value is replaced with an empty cell. The following types of suppression were applied for this project:

**global suppression (GS):** Occurs when risk measurement determines that no suitable generalized value can be retained and all values in the column are therefore suppressed.

**parameter-value suppression (PV):** Occurs when values in a column are suppressed based on the values of a parameter-column in the same dataset. For example, a vital sign dataset may include a parameter-column specifying the type of measurement such as “systolic blood pressure”, “height”, “weight” and “temperature”, and one or more value-columns containing the values of the measurements (for example, height measured in centimeters when the parameter is “height”). Parameter-value suppression occurs when all values in the value-column associated with one or more identifiers in the parameter-column are suppressed as part of the anonymization strategy.

**targeted suppression (TS):** Occurs when non-standardized values or identifying free-text are suppressed in a column with high data utility, retaining only coded and/or other non-identifying values. Targeted suppression may be used when no other columns in the data set contain the same information as the transformed column, and the clinical trial data set would lose significant utility if the column was suppressed in its entirety.

Please see the file “28431754DIA3008 Transformation Summary.csv” for a catalog of all transformations applied to the dataset.

---

### **3 Conclusions**

The re-identification risk of the Janssen 28431754DIA3008 clinical trial database, after the anonymization as described in this report, is below the data risk threshold given the assumed level of mitigating controls and motives and capacity in the context of the data sharing environment.

---

## References

- [1] Khaled El Emam. *Guide to the De-Identification of Personal Health Information*. CRC Press (Auerbach), 2013.
- [2] International Standards Organization. ISO/IEC 27559:2022: Information security, cybersecurity and privacy protection – Privacy enhancing data de-identification framework. Technical report, ISO, 2022.
- [3] PhUSE De-Identification Working Group. De-Identification Standards for CDISC SDTM 3.2. Technical report, 2015.
- [4] Pierangela Samarati. Protecting Respondents' Identities in Microdata Release. *IEEE Transactions on Knowledge and Data Engineering*, 13(6):1010–1027, 2001.
- [5] L. Sweeney. k-Anonymity: A Model for Protecting Privacy. *International Journal on Uncertainty, Fuzziness and Knowledge-based Systems*, 10(5):557–570, 2002.



---

## A Definitions

### A.1 Acronyms

**FPE** Format-Preserving Encryption

**PHUSE** Pharmaceutical Users Software Exchange

**SDTM** Study Data Tabulation Model

### A.2 Identifiers

It is useful to differentiate among the different types of variables in a disclosed data set or document. The way the variables are handled during the risk measurement and anonymization process will depend on how they are categorized.

A distinction is made among three types of variables [4, 5]:

**Directly identifying variables.** One or more direct identifiers can be used to uniquely identify an individual, either by themselves or in combination with other readily available information. In clinical trial data sets and documents, the only patient direct identifier will likely be the subject ID. There will be direct identifiers pertaining to staff and investigators; however, these are treated differently than patient information.

**Indirectly identifying variables.** The indirect identifiers are attributes that, together with other attributes that can be in the dataset or external to it, enable unique identification of a data subject within a specific operational context.

Examples of indirect identifiers include sex, date of birth or age, locations (such as postal codes, census geography, information about proximity to known or unique landmarks), language spoken at home, ethnic origin, aboriginal identity, total years of schooling, marital status, criminal history, total income, visible minority status, event dates (such as admission, discharge, procedure, death, specimen collection, visit/encounter), codes (such as diagnosis codes, procedure codes, and adverse event codes), country of birth, birth weight, and birth plurality.

**Other variables.** These are the variables that are not really useful for determining an individual's identity. They may be clinically relevant or not.

### A.3 Glossary

**data recipient** The data recipient is the researcher who accesses the anonymized data to perform an analysis.

**Privacy and Security Context Assessment** A questionnaire that evaluates the privacy and security controls in place for a data recipient.

**Recipient Trust Context Assessment** A questionnaire that evaluates the motives, capacity, and contracts in place with regard to data recipient performing a re-identification attack.

---

## B Datasets Delivered in 28431754DIA3008

Dataset	Number of Rows
ADSL	7693
ADTTE	4330
ADTTEAE	115362
ADTTEAEP	155845
ADTTECV	43270
ADTTECVP	60620
ADTTEEF	9098
ADTTEEFP	16293
ADTTEEP	25962
ADTTEEPP	47256
ADTTELIV	16754
AE	42153
CE	45771
CM	145526
CO	6034
DA	424082
DE	4789
DM	7693
DS	19719
DV	1647
EC	29138
EG	159286
EX	4327
FA	359044
HC	4790
IE	3519
LB	2531880

---

<b>Dataset</b>	<b>Number of Rows</b>
MD	146801
MH	72320
RELREC	139088
SC	7693
SG	30977
SS	8406
SU	4342
SUPPAE	69032
SUPPCE	2378
SUPPCM	1910400
SUPPDM	38174
SUPPDV	3826
SUPPLB	10570564
SUPPMH	827
SUPPSG	31063
SUPPSS	6109
SUPPSV	46948
SV	143644
TA	15
TE	6
TI	46
TS	67
TV	102
VS	1021078

**Table 2:** List tables considered and the number of rows in each.