South Africa - AHRI.Tier.Net.Release 2020-09

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Overview

Identification

ID NUMBER
AHRI.Tier.Net.202009.v3

Version

VERSION DESCRIPTION
v3.0.0

Overview

ABSTRACT
TIER.net is an electronic patient management system that is used for monitoring and evaluation of HIV care and treatment programmes in government health facilities throughout South Africa. The system was designed as part of a 3-tier approach to implementing a full electronic medical records (EMR) system. This approach provides a flexible solution that allows facilities to transition towards EMR in stages, as their infrastructure improves, and resources become available. TIER.net forms the second tier, whereby patient's paper clinical records are entered into a non-networked computer at the health facility and transferred periodically to a central database.

The TIER.net database contains information on clinic visit attendance, laboratory results and ART dispensing records for all patients on ART. The system was implemented in uMkhanyakude district in 2013; patient records from all visits before 2013 were back-captured into the system. AHRI has a memorandum of agreement with the Department of Health to receive the TIER.net data for the 17 clinics in the Hlabisa health sub-district and Hlabisa hospital. A dedicated data entry clerk based in each clinic enters information from patients' paper clinical records into the TIER.net system after each patient visit. Laboratory results are manually entered into TIER.net after they have been received by the clinic (i.e. are not imported electronically from the National Health Laboratory Service (NHLS) system).

Currently, pre-ART visits are not recorded in TIER.net, although modules to capture HIV testing and pre-ART care may be implemented in the future.

AHRI's new clinical database - ACCDB (Africa Centre Clinical Database)

TIER.net has been integrated with AHRI's previous HIV care clinical database (ARTemis), which contains records for HIV positive patients in care at 7 clinics in the sub-district, to create a new combined clinical database, ACCDB. The ACCDB contains clinical records for all HIV positive patients on ART since 2004, when the Hlabisa HIV treatment and Care programme was implemented. Linkage between the two databases is based on personal identifiers, using algorithms developed at AHRI.

The patient records in ARTemis were captured prospectively by AHRI clinical staff from 2004 until 2012, whereas records from this period were back-captured into TIER.net. Therefore, the information in ARTemis pre-2013 was used to fill in missing data in TIER.net, with the following decision rules:

Patients who had records in TIER.net and not in ARTemis: All information retained

Patients who had records in ARTemis but not in TIER.net: No pre-ART records retained (TIER.net only contains records after ART initiation, whereas ARTemis also captured pre-ART information). Retained in new database if the patient started ART and died, transferred out, or was lost to follow-up before 2013.

Patients on ART with records in ARTemis from 2013 onwards, but no record in TIER, were assumed to be a result of a linkage mismatch and were not retained.

Patients who had records in both TIER.net and ARTemis: Visit records from TIER.net only (i.e. visits records from ARTemis are not combined with those in TIER). Laboratory results from ARTemis up to 2013 are combined with results in TIER

The new clinical database has been linked with the AHRI population surveillance database (ACDIS) and the Hlabisa hospital admissions database (HIS). A longitudinal analysis of the HIV care cascade (Haber et al. From HIV infection to therapeutic response: a population-based longitudinal HIV cascade-of-care study in KwaZulu-Natal, South Africa. Lancet HIV 2017; 4(5):e223-e230) has been rerun on the new combined TIER.net and ARTemis data, and results are consistent with those obtained from the ARTemis data alone (although the pre-ART stages must be excluded).

TIER.net data are transferred to AHRI from the central Department of Health on a monthly basis and integrated into ACCDB bi-annually, and the linkages with ACDIS and HIS are updated. (The linkage with the ARTemis database is not re-run since this database is no longer active).

In April 2017, there were >47,000 individuals on ART in the TIER database, of whom approximately 12,000 were linked to ACDIS and 6500 were linked to HIS.

Although TIER.Net data has been included up to July 2017, the current dataset should be analysed only up to end 2016, because it has been linked to the Dec 2016 analytical database. The updated ACCDB data for 2017 will be available towards the end of the first quarter of 2018, linked to the end of 2017 analytical database relase.

UNITS OF ANALYSIS
Individual

TOPICS

Topic	Vocabulary	URI
Tier.Net	Africa Health Research Institute	www.ahri.org

KEYWORDS
Individuals

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Kobus Herbst	Africa Health Research Institute; South African Population Research Infrastructure Network
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OTHER PRODUCER(S)

Name	Affiliation	Role
Africa Health Research Institute		

OTHER ACKNOWLEDGEMENTS

Name	Affiliation	Role
KZN Department Of Health		

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Africa Health Research Institute	AHRI		

DDI DOCUMENT ID

DDI.Tier.Net.202009.v3

Sampling

No content available

Questionnaires

No content available

Data Collection

Data Collection Dates

Start	End	Cycle
2004-01-01	2020-03-31	N/A

Data Processing

No content available

Data Appraisal

No content available

File Description

Variable List

EncounterEpisodes_2020v1

Content	
Cases	384771
Variable(s)	12
Structure	Type: Keys: ()
Version	
Producer	
Missing Data	

Variables

ID	NAME	LABEL	TYPE	FORMAT	QUESTION
V1250	EncounterEpisodeId		contin	numeric	
V1251	EncounterEpisodeTypeId	Type of episode	discrete	numeric	
V1252	IndividualId		contin	numeric	
V1253	LocationId	Health facility	discrete	numeric	
V1254	StartEventTypeId	Event at episode start	discrete	numeric	
V1255	OutcomeId	Outcome at end of episode	discrete	numeric	
V1256	EpisodeStartDate	Start of episode	discrete	character	
V1257	EpisodeEndDate	End of episode	discrete	character	
V1258	TreatmentFlags	Bitmap of drugs	contin	numeric	
V1259	Treatment		discrete	character	
V1260	EpisodeNr	Episode sequence number per individual	contin	numeric	
V1261	EpisodeCount	Number of episodes per individual	contin	numeric	

Encounters_2020v1

Content	
Cases	2695725
Variable(s)	5
Structure	Type: Keys: ()
Version	
Producer	
Missing Data	

Variables

ID	NAME	LABEL	TYPE	FORMAT	QUESTION
V1262	EncounterId		contin	numeric	
V1263	IndividualId		contin	numeric	
V1264	LocationId	Health facility	discrete	numeric	
V1265	EncounterTypeId	Type of visit	discrete	numeric	
V1266	EncounterDate		discrete	character	

LabResults_2020v1

Content	
Cases	707959
Variable(s)	9
Structure	Type: Keys: ()
Version	
Producer	
Missing Data	

Variables

ID	NAME	LABEL	TYPE	FORMAT	QUESTION
V1271	IndividualId		contin	numeric	
V1272	EncounterId		contin	numeric	
V1273	InvestigationId	Unique investigation identifier	contin	numeric	
V1274	InvestigationTypeId	Type of investigation	discrete	numeric	
V1275	ResultId	Unique result identifier	contin	numeric	
V1276	ResultDate		discrete	character	
V1277	ResultTypeId	Type of test	discrete	numeric	
V1278	ResultValue		contin	numeric	
V1279	ResultStatusId	Status of result	discrete	numeric	

ClinicalDbMatches_2020v1

Content	
Cases	109459
Variable(s)	13
Structure	Type: Keys: ()
Version	
Producer	
Missing Data	

Variables

ID	NAME	LABEL	TYPE	FORMAT	QUESTION
V1280	IndividualId	Clinical Db Id	contin	numeric	
V1281	Sex	Sex	discrete	numeric	
V1282	DateOfBirth	Date of birth	discrete	character	
V1283	DateOfDeath	Date of death	discrete	character	
V1284	ACDIS_IIntId	PIP Individual identifier	contin	numeric	
V1285	ACDIS_MatchMethod	PIP match method	discrete	character	
V1286	ACDIS_MatchScore	PIP match score	contin	numeric	
V1287	Artemis_PersonNo	Artemis individual identifier	contin	numeric	
V1288	Artemis_MatchMethod	Artemis match method	discrete	character	
V1289	Artemis_MatchScore	Artemis match score	contin	numeric	
V1290	ACHIS_PatientId	Hospital Information System individual identifier	contin	numeric	
V1291	ACHIS_MatchMethod	Hospital Information System match method	discrete	character	
V1292	ACHIS_MatchScore	Hospital Information System match score	contin	numeric	

Individuals_2020v1

Content	
Cases	109459
Variable(s)	4
Structure	Type: Keys: ()
Version	
Producer	
Missing Data	

Variables

ID	NAME	LABEL	TYPE	FORMAT	QUESTION
V1293	IndividualId	Individual identifier	contin	numeric	
V1294	Sex	Individual gender	discrete	numeric	
V1295	DateOfBirth	Date of birth	discrete	character	
V1296	DateOfDeath	Date of death	discrete	character	

(EncounterEpisodeId)
File: EncounterEpisodes_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-388844

Valid cases: 384771
Invalid: 0
Minimum: 1
Maximum: 388844
Mean: 192423.1
Standard deviation: 111138.2

Type of episode (EncounterEpisodeTypeId)
File: EncounterEpisodes_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-5

Valid cases: 384771
Invalid: 0

(IndividualId)
File: EncounterEpisodes_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-114432

Valid cases: 384771
Invalid: 0
Minimum: 1
Maximum: 114432
Mean: 31636.6
Standard deviation: 22845.9

Health facility (LocationId)
File: EncounterEpisodes_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 2887-6454

Valid cases: 384771
Invalid: 0

Event at episode start (StartEventTypeId)
File: EncounterEpisodes_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-11

Valid cases: 384771
Invalid: 0

Outcome at end of episode (OutcomeId)
File: EncounterEpisodes_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-9

Valid cases: 384771
Invalid: 0

Start of episode (EpisodeStartDate)
File: EncounterEpisodes_2020v1

Overview

Type: Discrete
Format: character
Width: 11

Valid cases: 384771
Minimum: NaN
Maximum: NaN

End of episode (EpisodeEndDate)
File: EncounterEpisodes_2020v1

Overview

Type: Discrete
Format: character
Width: 11

Valid cases: 384274
Minimum: NaN
Maximum: NaN

Bitmap of drugs (TreatmentFlags)
File: EncounterEpisodes_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 0-40976

Valid cases: 381270
Invalid: 3501
Minimum: 0
Maximum: 40976
Mean: 3212.1
Standard deviation: 5990.7

(Treatment)
File: EncounterEpisodes_2020v1

Overview

Type: Discrete
Format: character
Width: 20

Valid cases: 358370
Invalid: 0

Episode sequence number per individual (EpisodeNr)
File: EncounterEpisodes_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-156

Valid cases: 384771
Invalid: 0
Minimum: 1
Maximum: 156
Mean: 5.8
Standard deviation: 6.8

Number of episodes per individual (EpisodeCount)
File: EncounterEpisodes_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-156

Valid cases: 384771
Invalid: 0
Minimum: 1
Maximum: 156
Mean: 10.6
Standard deviation: 10.4

(EncounterId)
File: Encounters_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-2736170

Valid cases: 2695725
Invalid: 0
Minimum: 1
Maximum: 2736170
Mean: 1371142.8
Standard deviation: 791711.8

(IndividualId)
File: Encounters_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-114432

Valid cases: 2695725
Invalid: 0
Minimum: 1
Maximum: 114432
Mean: 26847.1
Standard deviation: 20044.3

Health facility (LocationId)
File: Encounters_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 2887-6454

Valid cases: 2695703
Invalid: 22

Type of visit (EncounterTypeId)
File: Encounters_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-6

Valid cases: 2695725
Invalid: 0

(EncounterDate)
File: Encounters_2020v1

Overview

Type: Discrete
Format: character
Width: 11

Valid cases: 2695725
Minimum: NaN
Maximum: NaN

(IndividualId)
File: LabResults_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-114412

Valid cases: 707959
Invalid: 0
Minimum: 1
Maximum: 114412
Mean: 26516.2
Standard deviation: 18588.3

(EncounterId)
File: LabResults_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 14-2736151

Valid cases: 345116
Invalid: 362843
Minimum: 14
Maximum: 2736151
Mean: 1072781.6
Standard deviation: 710173.5

Unique investigation identifier (InvestigationId)
File: LabResults_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-294177

Valid cases: 707959
Invalid: 0
Minimum: 1
Maximum: 294177
Mean: 119977.2
Standard deviation: 75978.6

Type of investigation (InvestigationTypeId)
File: LabResults_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-1

Valid cases: 707959
Invalid: 0

Unique result identifier (ResultId)
File: LabResults_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-711919

Valid cases: 707959
Invalid: 0
Minimum: 1
Maximum: 711919
Mean: 355851
Standard deviation: 205413.3

(ResultDate)
File: LabResults_2020v1

Overview

Type: Discrete
Format: character
Width: 11

Valid cases: 707959
Minimum: NaN
Maximum: NaN

Type of test (ResultTypeId)
File: LabResults_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-14

Valid cases: 707959
Invalid: 0

(ResultValue)
File: LabResults_2020v1

Overview

Type: Continuous
Format: numeric
Width: 10
Decimals: 0
Range: -60-28000000
Invalid: 100000001

Valid cases: 706771
Invalid: 1188
Minimum: -60
Maximum: 28000000
Mean: 5978
Standard deviation: 114481.6

Status of result (ResultStatusId)
File: LabResults_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-5

Valid cases: 707959
Invalid: 0

Clinical Db Id (IndividualId)
File: ClinicalDbMatches_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-114433

Valid cases: 109459
Invalid: 0
Minimum: 1
Maximum: 114433
Mean: 57719.3
Standard deviation: 33659.2

Sex (Sex)
File: ClinicalDbMatches_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-9

Valid cases: 109459
Invalid: 0

Date of birth (DateOfBirth)
File: ClinicalDbMatches_2020v1

Overview

Type: Discrete
Format: character
Width: 11

Valid cases: 109458
Minimum: NaN
Maximum: NaN

Date of death (DateOfDeath)
File: ClinicalDbMatches_2020v1

Overview

Type: Discrete
Format: character
Width: 11

Valid cases: 2854
Minimum: NaN
Maximum: NaN

PIP Individual identifier (ACDIS_IIntId)
File: ClinicalDbMatches_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 17-249203

Valid cases: 23188
Invalid: 86271
Minimum: 17
Maximum: 249203
Mean: 129362
Standard deviation: 75123.4

PIP match method (ACDIS_MatchMethod)
File: ClinicalDbMatches_2020v1

Overview

Type: Discrete
Format: character
Width: 31

Valid cases: 19363
Invalid: 0

PIP match score (ACDIS_MatchScore)
File: ClinicalDbMatches_2020v1

Overview

Type: Continuous
Format: numeric
Width: 10
Decimals: 0
Range: 0-5
Invalid: 11

Valid cases: 23188
Invalid: 86271
Minimum: 0
Maximum: 5
Mean: 4
Standard deviation: 0.4

Artemis individual identifier (Artemis_PersonNo)
File: ClinicalDbMatches_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 28-213150

Valid cases: 39339
Invalid: 70120
Minimum: 28
Maximum: 213150
Mean: 92779.9
Standard deviation: 70503.6

Artemis match method (Artemis_MatchMethod)
File: ClinicalDbMatches_2020v1

Overview

Type: Discrete
Format: character
Width: 31

Valid cases: 39339
Invalid: 0

Artemis match score (Artemis_MatchScore)
File: ClinicalDbMatches_2020v1

Overview

Type: Continuous
Format: numeric
Width: 10
Decimals: 0
Range: 1.42261904761905-5.75
Invalid: 11

Valid cases: 35529
Invalid: 73930
Minimum: 1.4
Maximum: 5.8
Mean: 4.8
Standard deviation: 0.5

Hospital Information System individual identifier (ACHIS_PatientId)
File: ClinicalDbMatches_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 15-82257

Valid cases: 15200
Invalid: 94259
Minimum: 15
Maximum: 82257
Mean: 40680.4
Standard deviation: 27934.6

Hospital Information System match method (ACHIS_MatchMethod)
File: ClinicalDbMatches_2020v1

Overview

Type: Discrete
Format: character
Width: 31

Valid cases: 15200
Invalid: 0

Hospital Information System match score (ACHIS_MatchScore)
File: ClinicalDbMatches_2020v1

Overview

Type: Continuous
Format: numeric
Width: 10
Decimals: 0
Range: 1.55-5.75
Invalid: 11

Valid cases: 15200
Invalid: 94259
Minimum: 1.6
Maximum: 5.8
Mean: 4.3
Standard deviation: 0.5

Individual identifier (IndividualId)
File: Individuals_2020v1

Overview

Type: Continuous
Format: numeric
Width: 12
Decimals: 0
Range: 1-114433

Valid cases: 109459
Invalid: 0
Minimum: 1
Maximum: 114433
Mean: 57719.3
Standard deviation: 33659.2

Individual gender (Sex)
File: Individuals_2020v1

Overview

Type: Discrete
Format: numeric
Width: 12
Decimals: 0
Range: 1-9

Valid cases: 109459
Invalid: 0

Date of birth (DateOfBirth)
File: Individuals_2020v1

Overview

Type: Discrete
Format: character
Width: 11

Valid cases: 109458
Minimum: NaN
Maximum: NaN

Date of death (DateOfDeath)
File: Individuals_2020v1

Overview

Type: Discrete
Format: character
Width: 11

Valid cases: 2854
Minimum: NaN
Maximum: NaN

Documentation

Technical documents

DDI:Tier.Net

Title	DDI:Tier.Net
Author(s)	Sweetness H Dube
Date	11/09/2020
Country	South Africa
Language	English
Filename	Tier.Net.202009.v3.pdf