



THE UNIVERSITY OF
WESTERN AUSTRALIA



Curtin
University of Technology



Government of **Western Australia**
Department of **Health**

DATA LINKAGE BRANCH

www.datalinkage-wa.org.au

Researcher's Toolkit

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1. Introduction

The purpose of this document is to assist researchers to understand data linkage and the use of DOHWA linked data. It does not cover requests for data from a single collection (which should be sent to the relevant Data Manager), data analysis methods or software.

If you have a suggestion for the toolkit please email Alex Godfrey, the Data Linkage Project Officer, at alexandra.godfrey@health.wa.gov.au

2. Linkage

2.1 What is data linkage?

Data linkage is the activity of finding connections between different pieces of information that are thought to belong to the same person, or between events that occurred at the same place or happened at or about the same time. Probabilistic linkage is the method used to find links and relies on the availability of similar demographic information (e.g. name, sex, date of birth, address).

The Data Linkage Branch (DLB) creates, updates, enhances and manages links between the core Department of Health Western Australia (DOHWA) data collections, other approved administrative data sources and research collections. The DLB also has the capacity to geocode address information. The branch consists of the Data Linkage Unit (DLU), the Client Services Team, data analysts and Program Manager. These teams are physically located at the DOHWA offices at 189 Royal St, East Perth, alongside the Data Collections and Analysis Branches of the Health Information Network.

The linkage process produces a set of indexes sometimes referred to as 'linkage keys'. These keys are stored in the Master Links File of the Western Australian Data Linkage System (WADLS) and are kept separate from personal and clinical information. These keys are actually 'pointers' to the original administrative records and are used to enable these original records to be joined together later for analysis if they belong to the same people, places, or events.

2.2 Ethical Considerations

Access to linked data may be granted to bonafide researchers who meet the stringent requirements of a human research ethics committee (HREC). Wherever possible, research should be carried out using de-identified data. For more information please see the Access Policy, available at the DLB website: <http://www.data-linkage-wa.org.au/go/access-and-application/access-to-linked-data>

ALL research projects using linked DOHWA data require the approval of an institutional HREC. Currently, there is only a reciprocal ethics arrangement between the DOHWA HREC and the University of Western Australia. If you would like more information about this arrangement please contact the HREC Executive Officer at HREC@health.wa.gov.au

Depending on your request, you may also need DOHWA HREC approval. DOHWA HREC approval is needed if you are requesting:

- personal information (where the identity of an individual can be reasonably determined- this includes full date of birth)
- the linkage of an external dataset to DOHWA collections
- any data from the Mental Health Information System
- any data from the Birth Defects Registry

For further information on the DOHWA HREC please see the HREC website at: <http://www.health.wa.gov.au/healthdata/HREC/index.cfm>

2.3 Conditions surrounding the use of linked data

Please remember the following conditions surrounding the use of DOHWA data:

- Data provided can only be used for the specific project that has been approved. It must not be combined with other datasets or used for other projects.
- Only the approved personnel listed in the Application for Data (refer to section 3) may have access to the data extract. To add/remove personnel from a project the Principal Investigator must notify DOHWA (please see the FAQs section).
- Data extracts or client lists for linkage must never be sent via email.
- Data should always be encrypted and delivered/collected in person to the DOHWA Royal St offices. If you are unable to do this please contact the Data Linkage Project Manager to arrange an alternative method.
- When stored on a computer, disc or other media, data files must always be password protected.
- Data should not be transferred or stored on USB drives.
- All data to be linked by the DLB should have a unique identifier assigned to each client record.
- All projects require at least one investigator based in WA.

2.4 Data available

The DLB routinely links the administrative data sources listed below. These are referred to as the 'core' datasets. Please note that the dates of the most current data available will need to be confirmed with Data Custodians.

- | | | | |
|---------------------------|--------------|------------------------|--------------|
| • Midwives Notifications | 1980-current | • Cancer Registrations | 1982-current |
| • Mental Health records | 1966-current | • Electoral Roll | 1988-current |
| • Hospital admissions | 1970-current | • Birth records | 1974-current |
| • Emergency presentations | 2002-current | • Death records | 1969-current |

Commonwealth (DOHA) data includes the following:

- | | |
|--|--------------|
| • Pharmaceutical Benefits Scheme (PBS) | 1990-current |
| • Medicare Benefits Scheme (MBS) | 1984-current |
| • Aged and Community Care | 1990-current |

Please note: as at October 2009, links to only Medicare enrolments up to October 2005 are available.

There are also four major infrastructure projects:

- | | |
|----------------------|--------------------------|
| • Family Connections | • Genetic Epidemiology |
| • Road crashes | • Developmental Pathways |

2.5 Resources

The following resources may be of assistance in understanding data linkage:

Holman CDJ, Bass AJ, Rouse IL, Hobbs MST. Population-based linkage of health records in Western Australia: development of a health services research linked database. *Australian and New Zealand Journal of Public Health* 23 (5): 453-459, 1999.

Kelman CW, Bass AJ & Holman CDJ. Research use of linked health data - a best practice protocol. *Australian and New Zealand Journal of Public Health* 26 (3): 251-255, 2002.

Newcombe HB. *Handbook of Record Linkage*. Oxford University Press, New York 1988. Sibthorpe B, Kliewer E, Smith L. Record linkage in Australian epidemiological research: health benefits, privacy safeguards and future potential. *Australian Journal of Public Health* 19(3): 250-256, 1995.

3. Applying for Linked Data

3.1 Overview of the application process: WA Projects

A new application process was implemented in March 2008 to coincide with the creation of the DOHWA HREC. This application process incorporates a draft Expression of Interest stage to allow the Data Custodians to review projects & sort out any issues before the project is reviewed by the DOHWA HREC. This ultimately saves time for researchers having to go back and forth between the Data Custodians about what they will release, and the DOHWA HREC. Please understand that **ethics approval does not guarantee release of the data**- the Data Custodians must also approve the project and sign off on the release of the data. Therefore it is best to discuss your project with the relevant Data Custodians before you submit an application.

Stage One: Expression of Interest

The first step for all researchers is to submit an Expression of Interest (EOI) to Data Services (DataServices@health.wa.gov.au). This is completed on the Application for Data form (available at the DLWA website). To this form you should attach the data service forms relevant to your project (linkage, extraction etc) and the variable lists for the datasets you require. The Data Linkage Project Officer manages these EOIs and presents them to the Data Custodians for review. Any issues surrounding the release of data are identified and suggestions made. Feedback from this review is provided via email, and these suggestions should be incorporated into the formal application. Occasionally further discussion with the Data Custodians will be required, in which case the Project Officer will liaise with the researchers to arrange face to face meetings.

Stage Two: Formal Application for Data

After you have received feedback from your EOI and all issues have been resolved you can submit your formal Application for Data. This uses the same forms as the EOI, so you need only edit your original application. It is strongly recommended that you have someone not related to the project read over your application so that it makes sense and is well written.

There are two methods of submitting your formal application, which is dependent on whether you require DOHWA HREC approval.

1) DOHWA HREC not required

If you do not need DOHWA HREC approval (please note that you still require institutional ethics approval) you may send in a **hard copy** of your application to the DLB. Please ensure you have filled in all the relevant sections including the declarations and signatures. You must also attach the data service forms and variable lists. Please note that you must also submit confidentiality agreements/acknowledgements for all of the listed personnel on the project. These can be found at the HREC website (<http://www.health.wa.gov.au/healthdata/HREC/index.cfm>).

2) DOHWA HREC is required

If you do require DOHWA HREC approval, you must submit your application to the HREC Executive Officer. Please see the submission guidelines at the HREC website (<http://www.health.wa.gov.au/healthdata/HREC/index.cfm>).

Stage Three: Approval

Once the final applications have been received, with the appropriate ethics approval, the Client Services Team arranges formal sign off from the relevant Data Custodians and Director General's delegate. This must be done before any data can be linked or extracted.

After sign off has been completed, the Client Services Team will contact you and update you with the progress of your project.

3.2 Cross-jurisdictional applications

Health data held by the Australian Department of Health and Ageing (DOHA) can be relevant to W.A. research projects. This includes information relating to residential and aged care, and Medicare data which includes the Pharmaceutical Benefits Scheme (PBS) and Medical Benefits Scheme (MBS).

A Memorandum of Understanding (MoU) governs the linkage of WA health data with Commonwealth data and covers residential aged care data and MBS and PBS claims data. The Data Linkage Branch has links available for Commonwealth data up until 2005.

If you would like to apply for cross-jurisdictional data please contact a member of the Client Services Team to discuss your project prior to completing the Application for Data form.

As with WA data requests, cross-jurisdictional applications should go through the Expression of Interest stage. Cross-jurisdictional applications use the same forms as WA applications, with an extra module for cross-jurisdictional data. These forms are available at the DLWA website:

<http://www.data-linkage-wa.org.au/go/access-and-application/wa-data-application-form>

Formal cross-jurisdictional applications must be approved by DOHA and DOHWA as well as the Program Manager of the DLB and the relevant data custodians. Please be aware that this approval process can experience delays due to the number of stakeholders that must review each application.

3.3 Extraction Process & Time frames

Health records are stored separately by the various data collections (e.g. hospital morbidity, cancer registry) and the DLB does not have access to these. This means that to extract records for a particular group of people over several datasets we must liaise with the manager of each requested dataset. This can be a very complicated process, especially if the study group is defined by certain conditions or over more than one data collection. Client Services then pull all these extracts together to create the disc that you will receive & do quality checking on the files.

We aim to complete standard linkage/extraction projects within 3 months of the date of final approval. Please understand that this can vary depending on the size of the dataset you need us to link and the size and complexity of your extraction. We often have up to 50 projects in progress at one time and your project will be placed in a queue.

3.4 Data Linkage Branch Client Services

The role of the Client Services team is to assist clients in applying for linked data and managing requests, from the EOI stage through the final handover of data. The team is made up by the Project Manager and Project Officer. The Project Officer handles Expressions of Interest and takes projects through to the formal approval stage. After projects have received final sign off and ethical approval, the Project Manager coordinates the associated linkage and extraction tasks.

If you require assistance with your project, please contact a member of Client Services (see the [Contacts](#) page).

4. Receiving Linked Data

4.1 Collecting your data

Data must be collected in person and signed for by an approved analyst on the project. If the analyst is based outside of Perth then the data may be encrypted/password protected, using the Data Linkage Branch encryption program, and couriered.

4.2 What you will receive

Data files are usually provided on a CD as fixed width, text files. They will be encrypted/password protected using either WinZip or the Data Linkage Branch encryption program.

On receipt of your data you will also be given an information form and a WA Data Linkage Branch Project Report form.

The information form contains information about your linked data such as data file names, layout file names and reference files.

The Project Report form is to be used to inform the WA Data Linkage Branch of any report, journal article, other publication, conference presentation or media interest generated from data supplied by the WA Data Linkage Branch. A register of all outputs is maintained by the DLB. This Project Report form can be forwarded to the DLB when submitting annual progress reports to HRECs.

The following are examples of files you might receive (please see the Glossary for definitions):

Layout file

Hospital Morbidity System (morb.txt)

Field_Name	DataSize	OutputSize	Range
rectype	3	3	1-4
Rootnum	13	13	5-18
Lpnum	13	13	19-32
Hosparea	3	3	33-36
Hospcat	3	3	37-40
Adm	9	9	41-50
Sep	9	9	51-60
pcode	4	4	61-65
diag	8	8	66-74

Mapping file

Encrypted Root Number	Original Unique ID
D45927R096130	01
P049FNW5994L9E	02
C92FD8H1D8Y4R	03
D5GE6GH4DDH4Y	04
75E6R4H1FD6E8	05
5D4R5H116E6R7	06
R5F46S3S1J51E	07
D1H6ED41H8RG9	08
GF5G45HJ5G6RS	09
D5R8GS6D2HF2D	10

4.3 Data Dictionaries

Data Dictionaries are available via the Data Linkage Branch website <http://www.datalinkage-wa.org.au/go/access-and-application/access-to-linked-data>. If further information is required please contact the relevant Data Custodian (contact details for the Data Custodians are also available on the website).

4.4 Cost Recovery

Charges usually apply for linkage, extracting and geocoding requests for researchers. These charges are in place purely as cost recovery for the ongoing development of the WADLS. The cost of your project will depend on the size and complexity of your request. Charging for extractions is calculated based on the number of datasets, number of years and number of individuals in the data extract.

A quote will usually be provided with feedback to an Expression of Interest, and a final invoice sent out to the Principal Investigator once you have received your data. If you are applying for a grant and require a quote before lodging an EOI, please contact the Data Linkage WA Program Manager, Ms Diana Rosman, at Di.Rosman@health.wa.gov.au.

4.5 How to encrypt/decrypt data files

The Data Linkage Branch encrypts data files that are released to researchers to ensure maximum security. This encryption could be done using Winzip, or our own encryption program. If it is done with our own encryption program, you will receive separate instructions for decrypting the files (do not use the instructions below).

Using WINZIP for Encryption (require WINZIP 10.0 or more recent)

1. Right click on the file/folder you wish to zip & encrypt. From the menu select *Winzip* → *Add to zip file*.
2. An 'Add' box will appear. If you leave the path that already shows up in the 'Add to archive' box, the zipped file will be made in the same location as the original file. Click *Add*.
3. You will now have a Winzip box of the file/folder you are zipping with a list of the contents. To encrypt the file, click on *Encrypt* in the top menu bar. A Winzip caution box might pop up at this stage to make you aware of the uses of Winzip encryption.
4. An 'Encrypt' box will appear. You need to create a password to encrypt/decrypt the file. Enter this password in both boxes and click *OK*.
5. Close the Winzip window.

Using WINZIP for Decryption

1. Right click on the file/folder you want to decrypt. From the menu select *Winzip* → *Extract To*.
2. An 'Extract' box will appear. Change the location of where you want the file if necessary and click *Extract*.
3. A 'Password' box will appear. Enter the password and click *OK*.
4. The decrypted and unzipped file should now appear in the location you specified.

5. Using Linked Data

5.1 Referencing & Acknowledging Data Providers

The Data Linkage Branch has no preferred referencing system for publications. Please check with your institution for their preferred system. For further help with referencing please see the University of Western Australia Library guides at http://www.library.uwa.edu.au/education_training_and_support/guides#references

The paragraphs below may be used as templates in acknowledging the Data Linkage Branch in publications. If you are unsure of which version to use please contact Alex Godfrey at Alexandra.godfrey@health.wa.gov.au for assistance. Please see the Contacts section for the details of the Data Custodians.

- **Acknowledgement 1: Standard Project**

The authors wish to thank the staff at the Data Linkage Branch and [insert names of Data Custodians involved].

- **Acknowledgement 2: More complicated project**

The authors wish to thank the Linkage and Client Services Teams at the Data Linkage Branch, in particular [insert names of staff who provided extra help], as well as [insert names of Data Custodians involved].

- **Acknowledgement 3: Individual staff members provided extra help**

The authors wish to thank the staff at the Data Linkage Branch, in particular [insert name] for their work on [insert what they did] as well as [insert names of Data Custodians involved].

5.2 Research Outputs

To monitor the results of using linked data, we ask that you notify the Data Linkage Branch of all publications, media releases and presentations. Please remember to submit the Data Linkage Project Report that you receive on your extraction disc. To report any outputs of your project please email Alex Godfrey at Alexandra.godfrey@health.wa.gov.au

Please note that **ALL** publications, releases and presentations for cross-jurisdictional projects must be sent to the DLB Program Manager before being published. Please contact Diana Rosman at diana.rosman@health.wa.gov.au for more information.

6. Contacts

Data Linkage Branch

1st Floor, C Block
189 Royal St
East Perth WA 6004

Diana Rosman
Program Manager
diana.rosman@health.wa.gov.au
Ph: (08) 9222 4261

Enquiries about WA Birth and Death Registries and the Electoral Roll. Enquiries about creating infrastructure linkages & charging.

Dr Hilarie Tardif
Project Manager
Ph: (08) 9222 2370

Enquiries about existing projects, cross-jurisdictional projects.

Alexandra Godfrey
Project Officer
alexandra.godfrey@health.wa.gov.au
Ph: (08) 9222 2413

Enquiries about new projects, updates/amendments, application process, charging, website.

DOHWA Human Research Ethics Committee

1st Floor, C Block
189 Royal St
East Perth WA 6004

Walter Arrow
HREC Privacy Officer
HREC@health.wa.gov.au

Enquiries about privacy and ethical considerations.

Katerina Hegney
HREC Executive Officer
HREC@health.wa.gov.au

Enquiries about applying for ethical review.

DOHWA Data Collections

Hospital Morbidity Data Collection
Brooke Smith
Manager, HMDC
brooke.smith@health.wa.gov.au
Ph: (08) 9222 4362

Emergency Department Data Collection
Michele Russell
Manager, Non-admitted Data Collections
michele.russell@health.wa.gov.au
Ph: (08) 9222 4166

Mental Health Information System
Tom Pinder
Manager, MHIS
tom.pinder@health.wa.gov.au
Ph: (08) 9222 4496

Maternal & Child Health
Max Le
Manager, Maternal & Child Health
max.le@health.wa.gov.au
Ph: (08) 9222 2417

Western Australian Cancer Registry
Dr Tim Threlfall
Manager, WACR
tim.threlfall@health.wa.gov.au
Ph: (08) 9222 4022

Birth Defects Registry
Prof Carol Bower
Manager, BDR
Caroline.bower@health.wa.gov.au
Ph: (08) 9340 2721

Appendix A: Glossary of Linkage Terms

If you would like to make a suggestion for this glossary please email Alex Godfrey at alexandra.godfrey@health.wa.gov.au

Ad-hoc linkage

Linkage of an external dataset (e.g. survey results) to the WA Health data collections.

ARIA

Accessibility/Remoteness Index of Australia. These values are assigned to geocoded areas and measure geographic remoteness. ARIA codes can be assigned using 1996, 2001 and 2006 ABS census data.

Chain

A group of links that have been determined to relate to one individual.

CHIC

Confidentiality of Health Information Committee- previously advised on ethical considerations and has been replaced by the DOHWA HREC.

Cross-jurisdictional

Pertaining to both WA Health and Commonwealth data. An example of a cross-jurisdictional request would be WA hospital data and Commonwealth Medicare data. Sometimes also referred to as 'XJSC'.

Encryption

The process of transforming information into an encoded form. Extracted and linked data is encrypted before it is handed over to researchers.

Extraction

The process of selecting records from the health data collections. Researchers may request the extraction of certain variables from the DOHWA data collections. E.g. a researcher may ask for an extract of all people in WA who were diagnosed with breast cancer in 2005.

Frequency File

This file is sometimes provided on a data extract and contains the frequencies of each variable.

Geocoding

The process of assigning a geographical area to records, allowing analysis of geographical distribution. Related to SEIFA and ARIA variables.

HREC

Human Research Ethics Committee. The WA Department of Health HREC was formed in 2008 to consider applications for DOHWA health data. See the DOHWA HREC website: <http://www.health.wa.gov.au/healthdata/HREC/index.cfm>

Layout file

This file is provided on a data extract and contains the positions of the variables. Please see the 'What you will receive' section for more information.

Linkage

The activity of finding connections between different pieces of information that are thought to belong to the same individual.

Linkage Key

An index that is produced during the linkage process, which are used to enable health records to be joined together for research. The linkage keys are held separately from any personal demographic information.

Mapping file

This file is provided on an extract where the DLB has linked data for a project. All data given for linkage must contain unique identifiers for each individual. When the extract is given back to the researcher, the mapping file contains the original unique identifier and the root number on the extract, effectively mapping the original data to the new service data.

SEIFA

Socio-Economic Indexes for Area. These values are assigned to geocoded areas and measure socioeconomic conditions. SEIFA codes can be assigned using 1996, 2001 and 2006 ABS census data.

Variables

The specific values that are collected for health records, e.g. name, address, date of birth, sex etc. Researchers can apply to obtain certain variables from DOHWA data collections. The release of these variables is decided by the individual data custodians of those collections.

WADLS

The Western Australian Data Linkage System creates and stores links within and between the state's health data collections. The WADLS does not contain any clinical or service data, rather it consists of groups of links called chains.

XJSC

Abbreviation for Cross-Jurisdictional Steering Committee. Also used to refer to cross-jurisdictional projects (e.g. XJSC29).

Appendix B: Frequently Asked Questions

➤ **Q: How do I add/remove an analyst for my project?**

A: This depends on whether you have ethics approval from the DOHWA HREC.

	WA only projects	Cross-Jurisdictional projects
DOHWA HREC approved	Principal Investigator to notify the DOHWA HREC Executive Officer via email (HREC@health.wa.gov.au) and post in a hard copy of the new analyst's confidentiality agreement/acknowledgment.	Principal Investigator to notify: <ul style="list-style-type: none"> • the HREC Executive Officer Send in a letter/email requesting the analyst be added and post in a hard copy of the analyst's signed Confidentiality agreement/acknowledgement (available at the HREC website: http://www.health.wa.gov.au/healthdata/HREC/index.cfm) • XJSC Secretariat (DLB Project Officer) Send in a letter/email requesting the analyst be added and post in hard copies of the analyst's signed undertakings (from the XJSC application form) and Deed of Confidentiality (please email the DLB Project Officer if you do not have this document). • DOHA Send an email to elizabeth.hoole@health.gov.au asking that the analyst be added and attach scanned versions of the analyst's signed undertakings (from the XJSC application form) and Deed of Confidentiality (please email the DLB Project Officer if you do not have this document).
No DOHWA HREC approval	Principal Investigator to notify the DLB Project Manager via email and post in a hard copy of the new analyst's confidentiality agreement/acknowledgment.	Principal Investigator to notify: <ul style="list-style-type: none"> • XJSC Secretariat (DLB Project Officer) Send in a letter/email requesting the analyst be added and post in hard copies of the analyst's signed undertakings (from the XJSC application form) and Deed of Confidentiality (please email the DLB Project Officer if you do not have this document). • DOHA Send an email to elizabeth.hoole@health.gov.au asking that the analyst be added and attach scanned versions of the analyst's signed undertakings (from the XJSC application form) and Deed of Confidentiality (please email the DLB Project Officer if you do not have this document)

➤ **Q: How do I encrypt/decrypt data files?**

A: For simple encryption/decryption using Winzip, please see section 4.5. For data extracts encrypted using the DLB's own program, you will receive a separate copy of instructions.

➤ **Q: There is something wrong with my data, who do I contact?**

A: Please contact Geoff Davis, the DLB Senior Data Linkage Consultant on (08) 9222 2048 or at geoff.davis@health.wa.gov.au.

➤ **Q: Who do I contact to discuss data variables?**

A: Queries related to data variables should be directed to the individual Data Managers. For further information please see the [Contacts](#) section.

➤ **Q: Why can't I access certain variables?**

A: There are some variables contained in the data collections which are deemed sensitive (e.g. name, date of birth, address). Following the NHMRC National Statement the public benefit of using personal health information must outweigh the risk to privacy. Therefore wherever possible de-identified data must be used.

➤ **Q: What am I allowed to release in publications?**

A: No information that will directly or indirectly identify individuals should be released in publications. When there are a small number of people in a study group, be careful about describing details (e.g. cause of death) in the text. The same applies to tables, graphs and maps. If you have any queries about what you can include in your publication, please contact Diana Rosman on (08) 9222 4261 or Geoff Davis on (08) 9222 2048.

➤ **Q: How do I acknowledge the DLB?**

A: Please see the [Acknowledging the DLB](#) section.

➤ **Q: How do I import text files?**

A: This will depend on the software that you are using for your analysis. For assistance with importing text files please contact Geoff Davis at geoff.davis@health.wa.gov.au

➤ **Q: Which datasets can I obtain SEIFA/ARIA codes for?**

A: SEIFA/ARIA codes can be applied using the 1996, 2001 and 2006 census data on the datasets which are routinely geocoded:

- Emergency Department Data Collection
- Death Register
- Hospital Morbidity Data Collection
- Midwives Notification Scheme

➤ **Q: I have discovered a breach in protocol, what do I do?**

A: Please contact a member of the Client Services Team (see the [Contact](#) list) for advice.

➤ **Q: How do I know the progress of my project?**

A: To ask about the status of your project please contact the DLB Project Manager (see [Contact](#) list).

Appendix C: Useful Links

DOHWA

Data Linkage WA

<http://www.datalinkage-wa.org.au/>

DOHWA HREC

<http://www.health.wa.gov.au/healthdata/HREC/index.cfm>

WA Cancer Registry

<http://www.health.wa.gov.au/wacr/home/>

Maternal and Child Health

<http://dev.intranet.health.wa.gov.au/corpdocs/hic/ICAM-inter/health/maternal.cfm>

Non-Admitted Patient Collection

<http://dev.intranet.health.wa.gov.au/corpdocs/hic/ICAM-inter/health/patient.cfm>

Hospital Morbidity Data System

<http://dev.intranet.health.wa.gov.au/corpdocs/hic/ICAM-inter/health/hospital.cfm>

Mental Health Information System

<http://dev.intranet.health.wa.gov.au/corpdocs/hic/ICAM-inter/health/mental.cfm>

Other

NHMRC

<http://www.nhmrc.gov.au/>

Telethon Institute for Child Health Research

<http://www.ichr.uwa.edu.au/>

University of Western Australia Library

www.library.uwa.edu.au

School of Public Health, Curtin University

<http://publichealth.curtin.edu.au/>

Centre for Health Record Linkage (CHeReL)

<http://www.cherel.org.au/>

School of Population Health, University of Western Australia

www.sph.uwa.edu.au

Appendix D: Flowchart of the Extraction Process

