LIN✕MART

Maximising insights for effective health service delivery

Centre for
Data Linkage

Curtin University

THE POWER OF INSIGHT

Data is critical to health care research and innovation and making the most of data requires the very accurate linkage of disparate data sources. Data linkage is used to 'join up' or link together records that belong to the same person. It provides a detailed yet anonymous picture of patient experiences and health outcomes, generating insights that are used to improve the efficiency and effectiveness of health service delivery, clinical care, and guide the strategic directions of the health system.

LINKING IT ALL TOGETHER

Data linkage in Australia and elsewhere is typically performed by trusted third parties, known as data linkage units. These units need linkage software that is extremely accurate, secure, scalable and fast. They also need linkage software that can cope with the complexity of ongoing, operational data linkage, such as

- Managing ongoing linkage of data collections over time (without the need to relink at intervals)
- Managing multiple linkages and data extractions
- Managing amended and deleted records within an enduring system
- Handling diverse consumer and data custodian needs, such as a researcher wanting to link their own data or data custodians imposing restrictions on a particular linkage

A STATE OF THE ART SOLUTION

Curtin University has developed linkage management software (LinXmart) that matches records using deterministic and probabilistic methods. The software produces accurate results, maximising the insights from data. LinXmart can link very large files (tens of millions of records) at speed.

LinXmart has been specifically designed to meet the challenges of operational data linkage and to manage the growth of increasingly complex and dynamic linked datasets. It handles ongoing as well as project based linkages.

Data from all parts of the linkage process (loading, linking, grouping, reviewing, extraction) and repeated processes for enduring linkage are managed by the software.

LinXmart has several unique security features, including:

- Role based permissions
- Project separation
- Privacy-preserving features: the ability to load, process and link Bloom-encoded data returning very high quality results (see separate fact sheet)
- Secure storage of all data and results with logging and auditing

Using LinXmart requires minimal management and operational overheads.

TECHNICAL SPECIFICATIONS

- Built on Microsoft technologies for Enterprise integration

- Windows Server 2012 R2 or later

- .NET Framework 4.7.2

- SQL Server database

- Active Directory authentication

- Developed within an ISO/IEC 27001 certified Information Security Management System to ensure the system's security, continuity, and ongoing maintenance

- Web API for integration and automation, providing functions to configure projects, ingest data for linkage and extract linkage maps

Consult the **LinXmart with PPRL fact sheet** for additional information about LinXmart's unique privacy-preserving linkage features.
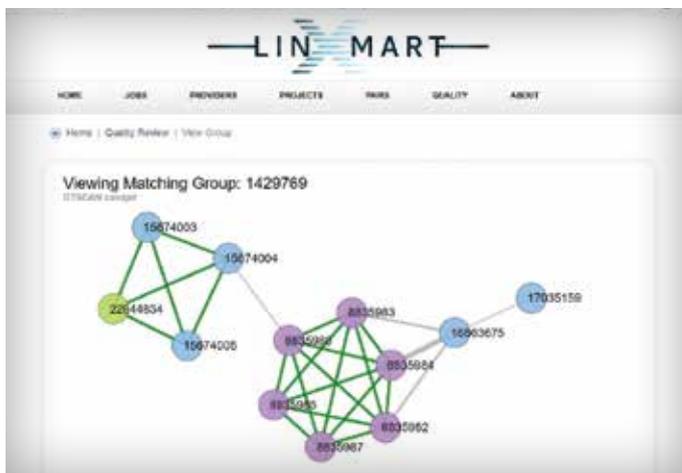
WHERE IS **LinXmart** BEING USED?

LINKING UP HEALTH DATA: CROSS BORDER HOSPITAL USE

LinXmart has been used to link hospital records and death registration data from four jurisdictions in Australia: New South Wales, Western Australia, South Australia and Queensland. The linkage made it possible for a national research study explore cross border hospital use and hospital related deaths (i.e. deaths in hospital or within 30 days of leaving hospital) in Australia. The linkage involved over 40 million records.

https://www.phrn.org.au/for-the-community/case-studies/case-study-9/

BEYOND THE HEALTH SECTOR: CREATING AN INTEGRATED DATA RESOURCE FOR GOVERNMENT (SIDR)

LinXmart is 'connecting up' sensitive datasets outside the health sector. In a pioneering initiative, the WA Government has partnered with Curtin University and the WA Department of Health to establish the Social Investment Data Resource (SIDR) a linked, administrative database containing de-identified information on individuals who have had contact with key government agencies. These agencies include the Departments of Communities, Health, Education, Justice and WA Police. The SIDR will help government and researchers to better design, target and evaluate social policies, services and intervention programs across Western Australia.

https://www.wa.gov.au/organisation/department-of-treasury/case-study-social-investment-data-resource

GOVERNMENT OF WESTERN AUSTRALIA

OUR TEAM

The LinXmart team comprises a seasoned group of professionals with skills, experience and expertise in operational data linkage, software development, academic research and government administration.

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We work collaboratively with data linkage experts across Australia, Germany, UK and Canada. We also work closely with other parts of Curtin University, including statisticians and health economists from our Health Research and Data Analytics Hub, data scientists and computational experts from the Curtin Institute for Computation.

LINXMART

WE'RE HERE TO HELP

Our team at Curtin University undertakes research and development in data linkage, we offer linkage services, act as a linkage unit and offer LinXmart on a commercial basis. If you are interested in our software or services, then please visit our website **linxmart.com.au** or talk to us directly **info@linxmart.com.au**

Certified System ™
Information
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ISO 27001
SAI GLOBAL