2019 | 011

INSPIRE

RESEARCH AUSTRALIA SHOWCASES HEALTH & MEDICAL RESEARCH

AUSTRALIAN GEOSPATIAL HEALTH LAB – MAPPING THE WAY TO IMPROVED WELLBEING

WORLD-FIRST RESEARCH IN IDENTIFYING HEART ATTACK RISK

NEXT GENERATION MEDICAL DEVICES TO ELIMINATE BLOOD TRAUMA

A BREAKTHROUGH IN HOW RESEARCHERS DISCOVER THE CAUSES OF GENETIC HEART DISEASE

RESEARCH AUSTRALIA
CONNECTING • ENGAGING • INFLUENCING

CONTENTS

Australian Health & Medical Research

Publisher
Research Australia Ltd

For Advertising enquiries please contact the Research Australia office on
p 02 9295 8546 or
e admin@researchaustralia.org

researchaustralia.org

INSPIRE ONLINE
issuu.com/researchaustralia

INSPIRE is a publication of
Research Australia Ltd
ABN 28 095 324 379
384 Victoria Street
Darlinghurst NSW 2010

Who can submit articles?
Any current member of Research Australia who would like to share a relevant story that affects their organisation including, philanthropic donations and their outcomes, research findings, and any other related health and medical research topic that affects the Australian population.

Submission guidelines & deadlines
For information regarding how to submit and publishing deadlines visit the Research Australia website.

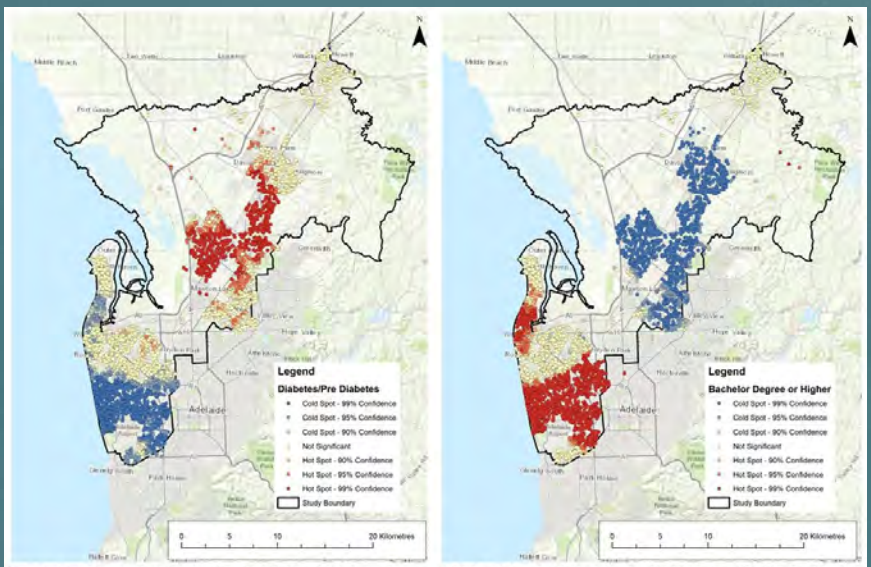
RESEARCH AUSTRALIA
CONNECTING · ENGAGING · INFLUENCING

AUSTRALIAN GEOSPATIAL HEALTH LAB MAPPING THE WAY TO IMPROVED WELLBEING

Geographic information systems (GIS) can provide enormous benefits by supporting routine and strategic decision-making in health and medical care.

The Australian Geospatial Health Lab (AGeo-L) is a unique disease prevention infrastructure developed through a partnership between the University of Canberra and GIS industry world leader Esri. AGeo-L innovates the integration of advanced digital tools for acquiring, managing, transforming, analysing and visualising spatially-referenced data. Spatial epidemiological analysis identifies built, social and physical environmental factors that shape risk factors, diseases and outcomes (complications, hospitalisations, death). Sophisticated geospatial modelling and inferential, multi-level analyses evaluate environmental features and risk factors against diseases and outcomes that vary over time and respond (or not) to policy and public health and practice-based intervention. Predictive modelling identifies high-priority environmental and population targets and provides stakeholders indispensable decision-making tools for the planning of health policy and practice interventions. AGeo-L provides essential evidence for policy and practice to reduce disease risk and treatment costs. It constitutes:

- A resource with strong flexibility to support public and private sector initiatives requiring geospatial analysis of health and health care relevant data;
- A foremost collaborative effort to facilitate the geospatial analysis of public health data for prevention research involving internal and external partner agencies;
- Leadership to co-ordinate the application of expertise in trans-disciplinary geospatial analysis, health policy, health planning, environmental health analysis, and spatial epidemiology; and
- Expertise to facilitate the development of new approaches and methodologies to sustain effective public health and health and medical care interventions.



Spatial analysis: Correspondence of hot spots for prediabetes and diabetes cases (orange-red) (left) with low education (pale blue-blue) (right), Northwest Adelaide, South Australia

FOCUS ON INFERENCE

AGeo-L unravels how relationships between environmental context and population composition together shape health. The focus is the active appraisal over time of dynamic, inferential relationships between people and places, to inform improved public health

and medical systems. This contrasts with usual passive monitoring of health outcomes alone, supporting only speculation as to why outcomes do or do not vary with changes in policy, or public health or medical practices. AGeo-L supports better intelligence of health inequalities and the causes of change in these dynamics, especially those affecting disadvantaged populations, including Aboriginal peoples. It also enables the evaluation of preventative interventions at the population level. Such capabilities support knowledge translation for end users concerned with health improvement and cost effectiveness.

UNIQUE TO AUSTRALIA.

AGeo-L is a uniquely enabling infrastructure. Through a graphical user interface, it provides an interactive, fully relational system for the storage, management and extraction of health-related spatial data covering national, state, regional and local levels. It houses a semi-automated extensive array of spatial databases and analytic tools including leading-edge Esri data analytics, GIS mapping and location platform. Further development is planned to support in-memory, relational databases optimised for transactional and analytic processing of spatial health relationships. Yet despite housing state, territorial and national data, AGeo-L is not a warehouse like the Australian Urban Research Infrastructure Network. Nor does it complete with NCRIS-supported data linkage efforts (e.g., SA NT DataLink, WA Population Health Research Network): it deals with spatial, not administrative, data linkage. Notable innovations include:

1. Support for collaborations through secure portal-to-portal linkages where sensitive data need not be transferred but can be linked to environmental data through the AGeo-L portal; and
2. Provision of a validated comprehensive, relational international indicator classification system (copyrighted, registered IP), a standardised framework for ensuring harmonised, replicable cross-jurisdictional research. The five-level, hierarchical, typological tree makes explicit the lineage of thousands of indicators against constructs for which they are isomorphic. This represents a major advance for the field, providing a defensible basis for indicator selection, development and validation, and for standardised, cross-agency research across different settings, nationally and internationally.

PARTNERSHIPS

The spatial sector is one of the main industry growth areas in which Australia has a competitive advantage. AGeo-L aligns with the 2026 Spatial Industry Transformation and Growth Agenda ("2026Agenda"), a whole-of-sector initiative of business, government, research, academia and spatial-user organisations. AGeo-L was purposely constructed to link to each sector as a shared resource enabling negotiated collaborations, comparative or synthetic, underpinned by the systematic approach to indicator classification using the five-level relational typology.

The capacity for expressing transparent, standardised operational measures of constructs, an essential basis for inferential comparisons of health relationships across diverse settings with environmental predictors having variations in operational form, yet conceptually consistent definitions, is unique.

It greatly increases the scope and scale for inference from wide-ranging partnerships, especially where sensitive raw data cannot be shared. Alternately, AGeo-L through Esri supports defence industry requirements for secure data storage when data sharing agreements are in place, with secure data sharing internally and externally. External web access to the indicator typology allows for browser-based web searching and viewing of ISO-standard metadata published for in-house data resources but not access to the actual data, thus assisting partners in reviewing collaboration possibilities.

Author: Mark Daniel is Professor of Epidemiology and leads the Australian Geospatial Health Lab at the Health Research Institute, University of Canberra.

RESEARCH
AUSTRALIA
CONNECTING ▪ ENGAGING ▪ INFLUENCING

384 Victoria Street, Darlinghurst NSW 2010
e admin@researchaustralia.org
p 61 (02) 9295 8546
w researchaustralia.org