From old to new:
using an Applied Learning Healthcare Systems approach to redesign a clinical decision support programme for antimicrobial stewardship.

April 2023

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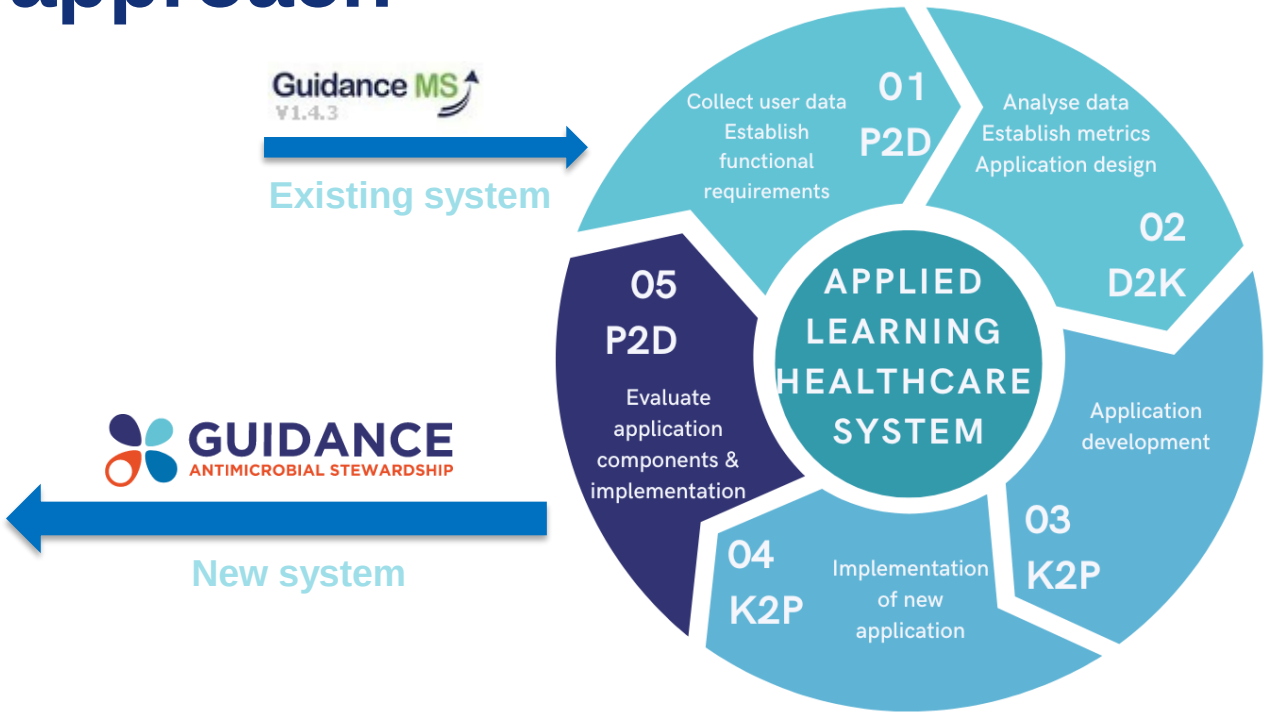
Background

Applied Learning Healthcare System – our approach



What is the Guidance® program?

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Formulary restriction of antimicrobials

- Highly restricted
- Restricted
- Unrestricted

Antimicrobial review

Pharmacists - clinical review & dispensing
Nurses - Rx review & administration

Data for action

Quality improvement & targeted feedback informed by data

Decision support

Prescribers - access to decision support, & local & national guidelines

AMS team review

Post prescription review & real-time feedback to prescribers

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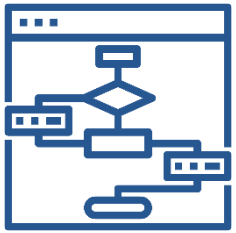
Practice to Data (P2D)

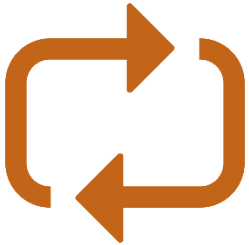
Goals

To implement a system that meets:

1. Evolving digital needs in AMS in hospitals
2. AMS accreditation standards
3. Expansion of AMS services



Improvement in workflows for key user groups



Improve ability to use data for target action

Guidance® re-design

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Redesigned and developed based on years of experience and user feedback on existing Guidance MS system

Expert-developed decision support content to facilitate indications-based approvals and prescriber education.

User-friendly program for editing and content management

Adherence to hospital policies around use of antimicrobials

Clear Antimicrobial restrictions and in-built assessments help nudge towards optimal prescribing.

Quality & significant time savings for reporting. Real-time reports enable more regular feedback to stakeholders.

Ability to target quality initiatives leads to greater improvement in outcomes

Able to interact with other systems to improve user workflow & data exchange.

Pilot program rolled-out at the Royal Melbourne Hospital September 2022

Requirements

- User requirements
- Functional requirements
- Regulatory requirements – Software as a Medical Device
- Quality Management System – ISO 9001 and other Standards
- Risk Assessments

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Data to Knowledge (D2K) - Design

Design Thinking

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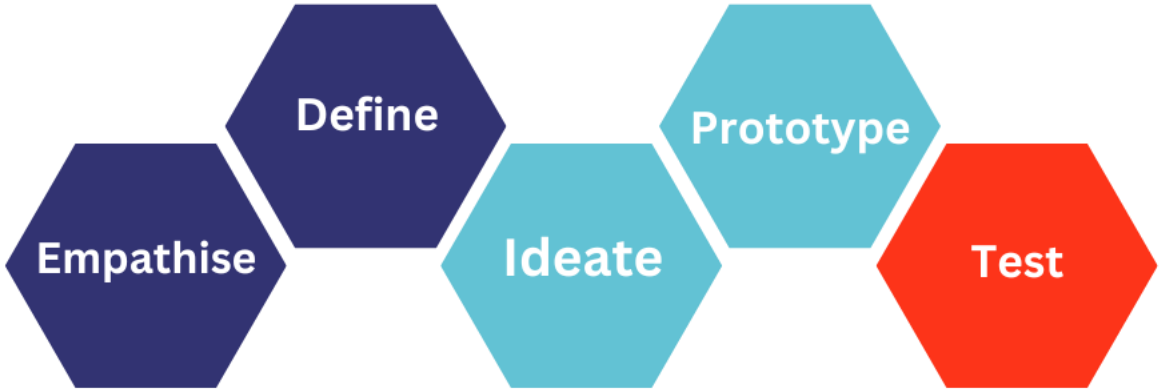

- Use of design thinking principles to design application with wire frames, user profiles, user stories, and workflows.

Development

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- Use of Agile methodology to develop components of the application.
- Each sprint comprised of:
  - Requirement specifications and UI designs
  - Functionality development
  - Design verification and validation

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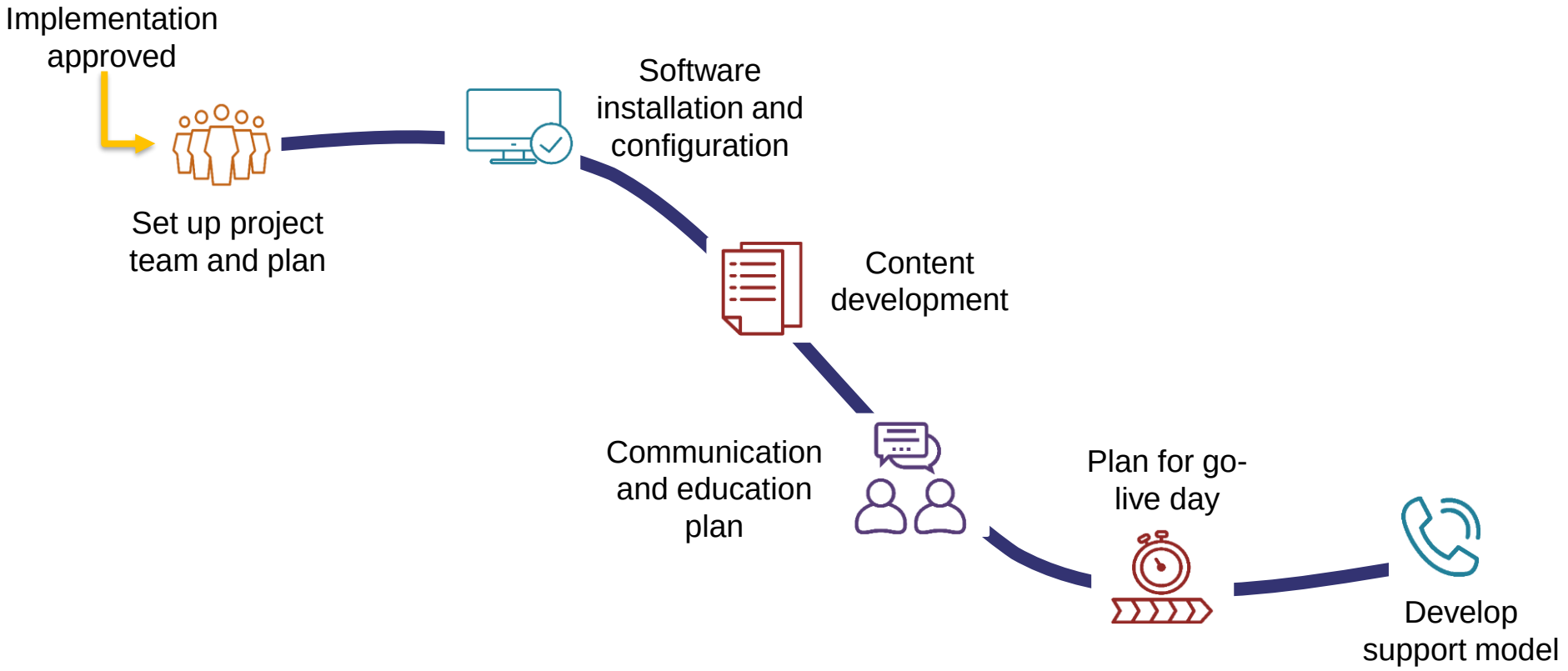
Knowledge to Practice (K2P) - Implementation

Implementation



Post - implementation

Monitor for unexpected behaviour

- Daily contact with prescribers
- Ad-hoc feedback on the program

Ongoing education and training

- Resources readily available
- Plan for training of new staff

Design an evaluation plan

- Choose an evaluation framework
- Design evaluation plan

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Practice to Data (P2D) - Design evaluation plan

Evaluation plan

Contents lists available at ScienceDirect

Clinical Microbiology and Infection

journal homepage: www.clinicalmicrobiologyandinfection.com

A systematic review of clinical decision support systems for antimicrobial management: are we failing to investigate these interventions appropriately?

T.M. Rawson [1,*], L.S.P. Moore [1], B. Hernandez [2], E. Charani [1], E. Castro-Sanchez [1], P. Herrero [2], B. Hayhoe [3], W. Hope [4], P. Georgiou [2], A.H. Holmes [1]

Socio-technical evaluation

Clinical evaluation

Economic evaluation

Socio-technical evaluation

Framework

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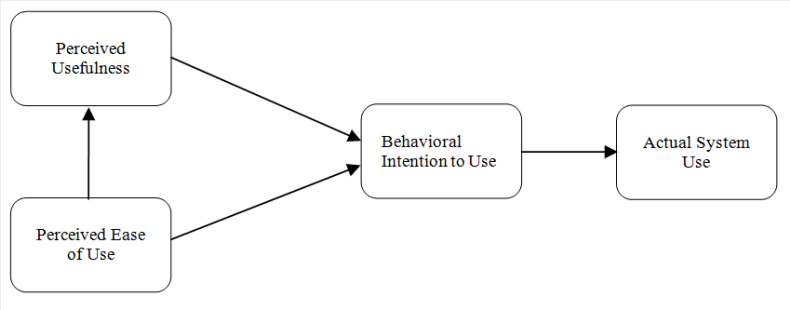
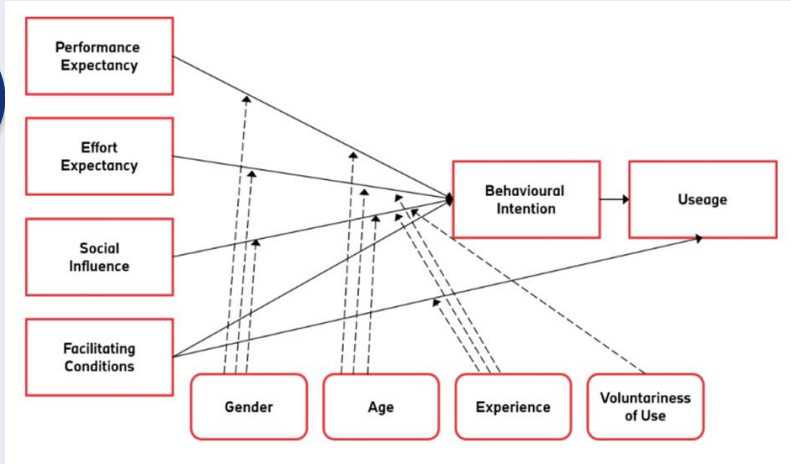
Technology Acceptance Model (TAM)



Vs

Unified Theory of Acceptance and Use of Technology (UTAUT)



Socio-technical evaluation

Study design

Performance Expectancy

The decision support questions help me select the most appropriate antimicrobial for my patient.

Effort Expectancy

Guidance fits my prescribing workflow (please provide further comments below)

Social influence

My registrar or consultant expects me to use Guidance to obtain approvals.

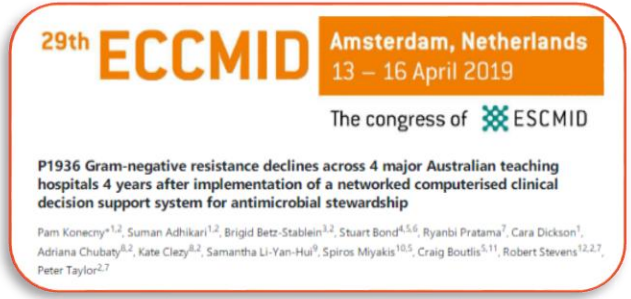
Facilitating conditions

I have the technical resources necessary to use the system.

Behavioural intention to use the system

I always use the system to obtain approvals for restricted antimicrobials.

Clinical evaluation


29th ECCMID Amsterdam, Netherlands 13 – 16 April 2019

The congress of ESCMID

P1936 Gram-negative resistance declines across 4 major Australian teaching hospitals 4 years after implementation of a networked computerised clinical decision support system for antimicrobial stewardship

Pam Konecny[*1,2], Suman Adhikari[1,2], Brigid Betz-Stablein[3,2], Stuart Bond[4,5,6], Ryanbi Pratama[7], Cara Dickson[1], Adriana Chubaty[8,2], Kate Clezy[8,2], Samantha Li-Yan-Hui[9], Spiros Miyakis[10,5], Craig Boutlis[5,11], Robert Stevens[12,2,7], Peter Taylor[2,7]


J Antimicrob Chemother 2017; **72**: 2110–2118
doi:10.1093/jac/dkx080 Advance Access publication 14 March 2017

Journal of Antimicrobial Chemotherapy

Outcomes of multisite antimicrobial stewardship programme implementation with a shared clinical decision support system

Stuart E. Bond[1–3]*, Adriana J. Chubaty[4], Suman Adhikari[5,6], Spiros Miyakis[2,3,7], Craig S. Boutlis[7], Wilfred W. Yeo[2,3,8], Marijka J. Batterham[9], Cara Dickson[10], Brendan J. McMullan[11], Mona Mostaghim[12], Samantha Li-Yan Hui[13], Kate R. Clezy[14] and Pamela Konecny[6,15]

Aim

- Measure the impact of the Guidance clinical decision support system

Primary outcomes

- Assess appropriateness of antimicrobial prescribing for indications previously identified with lower appropriateness of prescribing

Method

- Repeated point-prevalence NAPS for selected indications

Economic evaluation

- Compare patients with no approval or AMS review to those with an AMS review
- Patient level costing data including LOS and bed cost
- Guidance®
  - Provides quality post prescription review data
  - Systems-based approval to AMS

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Strategic planning

Strategic planning

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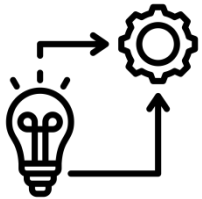
Implementation Project commencement

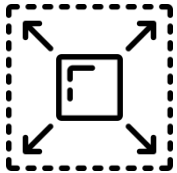
Implementation



Evaluation

Strategic planning

- Interoperability
- Scalability
- Sustainability



Interoperability

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- Integrate data systems
  - AD integration (user security)
  - iPM integration via HL7 (Patient Administration Management system)

- Integrate with EMM systems

- Enabled functionality for the Universal Indications List (UIL) to integrate with other systems

Scalability

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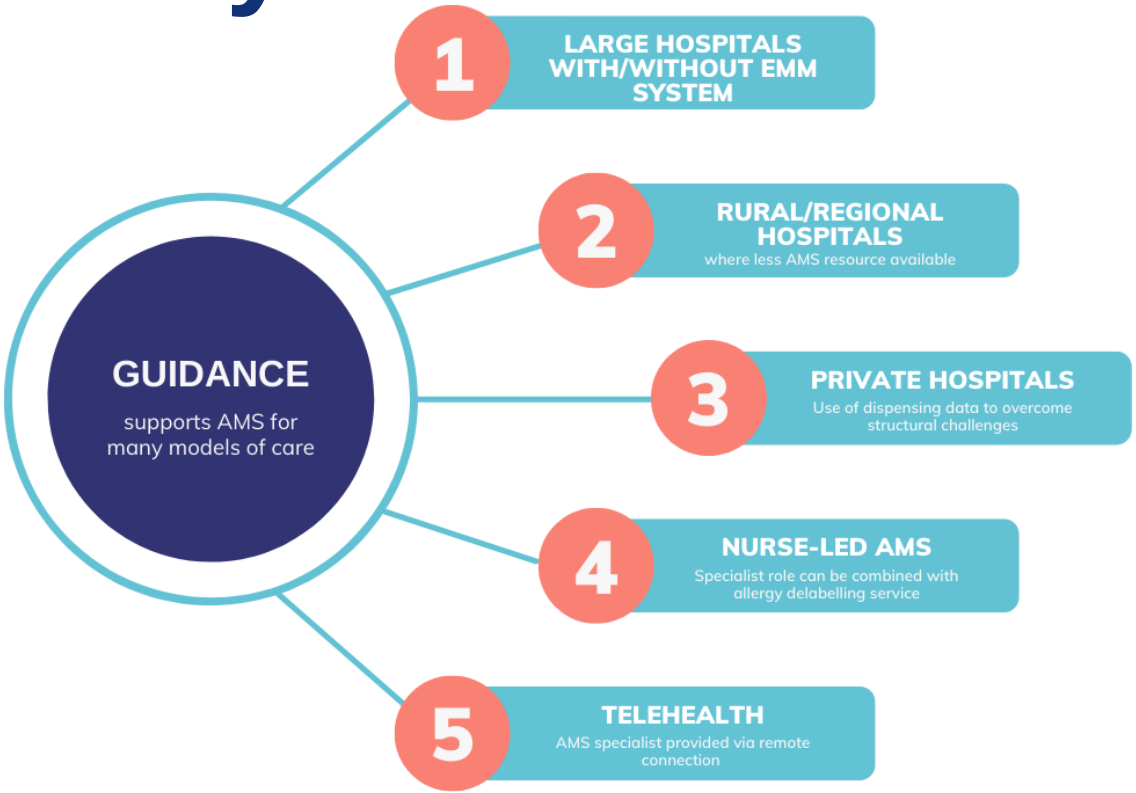

AMS Program models

Sustainability

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Drivers of equity and innovation

- Continuous quality improvement
- AMS embedded into policies and daily practices

Design for digital ecosystems

- Flexible design for evolving needs
- Data governance

Elements for systems integration

- Ongoing executive support
- Dedicated resources for AMS
- Champions

LeFevre et al., 2021

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Continuous assessment framework

Continuous assessment

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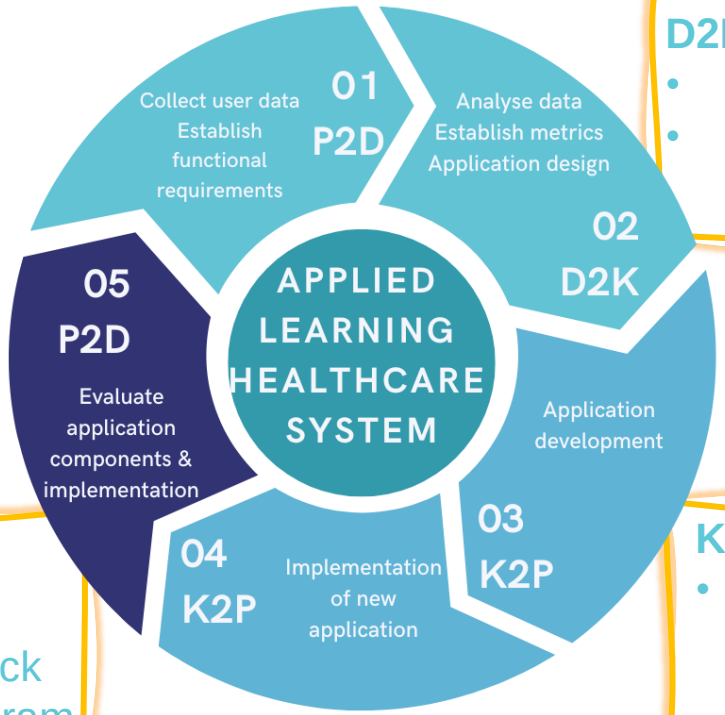

D2K

- Data reviewed by project team
- Assess feasibility and prioritise requests

P2D

- AMS and Guidance teams gather feedback and data on the program

K2P

- Enhancement requests passed to development team
- New version released

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Questions

Contact Us

- For further enquiries, contact us via our website:

Guidance Solutions (ncas-australia.org)