An innovative connectivity solution for national decentralised infectious diseases testing programs in regional and remote primary health services in Australia

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Molecular POC testing programs in Australia

- Two decentralised molecular POC testing programs in regional and remote primary health services
- GeneXpert molecular testing platform (4-module devices)
- Patient and quality tests performed by trained clinical staff
- GeneXpert platform generates an objective digital test result
- Result information is valuable for a range of purposes
  - Clinical management
  - Public health surveillance
  - Quality and program management
Sexually transmissible infections (STI) POCT Program

- Also known as TTANGO (Test, Treat ANd Go)
- TTANGO: cluster RCT (2013-15) at 12 sites using CT/NG assay
- TTANGO2: Translational research (2016-19) at 31 sites; TV added in 2018
- TTANGO3: Service delivery model (2020-2023) – scaling up to ~80 health services

CT: *Chlamydia trachomatis*, NG: *Neisseria gonorrhoeae* and TV: *Trichomonas vaginalis*
First Nations Respiratory Infections POCT Program

- Previously known as Aboriginal and Torres Strait Islander COVID-19 POCT program
- Commenced 2020, leveraging existing TTANGO network
- Scaled up to 105 primary care health services across 6 jurisdictions
- 2022 – transitioned to multiplex respiratory panel (COVID-19, FluA, FluB and RSV)

POC testing health services characteristics

• 6 Australian jurisdictions
• 65% are Aboriginal community controlled
• 35% are government managed
• 78% are very remote or remote locations
• median aerial distance from health service to reference laboratory ~600 km
• variety of clinical management systems in use e.g. Communicare, MMEX, Best practice, Medical Director
Infrastructure required

- No existing connectivity infrastructure for decentralised POCT in Australia
- Range of end-user requirements
- Relying on busy clinical staff at primary health services
- Design and implement a connectivity system to meet requirements for
  - Clinical management
  - Public health surveillance including mandatory notifications
  - Program implementation and monitoring
  - Quality management and training
- Maximise data quality
- Ensure device performance
- Minimise clinician workload
Connectivity system and result transmission

Gx Dx software (Cepheid)
- Proprietary software
- Drives testing process
- Limited patient identifiers

ONDAS software (Clinical Universe)
- Commercial middleware
- Interfaces with Gx Dx
- Captures patient identifiers
- Generates test orders and result message
Connectivity system and result transmission

Patient management systems

Primary Health Service

GeneXpert device

ONDAS software (Clinical Universe)
- Commercial middleware
- Interfaces with GxDx
- Captures patient identifiers
- Generates test orders and result message

Patient and doctor list
- Configured and installed
Connectivity system and result transmission

- LogMeIn
  - Enables remote laptop access
  - For instrument set-up, software upgrades and operator troubleshooting
Connectivity system and result transmission

HealthLink
- E-messenger service
- Encrypted end-to-end delivery to designated end user
Connectivity system and result transmission

1. Clinical Management Systems
   - Primary Health Service
   - GeneXpert device
   - LogMeIn
   - Gx Dx
   - ONDAS

2. Jurisdictional Department of Health
   - Healthlink
   - LogMeIn
   - e-messenger service

3. Program Databases
   - Software
Quality, timeliness and completeness

Tests and completeness
• Total patient test results: 117,411
• Complete demographic data for sex, age and ethnicity >99%

Median time to receipt of result (IQR)
• In 2016: 5.1 hours (1.7 – 268.5)
• In 2022: 2.3 hours (1.4 – 3.1)
“Hotline” rapid response for quality POCT results

- Received automated email alert from health service
- Phone conversation with health service operator
- Scientific verification of all positive results
- Rapid notification to requesting doctor, surveillance team and department of public health
Challenges

• Geographic remoteness of the health services
• Variety of governance structures and local systems
• Multiple recipients and reporting requirements
• Program and health service commitment
• Limited IT capacity
• Software upgrades and new assay deployment
Conclusion

• Connectivity system supported the implementation and integration of POC testing in primary health services
• Optimised system delivers real-time results to meet clinical, public health surveillance needs
• Approach is technically scalable, suitable for onboarding of other POC tests
• Represents the first such system in Australia implemented independent of traditional pathology networks
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