SBRI: Dynamic Resource Optimisation – NIAS [5528995]

Document 02:
COMPETITION BRIEF

2024-25

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	The Competition Brief describes the challenge to be addressed during the competition. It should be read in conjunction with the accompanying tender documents for this competition, all of which are available to download from the competition website prior to the tender submission deadline.

1. Summary

Funding is currently in place for Phase I of the competition, but the Authority reserves the right at its sole discretion to extend from Phase I with successful contractors as part of this procurement. The Authority also reserves its right to extend the competition to a third phase to allow for further testing of potential solutions.

A description of the SBRI competition model is set out in competition Document 01 Invitation to Tender.

Phase I of the SBRI is intended to show the technical feasibility of the proposed concept and its viability as a solution for NIAS.

Phases II and III of the SBRI are intended to provide an opportunity for further feasibility testing with service users and healthcare professionals in Northern Ireland to ensure their solutions are developed with a focus on actual local needs and experience. It also needs to address outstanding challenges not yet solved within previous Phases. These are outlined below.

This Competition Brief sets out the background to the challenge and the features and benefits sought in the solutions developed. It should be read in conjunction with the other tender documents for this competition, which are available to download from the competition website at European Dynamics - Welcome to eTendersNI

2. Funding Body

This SBRI competition is funded by the Department for Economy via the Northern Ireland Ambulance Service - Contracting Authority in this procurement.

The SBRI competition process is being managed on behalf of the Contracting Authority by the Innovation and Market Development Unit, PaLS, BSO, who will also carry out certain project management functions including making payments to successful contractor/s on behalf of the Contracting Authority.

3. Background

The Northern Ireland Ambulance Service Trust exists to improve the health and well-being of the people of Northern Ireland. NIAS apply the highest levels of knowledge and skill to preserve life, prevent deterioration and promote recovery. The Trust touches lives at times of basic human need when care and compassion are what matter most.

NIAS provides high-quality emergency, urgent and primary care services throughout the whole of Northern Ireland. Dedicated, committed and highly skilled staff work 24 hours a day, 365 days a year, to ensure patients receive the best possible care in a timely manner.

The most important function that NIAS performs is responding to emergency 999 calls as fast as possible, helping those in life-threatening conditions.

NIAS also strive to help those who require non-emergency assistance by providing a signpost service, and directing service users towards the required information.

Another duty that the Ambulance Service undertakes is transporting the most vulnerable patients in the community to outpatient hospital appointments. This is carried out by utilising the Patient Transport Service and the Voluntary Car Scheme.

At NIAS there are procedures in place to help with Major Incidents, ranging from train crash incidents to those involving hazardous materials. The Hazardous Area Response Team (HART) will be at these scenes working with other emergency services to treat anyone who is injured, including emergency service colleagues.

The efficiency, effectiveness and clinical outcome of NIAS service provision is heavily reliant on the deployment of resources to the population across Northern Ireland. To inform decision-making on resource deployment, NIAS currently uses a range of systems which store information on resources available to NIAS at any given time.

Unlike other health services, not only does NIAS need a workforce that delivers clinical excellence, but in most cases, it has to get to the patient rather than the patient travel to NIAS. This requires an infrastructure (suitable vehicles in suitable locations) that enables the workforce to get to the patient as quickly as possible.

In terms of scale, NIAS currently provides an operational frontline service from 34 Ambulance Stations and 22 Ambulance Community Deployment Points (ACDPs) spread over 5345 square miles (13,843 km^2), serving a population of over 1.8 million.

NIAS current vehicle resources *(as of Feb 2023)* available for deployment include:
- 116 Double crew ambulances (DCA)
- 112 Patient Care Service (PCS) vehicles
- 43 Rapid Response Vehicles (RRV)
- 33 Officer vehicles
- 4 NISTAR vehicles
- 4 Hazardous Area Response Team (HART) Specialist Rescue Vehicles
- 2 HEMS aircraft
- 49 Voluntary Car Scheme drivers

In addition to NIAS's resources, there is a framework contract for Independent Ambulance Services (IAS) which can be brought on board if required to support operational deployment.

NIAS also employs 1,547 staff at various levels throughout the organisation, 1,070 of whom are frontline-facing *(as of Feb 2023)*:
- 424 paramedics
- 43 RRV paramedics
- 271 ambulance care attendants
- 291 emergency medical technicians
- 38 station supervisors
- 3 NISTAR ambulance care attendants

4. Challenge

Examples of issues faced by NIAS at present:

Example 1:

NIAS maintains a rota which has approximately 60 Double Crewed Ambulances crews on duty throughout NI every day. Crews are planned in advance, however like any organisation heavily reliant on staff resources, crews can and do phone in sick or have emergency needs, cancel overtime etc. In addition to capacity which has already been lost a result of crew delayed making handovers at hospitals, this can create additional downtime in the system and all of the elements used to make up a shift start falling away. Often rota staff then bring in Independent Ambulance Service (IAS) resources (at a significant cost to NIAS, and risk to clinical outcomes for patients).

Example 2:

Mary is a patient who is booked into an outpatient clinic for renal dialysis. Our system has stored Mary's patient records and it knows Mary can walk, but we still send a PCS mini-bus crewed with two staff members to transport Mary to her appointment. When the crew get there, they hand Mary over to the hospital staff and return to base. They then wait on a call for another patient. Meanwhile, Trevor has been waiting to be discharged from the hospital and waits two hours for a crew to be dispatched to pick him up. Again, Trevor has no mobility issues and is dispatched on a double crewed PCS mini-bus.

There is a need to optimise the utilisation of resources to improve real-time deployment and contribute to longer-term decision-making, in order to realise NIAS' strategic vision of **caring for patients today and planning for tomorrow.**

NIAS requires a solution that helps to leverage scale across the organisation in regard to all available assets to ensure resources are utilised in the most optimal way; the optimum utilisation of resources for the optimum clinical outcome for patients. This project seeks to assist in optimising allocation resources and limit the extent to which the IAS option is triggered to address gaps in deployment on a contingency basis only.

Example 1 above - NIAS require a dynamic solution which captures unplanned downtime dynamically and then is able to identify the right staff and patient resources to effectively meet patient need.

Example 2 above - NIAS require a smart solution that supports staff in making an effective dispatch decision which may be to dispatch a voluntary car (VCS) driver to Mary as her means of transport (rather than a more costly resource of a mini-bus with two staff members). The system may generate decision trees which in future automate and learn decisions required to optimise dispatch protocols. This will optimise the routes to be taken by the VCS driver to improve response time to Mary, transport time to the clinic and cost of transport to NIAS. When the VCS driver hands Mary over to outpatients, NIAS need a system that can alert the VCS driver to pick up Trevor and bring him back home from the same hospital as soon as Mary has been dropped off. We require a system which generates decisions optimising cost, without risk to patient safety.

5. Scope

The overall aim of this Phase I SBRI Project is to identify potential solutions to develop an affordable and effective tool to triangulate NIAS databases of information and planning tools to deliver the most effective, safe and optimised journey for patients. It is anticipated the solution/s will provide the most effective resource allocation both in terms of NIAS's management of the resource and patient experience.

Information currently collected which will feed into this is:
- Rota management
- Fleet and staff resources

A range of protocols will need to be considered which will help to provide safe clinical outcomes:
- Appropriateness of the resources
- Right resource allocated for the safest clinical outcome
- Optimising timing of pick-up for patients
- Analysing historical traffic information data to identify optimal resourse allocation considering and detailing the best vehicle routes for pre-planned journeys and also the use of live traffic information to identify real-time optimal resourse allocation considering and detailing the best vehicle routes for unplanned journeys.

We require a solution that has capacity to make dynamic decisions based on the information held within our databases and protocols, with the aim of introducing dynamic rota and asset management and planning system. Any outcome must be aligned to Quintuple Aim (including patient experience, population health, reducing costs, care team well-being, and health equity).

A solution which:
- provides the most effective resource allocation both in terms of NIAS's management of the resource and patient experience and informs future planning.
- Triangulates our databases of information, planning tools to deliver the most effective and optimised journey for patients.

An example of how this will change current practice is if NIAS receives an emergency call for a patient to whom they allocated an emergency resource, a first responder and a conveyancing vehicle to be dispatched. The first responder determines that a non-emergency response is more appropriate, the emergency vehicle is stood down and a second vehicle with appropriate crew is dispatched to attend the call. The destination of this patient has also changed based on the assessment of the first responder. The benefit of the system will be dynamically avoiding this potential inefficient resource allocation, based on the information from previous calls and patient profiles.

Outcome Measures:
- Reduced costs (overtime, commissioning Independent Ambulance Service resources)
- Increased productivity of NIAS crews
- Improved staff experience
- Improved patient experience
- Reduced hours lost
- Reduced miles travelled by crews
- Reduced carbon footprint
- Better clinical outcomes

- Achieving lower cost

6. Requirements

The solution's functionality & acceptability
The proposed solution must:
- use data collected to derive insights for future planning, using automated learning or AI
- be able to deliver management information and insight for future decision making and planning
- be innovative
- be practical and deliverable
- take affordability into consideration
- result in sustainable innovation which, in Phase II, can act as a showcase approach to delivering the most effective resource allocation both in terms of NIAS's management of the resource and patient experience
- Solutions need to be considerate of NHS Quintuple Aim, including patient experience, population health, reducing costs, care team well-being, and health equity

Solution's technical feasibility
The proposed solution will need to take into account:
- Ability to interface with current data management systems in NIAS
- Dynamic rota and resource management
- Assets management and optimisation
- Interface with digital handover for patients
- If relevant, the solution may need to demonstrate potential interoperability with other information and technical platforms to be utilised in NIAS

Also protocols determining:
- Appropriateness of the asset
- Right resource allocated for the safest clinical outcome
- Optimising timing of pick-up for patients

Solution's financial viability
Given the financial constraints of public sector bodies, the proposed solution must ensure long-term affordability and contractor/s will be expected to:
- Identify the affordability and costs of development, integration, customisation, incremental adaptations and improvements to existing products or processes
- Identify the revenue costs of each option in Phase I and potentially the final solution in later phases
- Identify how much staff resource it will require to use it on an ongoing basis including training and support requirements
- Identify various business models which should include an option solely held by the Contracting Authority.

At the end of each Phase, and after the final presentation of the results of the project, all capital assets/ equipment purchased for use on the project with funds provided by the Authority shall become the property of the Authority.

Professional Requirements

There may be occasions when the contractor is asked to attend (virtually or in person) innovation events to showcase their solution. There would be the expectation that the contractor will attend, and all associated costs would be met by the contractor.

The proposal should set out details of the project team, which should be of sufficient size and have sufficient expertise to deliver the project and potential Phase II trial and to develop a commercially viable solution. The tenderer should set out clearly any sub-contractor arrangements, including the time allocation, role, responsibility and reporting / data security arrangements. The lead contractor is responsible for the performance and data compliance of all sub-contractors.

Data Protection & Information Governance Requirements

Within the context of all Health and Social Care SBRI in Northern Ireland, there must be significant attention paid, by potential tenderers, to Data Protection and the application of a Privacy by Design Approach. It is a requirement that once awarded the SBRI contract, successful contractors must discuss and enter into a Data Access Agreement with the lead HSC organisation(s) as appropriate.

More information on the requirements to demonstrate when processing service user data can be found within data protection legislation (the UK General Data Protection Regulation and the UK Data Protection Act 2018), with further information available via the Northern Ireland Department of Health and the Information Commissioners Office.

https://www.health-ni.gov.uk/publications/doh-hsc-protocol-sharing-service-user-information-secondary-purposes

Data protection by design and default | ICO

All solutions must be fully compliant with all applicable data protection legislation (including, but not restricted to, the above).

Cloud-based solutions will be evaluated against the National Cyber Security Centre's (NCSC) Cloud Security Principles details of which can be accessed at:

https://www.ncsc.gov.uk/guidance/cloud-security-collection

7. Phase II/ III Considerations

The Authority reserves its right to extend the competition to a second or third phase to allow for further testing of potential solutions, therefore additional requirements below would need to be considered within Phase I planning for potential subsequent Phases.

Research & Governance (if applicable)

It is expected that the successful contractor should be applying for ethical approval and completing all relevant governance documentation as close to Phase II/ III contract commencement as possible, to

ensure that the necessary permissions to operate feasibility trials in Phase II/ III are in place and the trial can commence promptly. Please factor this into any project timeline if applicable.

Please see the R&D guidance below for further information (if applicable).

HSC R&D Approvals Service | Public Health Agency - Research & Development in Northern Ireland (hscni.net)

Cyber Security

As the HSC systems/ network forms part of the UK's critical national infrastructure, NCSC has recommended that all systems are assessed by a CHECK company.

Further information is available here - CHECK - penetration testing - NCSC.GOV.UK

It is required that this testing is undertaken at the start of Phase II/ III and then every 12 months, the contractor will be responsible for this cost and should factor this into their financial schedule.   For reference, a penetration test on standard web applications, on average, will usually take 5-7 days to complete and for a re-test, on average, 1-2 days. The approximate cost of penetration testing is £950 per day.

Please note – at penetration testing, it is expected that results should only return a minimal volume of low risks. Contractors are expected to update solutions in response to all risks and retest until they reach an acceptable level that the Contracting Authority is agreeable to. In the case that testing returns Medium to High Risk/s which cannot be rectified, the Contracting Authority may choose to terminate the project.

In addition to this, HSC has implemented a new Cyber Security Assurance Framework that contractors must adhere to. Each new contract will be risk assessed and given a Risk Rating of 'N/A', 'Low', 'Medium' or 'High'. Each rating will have a corresponding set of requirements, proportionate to the cyber security risk. Included in these requirements may be the need for the chosen contractor to obtain either 'Cyber Essentials' (self-certified) or 'Cyber Essentials Plus' certification. The contractor will be responsible for this cost, costs can vary and early costing is recommended.

Further information is available here - https://www.ncsc.gov.uk/section/products-services/cyber-essentials

Additional Information regarding digital technologies

https://www.nhsx.nhs.uk/key-tools-and-info/designing-and-building-products-and-services/
https://www.nice.org.uk/about/what-we-do/our-programmes/evidence-standards-framework-for-digital-health-technologies
digital service manual

HSCNI Resource

For support in relation to specialist areas such as IT or more general support with feasibility trials, the successful contractor/s may need to commission support from local HSC clinical, IT staff as well as information governance departments. (The tenderer should make provision in their submission to cover the additional costs of this support based on an approximate hourly rate for HSC staff is £29.30 per hour at Band 6 level, £34.52 per hour at Band 7 level and £39.65 per hour at Band 8A level. Based on highest point - 2024/25)

Additional Trial Requirements

It will be the responsibility of the contractor to ensure onboarding and connectivity for service users to their solution for the duration of the feasibility trial. It is also essential that the tenderer set out arrangements for providing user support during the trial, including availability to provide "real-time" support during normal business hours for HSC staff who encounter problems with the solution during the trial.

The successful contractor/s would be expected to engage with a diverse group of service or end users, reflective of the equality profile of end users, throughout their trial. The approach for this should be set out clearly in the proposal and may include one-to-one engagement, focus group or wider testing. The contractor may need to incentivise these functions to ensure maximum response and turnout; all associated costs for running testing workshops and incentives etc. will have to be met by the contractor.

8. Performance Management

Performance monitoring mechanisms will be used throughout the project including regular checkpoint meetings with the project team and HSC Leads, monthly reporting, interim and end review meetings and end reporting. Participation in these mechanisms forms an essential requirement of project delivery.

Appendices

Appendix 1 – Competition Information Webinar