Department of Health & Social Care

The UK Vaccine Network Annual Review 2021/22

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Contents

Abbreviation list

Abbreviation	Term
BBSRC	Biotechnology and Biological Sciences Research Council
CEPI	Coalition for Epidemic Preparedness Innovations
CSA	Chief Scientific Advisor
CCF	NIHR Central Commissioning Faculty
CCHF	Crimean Congo Haemorrhagic Fever
EPSRC	Engineering and Physical Sciences Research Council
GIAA	Government Internal Audit Authority
LMIC	Low- and Middle-Income Countries
MERS	Middle East Respiratory Syndrome
NETSCC	NIHR Evaluation, Trials and Studies Coordinating Centre
NIHR	National Institute for Health and Care Research
ODA	Official Development Assistance
R&D	Research and Development
ToC	Theory of Change
IUK	Innovate UK
UKVN	UK Vaccine Network

1. Summary and overview

Project Title: UK Vaccines Network

Project Value (full life): £134 million

Review period: 1 April 2021 to 31 March 2022

Project's Start Date: 21 October 2016

Project's Current Phase End Date: 31 March 2022 (with a few projects extended to 2023)

Summary of Project Performance

Year	2020	2021	2022
Project Score	N/A[1]	B	A
Risk rating	Amber/green	Amber/green	Green

1.1 Outline of project

The UK Vaccine Network (UKVN) Project is funded through Official Development Assistance (ODA) by the Department of Health and Social Care (DHSC). It aims to improve health security in low- and middle-income countries (LMICs) by supporting the research and development (R&D) of vaccines and vaccine technologies to combat diseases with epidemic potential, focusing on diseases that primarily impact LMICs.

An investment strategy for the UKVN Project was developed using advice from the UKVN expert group, a group of experts from academia, industry, government and philanthropic organisations, chaired by DHSC's then Chief Scientific Adviser (CSA), now Chief Medical Officer, Professor Sir Chris Whitty. The UKVN expert group was established in 2015 and identified 12 priority pathogens with epidemic potential in LMICs, on which efforts should initially be focused[2], alongside 'disease X'[3]. The expert group has continued to meet annually and works to understand wider policy issues around vaccine development and

[1] Project scoring system was implemented in 2021.
[2] [The 2016 priority pathogens:] Chikungunya, Crimean Congo Haemorrhagic Fever (CCHF), Ebola, Hantavirus, Lassa Fever, Marburg, Middle East Respiratory Syndrome (MERS), Nipah, Plague (Yersinia pestis), Q fever (Coxiella burnetii), Rift Valley Fever and Zika
[3] The term 'disease X' was adopted by the World Health Organization and suggests an international epidemic could result from a pathogen currently unknown to cause human disease.

manufacturing. The group has produced and published tools to aid research and policy decisions.

Seven research competitions were designed and established on the advice of the UKVN expert group. These competitions were run through experienced cross-government delivery partners, who now manage the funded research projects. The delivery partners are: Innovate UK (IUK, who manage 3 research competitions), Biotechnology and Biological Sciences Research Council (BBSRC), Engineering and Physical Sciences Research Council (EPSRC) and 2 bodies of the National Institute for Health Research (NIHR) – the NIHR Evaluation, Trials and Studies Coordinating Centre (NETSCC) and the Central Commissioning Facility (CCF).

The UKVN portfolio is comprised of 78 R&D projects, focusing on pre-clinical and early clinical development of vaccines for the UKVN's 12 priority pathogens, as well technologies for vaccine manufacture and distribution, and associated epidemiological research. It was originally anticipated that all projects would complete by March 2021. While many have achieved this, the COVID-19 pandemic has meant a number required extensions to meet their original objectives. The impact of the pandemic on vaccine R&D limited the capacity available for other vaccine research resulting in delays. These extensions were granted where appropriate; the new overall endpoint for the current phase of the UKVN Project is March 2022 (with a few extended until March 2023).

The next reporting period (April 2022 - March 2023) will serve as an interim year for the UKVN while the next phase of the project is finalised. Hence, in addition to the progress against the logframe metrics, the UKVN also completed supplementary activity preparing for the upcoming year by planning and launching an interim competition.

1.2 Summary of progress

This section includes a summary of progress and a supportive narrative for the overall score. This reporting period reflects the end of the current phase of the project and the planning phase for the future of the UKVN. The previous UKVN logframe and its indicators were updated prior to the reporting year to reflect this change and accurately measure progress. The current review serves to provide a high-level update on the UKVN's progress against these indicators.

The UKVN performed well this year, as it was not as significantly affected by the challenges and delays experienced in previous years due to the COVID-19 pandemic, and has achieved considerable successes. There were multiple success stories this year to evidence the impact of the project such as:

- 21 research projects completed this reporting period (with a total of 72 projects completed out of a total of 78 funded since the outset of the UKVN Project).

- Clinical trials completed for vaccines against Plague, Zika and Chikungunya and two multivalent vaccines for viral haemorrhagic fevers.
- Preclinical trials completed for vaccines against Zika and Nipah.
- Regulatory approval for a clinical trial for a Crimean Congo Haemorrhagic Fever (CCHF) vaccine.
- Over 15 UKVN funded research projects receiving follow on funding.
- Over 100 research publications generated by funded projects this year.
- Planning of the interim competition which resulted in the awarding of £10 million for vaccines research to combat potential epidemics in developing countries.
- Extension of Vaccine Manufacturing Research Hub Competition delivered by EPSRC following independent review.
- Supporting the Global Pandemic Preparedness Summit and CEPI Replenishment Event

To note, we expect to achieve further success after this reporting period as majority of projects ended towards the end of this review's reporting period.

Given the UKVN's clear progress towards concluding its first phase, and evidenced success, an overall score of A has been awarded for this reporting period. This indicates the UKVN met expectations and reflects the overall score of A for output 1, which is the most heavily weighted output in the logframe.

1.3 Progress against recommendations

Project Management

"LMIC collaborations should be a pre-requisite of a proportion of UKVN funding in the future."

Achieved: The facilitation of LMIC collaborations have been a key component of the designing of the next phase of the UKVN and will be included as an overarching theme in the next iteration of the Theory of Change.

"The UK Vaccine Network Expert Group should be reconvened to identify if any updates are required to the policy tools the group developed, given changes in vaccine landscape and COVID-19's impact."

Achieved: This was achieved in October 2021, the expert group reconvened and identified which policy tools will need to be updated. This included working group 1 (identify and prioritise human and zoonotic disease) and working group 3 (produce a process map for vaccine development, from discovery to deployment).

Communications

As projects are closing by March 2022, tweets, publications and communication content should be planned to be published after end of projects. The UKVN project team should also consider developing a UKVN website to host long form content.

Partially achieved: Due to team capacity, the development of a website to host long form content was not deliverable this reporting period. However, tweets and communication activities have been planned have been planned for when majority of projects will finish (which is now March 2023) and will also include content for projects under the interim competition.

Theory of Change (ToC)

“Assumption 8 should be updated to reflect the likelihood of a phase 2-ready vaccine being affected by not only the number of vaccine candidates in the pipeline but the type and range of vaccine platform technologies they are based on.

Partially achieved: The draft Theory of Change for the next phase of the UKVN is currently being developed and this assumption will be included.

“An additional assumption should be added to reflect the requirement for sufficient manufacturing capacity to produce the quantity of doses required for deployment during an epidemic.”

Partially achieved: The draft Theory of Change for the next phase of the UKVN is currently being developed and this assumption will be included

Monitoring, Evaluation and Learning

"A recommendation from the Publish What You Fund assessment (December 2019) was to prioritise improving the quality and amount of performance data, particularly results or shared learning."

Achieved: This UKVN has made its Theory of Change and logframe publicly available (via d-portal) and remains committed to publishing its Annual Reviews in a timely manner.

"Lessons learned from the UKVN event held in February 2020 should be considered during the design of the next stage of the UKVN project."

Achieved: Lessons learnt have been considered and informed the design of the next stage of the UKVN project.

"A process should be implemented for documenting and sharing lessons learnt across delivery partners, researchers and internally as projects are closing."

Achieved: a process for documenting and disseminating lessons across the UKVN programme was established during this reporting period. This includes workshops organised by delivery partners to collate lessons from researchers and quarterly updates from delivery partners on lessons learnt across their respective portfolios.

"Scoping and planning for an impact evaluation should occur for end of current UKVN phase."

Partially achieved: scoping for an impact evaluation started in this reporting period however, planning was postponed as the impact will not be fully known until the projects close and their final reports are submitted. To maximise the usefulness of the impact evaluation it was decided to postpone the work so this data could be incorporated. This will now be planned next year.

"The UKVN logframe should be updated to reflect the post-COVID-19 vaccine research landscape, with focus on updating milestones to ensure they are quantifiable and reflect expectations ahead of next reporting period."

Achieved: The logframe was updated to update milestones to be quantifiable and to include new indicators for this reporting period.

1.4 Major lessons and recommendations

This section details lessons and recommendations for the year ahead (22/23). During this year, several notable lessons have been recorded for future versions of the UKVN such as:

1. Future iterations of the logframe should include one quantifiable metric for each indicator and realistic indicators for final years.

2. Delivery partners should be provided financial reporting templates to ensure accurate reporting and consistency across the programme.

3. To further ensure the UKVN strategy is clearly communicated to the research community and other stakeholders, regular engagement events should be planned.

4. To ensure future agreements with delivery partners include lessons learnt from previous research projects.

2. Theory of Change (ToC)

2.1 Summary of changes to the ToC

The ToC was revised before this reporting period to reflect the extension of the current phase of the UKVN which was a key recommendation from the last Annual Review. The changes included the addition of 21/22 as the final reporting year with quantifiable milestones to measure progress.

The ToC did not undergo an extensive update as this year marked the end of the current phase of the UKVN. However, during the review process the UKVN Project team, along with the GHS Monitoring, Evaluation and Learning Lead, noted there were areas which could be significantly improved. Recommendations were not implemented but recorded to inform the development of a new ToC for a future iteration of the UKVN.

2.2 Projects progress towards outcomes

The UKVN Project logframe defines a single outcome of: ‘new technologies and vaccine candidates for epidemic diseases are advanced’. This indicator has been achieved by the UKVN and is evidenced by the numerous success stories throughout the lifetime of the programme as outlined in Annex A.

The first indicator for the outcome is described as: ‘vaccine pipelines for pathogens on the UKVN priority list are diverse, with products at all stages of the development process’. This

indicator has been achieved and evidenced by the Figures below, breaking down the UKVN's funding distribution by pathogen and stage of the vaccine development pipeline.

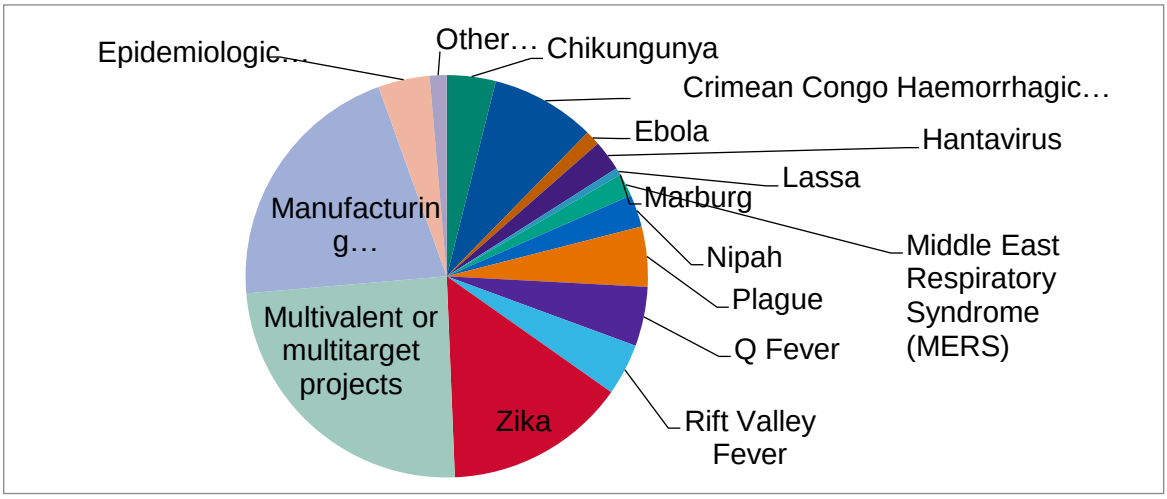

Figure 1 - UKVN Project Funding distribution by pathogen and research area. This figure showcases the distribution of UKVN funded awarded to each pathogen and research area. While the majority of funding was awarded to manufacturing and multitarget projects, some funding was awarded to each of the priority pathogens'

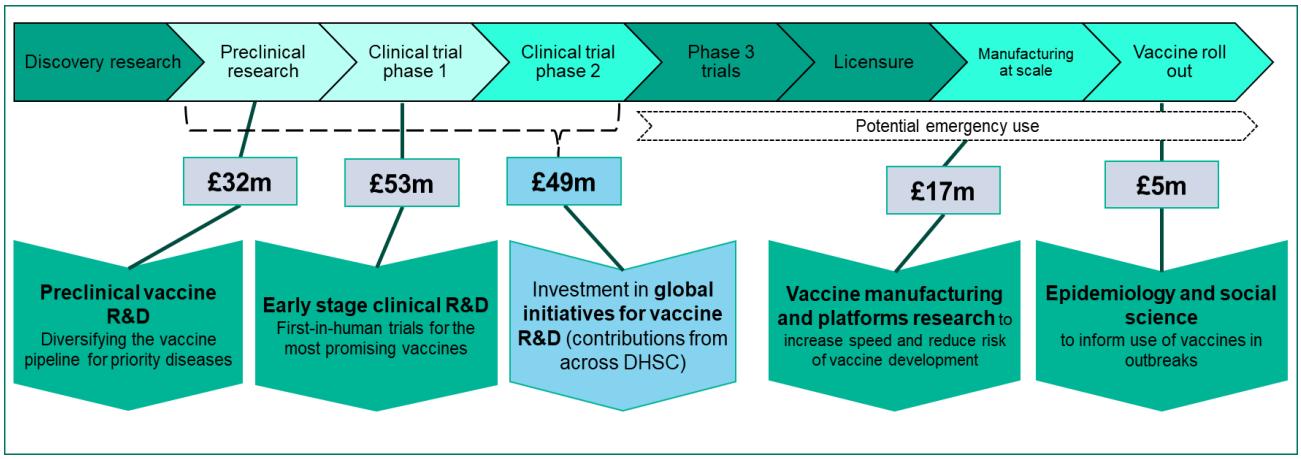

Figure 1 - Areas of UKVN investment along vaccine pipeline. This figure showcases the UKVN investment at different stages of the vaccine development pipeline with majority of the investment focused on early-stage research.

The expected long-term impact for the UKVN Project described in the logframe is that the: 'global community is able to prevent and reduce the severity of outbreaks through availability of vaccine candidates and associated technologies that can be readily deployed under emergency situations'. Given the timeframes associated with vaccine development, it will take some time before the contribution of the UKVN Project to this impact can be fully evaluated. The UKVN project team is planning to commission an evaluation in FY 23/24 to assess the impact of the UKVN, which will include the above indicator.

2.3 Projects progress towards outputs

Output 1: High quality research that aims to:

- **Feed the vaccine development pipeline for 12 priority pathogens**
- **Test new platforms and technologies to accelerate vaccine development**
- **Produce processes and products to support vaccine manufacture and delivery in LMICs**
- **Produce and test epidemiological models for optimal vaccine deployment for UKVN priority pathogens**

Output Score: A

Impact weighting (%): 60%

Risk rating: Green

Risk revised since last AR? No

Indicator(s)	**Milestone for the review**	**Progress**
Competitions that cover these four research areas are run successfully.	All planned competitions complete	Achieved in prior reporting period
Number of Projects active and completed.	'≥70 projects contracted (cumulative), c.60 of which complete	Exceeded
UKVN funded projects generate outputs (full output descriptor in log frame indicator)	'>10 high quality outputs generated	Exceeded
UK research from across academia and SMEs is accessed to support Project aims.	≥ 25% active projects are from SMEs	Achieved in prior reporting period
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UKVN funded projects generate outputs (full output descriptor in log frame indicator)	'>10 high quality outputs generated	Exceeded
UK research from across academia and SMEs is accessed to support Project aims.	≥ 25% active projects are from SMEs	Achieved in prior reporting period

This output relates specifically to progress in research and development funded by the UKVN Project, across the focus areas of vaccine development (pre-clinical, early-stage clinical development and the testing of platforms and technologies); manufacturing and delivery solutions; and epidemiology and social science research.

The project's logframe was updated to reflect an additional year, hence the previous indicators for 1.2 and 1.3 were extended to the reporting year 2021/22. Indicators 1.1 and 1.4 were both achieved in prior reporting years.

At the end of the reporting period, a cumulative total of 69 projects had been completed out of a total of 78 funded since the outset of the UKVN Project. Of these 27 were completed during this reporting period. As a result, indicator 1.2 was not only achieved but exceeded this year by the project.

Indicator 1.3 has been exceeded this reporting year with over 100 research publications generated by UKVN-funded projects.

Considering all indicators have been achieved, exceeded, or partially achieved an overall score of A has been given for this output.

Output 2: Clear UK vaccine investment strategy contributes to global leadership in this space and supports development of a clear process for end-to-end vaccine product development for epidemic diseases.

Output score: A

Impact weighting (%): 30

Risk rating: Green

Risk revised since last AR? No

Indicator(s)	Milestone for the review	Progress
Use of UKVN policy tools by international stakeholders.	Policy tools/findings from UKVN working groups 1, 2 and 3 are reviewed by working groups to reflect learning from COVID and updated for next phase of UKVN project.	Not achieved
Vaccines Project funded research supports the development of collaborations between LMIC and UK researchers and organisations.	≥50% of entire portfolio has active collaborations with LMIC-based researchers or organisations.	Achieved in previous years
Findings of Vaccines Project funded research are disseminated to non-academic audiences, including public health practitioners and the public.	15 UKVN showcase stories are disseminated through tweets, case studies, press releases and presentations.	Exceeded
UKVN strategy clear and communicated to research community and other stakeholders, including organisations that support development and deployment of vaccines.	Convening of UKVN Expert Group and attendance includes key stakeholders, other funders and industry to discuss future strategy.	Achieved

This output reflects the UKVN Project's broader contribution to the UK's leadership in the vaccine development space and related policy. It focuses on the activity of the UKVN expert group in setting strategic direction and the wider project of developing policy tools.

The expert group reconvened in October 2021, during this reporting period, and reviewed the policy tools. Whilst the working groups did not meet this year, the expert group made

plans to reconvene working groups in the following year. This was due to both researcher and project team capacity.

In previous years, the UKVN has achieved the metrics for indicator 2.2 however, due to the majority of UKVN projects closing this year, this indicator is not applicable.

Indicator 2.3, the milestone of disseminating findings of UKVN research and success stories was exceeded this reporting period. In total, 12 tweets, 2 press releases, one presentation and a landscape report were disseminated during this year by the UKNV Project team. Furthermore, findings were also disseminated by the research projects themselves, which increases this number to more than 214.

Indicator 2.4 covers the UKVN's communications strategy with the research community and other stakeholders, this milestone was achieved through the convening of the working group. To build on this milestone in future years, the UKVN should plan an event to engage with researchers, LMIC organisations, vaccine developers and other key stakeholders.

Given the indicators have all been achieved, exceeded or partially achieved, an overall score of A has been given for this output.

Recommendation: To further ensure the UKVN strategy is clearly communicated to the research community and other stakeholders, regular engagement events should be planned.

Annex A UKVN Success Stories

These examples show impact over the lifetime of project

- 11 UKVN-funded vaccine candidates have advanced to phase 1 (first-in-human) trials
- UKVN-funded MERS vaccine technology was repurposed with funding from others to develop the Oxford- AstraZeneca COVID-19 vaccine. This vaccine has been distributed to 178 countries with over 1.3 billion doses deployed.
- Two international hubs established with aim of advancing vaccine manufacturing technology. Vax-Hub supported the scale-up of manufacturing for the Oxford-AstraZeneca vaccine.
- Development of an epidemic data capture platform which was used in the 2019 DRC Ebola outbreaks to collect, manage and coordinate data and is estimated to have removed the need to handle 15 million pieces of paper and 100,000s of data-clerk/analyst hours.
- Successful clinical testing of a ChAdOx1 platform Rift Valley Fever veterinary vaccine; findings indicate 100% efficacy against both infection and disease.
- Developed computational tool for vaccine demand forecasting and mathematical model for vaccine supply
- Thermostable chikungunya virus vaccine candidate developed

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