Open Orphan plc

Investor Presentation - April 2021

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Experienced management with strong operational track record

KEY MANAGEMENT

Cathal Friel
Executive Chairman

- Established Raglan Capital in 2007 and co-founded Open Orphan in 2016
- Co-founder and remains significant shareholder in Amryt Pharma plc, a leading publicly listed orphan drug company
- Founder and Chairman of Fastnet Oil & Gas plc which listed in 2012 and raised
- $50m in equity on the AIM market

Leo Toole
Chief Financial Officer

- Over 20 years' experience in senior finance roles in Pharmaceuticals, Medical Technology and FMCG sectors.
- Extensive experience in building finance teams, corporate development, equity and debt financing, public markets, and mergers and acquisitions.
- He has held senior finance positions at Procter and Gamble, ResMed and Sublimity Therapeutics.

Andrew Catchpole
Chief Scientific Officer

- Approximately 20 years' experience in virus research and the application of scientific concepts within a commercial setting
- Experienced scientific strategy and operational delivery leader
- Viral Challenge Model expert with over 14 years advising pharma and biotech on vaccine and antiviral efficacy testing
- Has extensive involvement in the entire business development process

Martin Johnson
Chief Medical Officer

- Approximately 29 years of General Practice combined with extensive Primary Care Research and Healthcare reorganisation.
- Principal Investigator and Sponsor Medical Expert for numerous studies in asthma and virology.
- Royal College of General Practitioners lead for chronic pain
- Council Member of the British Pain Society and co-chair of a parliamentary advisory group on chronic pain

John Sheridan
VP Clinical Operations

- Senior executive with 30 years of international experience in diagnostic, medical devices and clinical trial industries.
- Proven record of establishing, developing and strategically integrating companies with small, medium and large operations
- Experience in building high-performance, multidisciplined, international teams
- Successfully optimised complex operations within service and highly regulated environments.

Adam French
Director Laboratory Operations

- Over 18 years' experience working in a number of roles in the Pharmaceutical and CRO industry, including project management and laboratory leadership.
- Adam joined hVIVO in 2014, where he has implemented a number of productivity and growth improvements, with a focus on operational delivery, business growth and personnel development.

NON-EXEC. DIRECTORS

Michael Meade
Non-Executive Director

- Spent 30 years in investment banking in London with HSBC, UBS and Numis
- Particular focus on healthcare sector

Elaine Sullivan
Non-Executive Director

- Over 25 years of international experience in Pharma and Biotech.
- NED at IP Group plc, Active Biotech AB and Supervisory Board at Evotec AG.

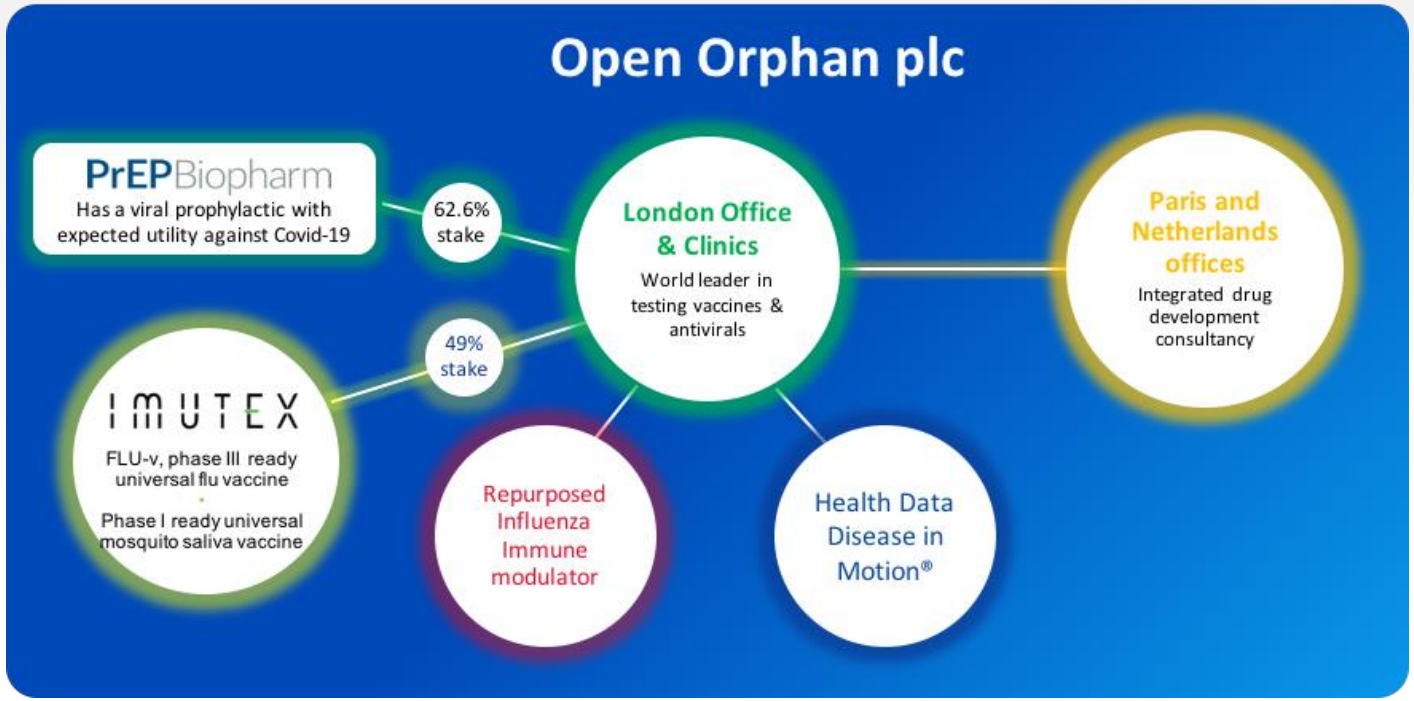
Prof Brendan Buckley
Non-Executive Director

- CMO and member of Exec Leadership Team of ICON Plc from 2013-2017
- Over 30 years' experience in clinical research, co-founded and sold Firecrest to ICON

Open Orphan plc Investor Information

Open Orphan plc

- 3 offices - London, Paris, and the Netherlands
- Open Orphan plc completed its IPO in June 2019 on the Dublin & London Stock Exchanges
- In January 2020 acquired hVIVO plc for £13m in an all-equity acquisition and raised £5.3m in fresh equity at 6.1p
- June 2020 completed fundraise of £12m at 11p



Investor Information

- Listed on London and Euronext Exchange
  - Ticker: ORPH
- Shares in issue: 669,401,610
- Market Cap: 31 Dec 2020: c. £170m
- Cash Balance: 31 Dec 2020: c. £19.2m
- Debt: 31 Dec 2020: c. £360k
- Operationally profitable in Q4 2020

Disclosable Shareholdings over 3%

- Cathal Friel 6.69%

Business Overview

World leader in testing vaccines & antivirals using human challenge study clinical trials
Operationally profitable in Q4 2020

London Office – Challenge Study Clinical Trials

- London office roots in challenge studies go back to 1945 when the UK Government established the Salisbury Common Cold unit
- 24-bedroom quarantine clinic in QMB, East London with onsite virology laboratory
- Access to 19-bed quarantine unit at The Royal Free Hospital in London for VTF COVID-19 characterisation study
- New 19-bed quarantine clinic in Whitechapel, across the road from QMB clinic

Paris Office – Data Management & Biostats

Netherlands Office – CMC, PK, etc

- Over 25 years servicing pharma companies
- Both Paris and Netherlands offices are now fully integrated to the London challenge study business
- Drug development consultancy business
- Offers CMC, preclinical, PK etc from Netherlands office
- Paris office offers Data Management Services, Biostatistics, and Randomisation

Business progression over the past 12 months

Many Challenge Study Contract Wins including

- March 2020 £3.2m pilot RSV study with a £7m pivotal study to follow May 2020 £3.5m RSV study
- Aug 2020 £4m RSV study
- Sept 2020 £4.3m challenge study
- Nov 2020 £2.5m Influenza Study
- Mar 2021 £7.5m RSV study

October 2020

COVID-19 Human challenge model contract with UK Government

Operationally profitable in Q4 2020

February 2021

New quarantine clinic opened in Whitechapel

February 2021

Ethics approval for COVID-19 characterisation study received

March 2021

First COVID-19 study cohort discharged with no safety concerns presented

Developing Disease in Motion® digital platform with applications for wearables

Actively working towards monetization of non-core assets

1. Imutex
2. Prep Biopharm
3. Immune modulator

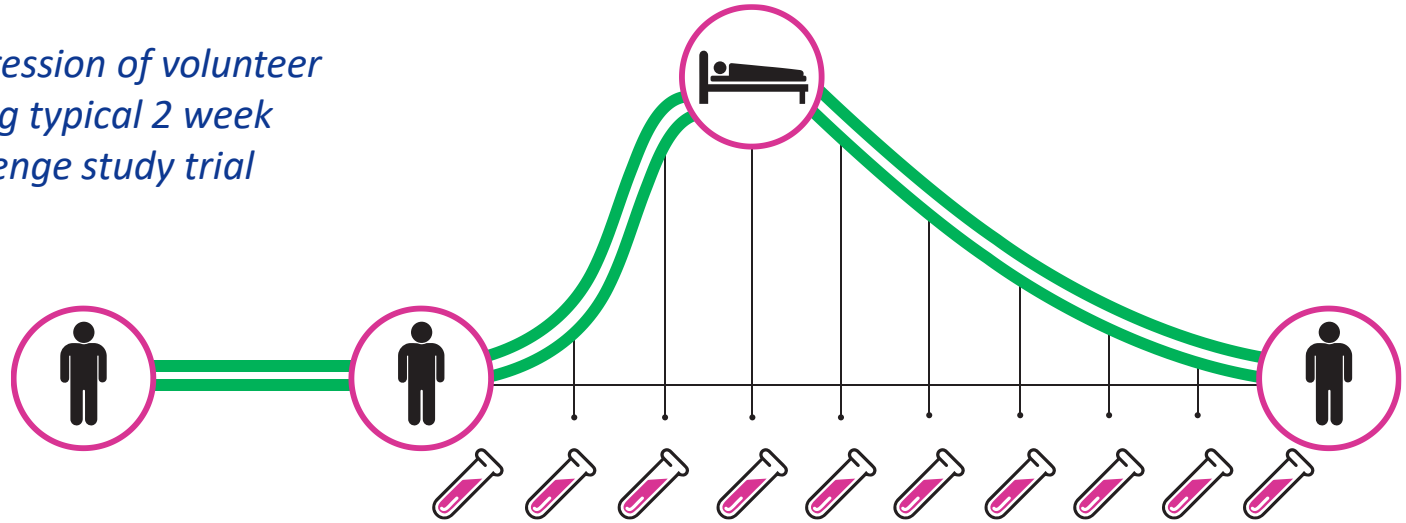
Unprecedented growth opportunity as the world focuses on infectious diseases

Benefits of Challenge Studies

Challenge studies involve testing vaccine efficacy by infecting healthy volunteers in a controlled quarantine setting

- potentially speed up vaccine development and approval by 2-3 years
- can test vaccine efficacy against specific variants which is impossible in regular field study
- fewer subjects required
- potential for emergency vaccine licence with challenge study data
- far cheaper than large field studies

Progression of volunteer during typical 2 week challenge study trial



Next generation of COVID-19 vaccines starts

- bringing more challenge study work

COVI-VAC Phase I study commenced
at hVIVO clinic in January 2021

First generation vaccines

– may have reduced protection against new variants
– many require deep freeze

Second generation vaccines

– e.g. Codagenix COVI-VAC vaccine
– live attenuated virus (entire virus in weakened form)
– may give 5 - 7 years immunity
– protects against new variants
– intranasal, single dose– needle free
– no need for deep freeze storage
– may prevent onward transmission

Expanding volunteer recruitment screening across the UK

New volunteer screening centre in Whitechapel

- formerly a Costa Coffee

New Manchester screening centre

New London and Manchester volunteer recruitment centres offer over 520 additional volunteer recruitment screening visit slots per week.

The number of volunteers required by hVIVO is increasing rapidly and these two additional centres will allow a substantial increase in volunteer screening capacity

www.FluCamp.com
Clinical Trials Recruitment

Expanding our quarantine clinic footprint

The Whitechapel Clinic

– *increased challenge study capacity to facilitate pipeline*

- Converted 26-bed boutique hotel on a very cost efficient basis
- Into a 19 bedroom quarantine unit
- Across the road from QMB
- hVIVO currently has access to three quarantine units
  – QMB
  – Whitechapel Clinic
  – The Royal Free Hospital in London

Disease in Motion® platform

Includes the worlds largest database of infectious disease progression data which can power wearables

- hVIVO has an extensive database of infectious disease progression
- Now patented as Disease in Motion® platform
- Dataset includes: clinical, immunological, virological and digital biomarkers
- Applications for big tech and wearables; pharma and biotech companies

Global awareness of our capability

- In 2020 hVIVO and Open Orphan made world news as the leaders in testing of vaccines and antivirals
- Resulting in enquiries from virtually every vaccine company in the world
- Featuring in over 10,000 international media articles
- Listed by Pharma Tech Outlook as a top ten European CRO

BBC NBC WSJ Bloomberg FT

4 FIERCE Biotech The Guardian CNN abc

THE TIMES nature sky SBS

Phoenix TV itv yahoo! finance CHINA DAILY

The Guardian

UK Covid-19 vaccine trial set to infect healthy volunteers with virus

sky news

Coronavirus: UK becomes first country to back studies that would deliberately infect volunteers with COVID-19

abc NEWS

Inhaling away the virus: Is the next generation of COVID vaccines on its way?

Phase 1 trials have begun in London for a new nasal vaccine.

Monetizing our non-core product portfolio

IMUTEX

FLU-v, phase III ready universal flu vaccine

•

Phase II ready universal mosquito saliva vaccine

- 49% owned Joint Venture with SEEK Group (51%)
- Substantial increased interest in universal flu vaccines and universal mosquito vaccines
- Flu-v could be repurposed as a universal COVID vaccine

PrEPBiopharm

- Viral prophylactic with expected utility against COVID-19

62.6% stake

Repurposed Influenza Immune modulator

- In-licensed repurposed drug, with supporting patent applications
- Phase II ready immune modulator for severe influenza

Conclusion

- ✓ Operationally profitable in Q4 2020
- ✓ World leader in the testing of vaccines
- ✓ The next 10 years will be the decade of vaccines & infectious diseases
- ✓ Extensive pipeline of challenge studies
- ✓ Disease in Motion® digital platform now patented
- ✓ Monetizing three non-core asset sets

Open Orphan plc

Fully integrated top-10 European CRO

London operation: challenge studies
Paris office: biometry
Breda office: pre-clinical consulting services

Appendix

COVID-19 Human Challenge Model

On the 20th October 2020 Open Orphan announced the signing of a contract with the UK Government for the development of a COVID-19 Human Challenge Study Model

- The model development involves the manufacture of the challenge virus and the first-in-human characterisation study for this virus.
- The contract starts immediately and could be worth approximately £10 million to the company depending upon the final number of volunteers that are included in the characterisation study.
- The study is sponsored by Imperial College London and conducted by hVIVO at The Royal Free Hospital's specialist unit in London.
- The Government has secured the first 3 slots to test vaccines using hVIVO's COVID-19 challenge study, which is expected to start in 2021
  - Each slot reservation has been secured at a cost of £2.5m each bringing the total value of these slot reservations to £7.5m.

What is a characterisation study?

It enables identification of the smallest dose of the challenge virus it takes to cause a person to develop COVID-19 which will be used for future human challenge studies.

hVIVO's 24-bed unit is close to full capacity until December 2021 delivering its traditional challenge studies.

Human Viral Challenge Models

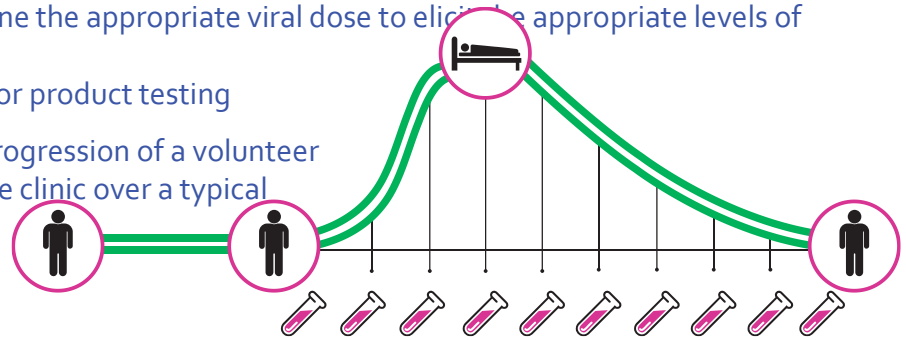
- **What are Human Viral Challenge Models (also known as Controlled Human Infection Models or CHIMs):**

- The Human Viral Challenge (HVC) model has, for many decades, helped in the understanding of respiratory viruses and their role in disease pathogenesis. In a controlled setting, using small numbers of volunteers removed from community exposure to other infections, volunteers are inoculated by known doses of the challenge virus and the disease time course monitored. All subjects are inoculated with virus but with some receiving a placebo and others the experimental drug to test the efficacy of the drug and obtain proof of concept data much quicker than can be achieved in the field. This experimental model enables proof of concept work to be undertaken on novel therapeutics, including vaccines, immunomodulators and antivirals, as well as new diagnostics.
- Crucially, unlike conventional phase 1 studies, challenge studies include invaluable efficacy endpoints that then guide decisions on how to optimise subsequent field studies, as recommended by the FDA, and thus licensing studies that follow. Such a strategy optimises the benefit of the studies and identifies possible threats early on, minimising the risk to subsequent volunteers, whilst also maximising the benefit of scarce resources available to the research group investing in the study. Inspired by the principles of the 3Rs (Replacement, Reduction and Refinement) now commonly applied in the preclinical phase, HVC studies allow refinement and reduction of the subsequent development phase, accelerating progress towards further statistically powered phase 2b studies. The breadth of data generated from challenge studies allows for exploration of a wide range of variables and endpoints that can then be taken through to pivotal phase 3 studies.

hVIVO today has a leading portfolio of 2 FLU, 2 RSV, 1 HRV, 1 Asthma, 1 cough, and 1 COPD viral challenge models
To replicate this portfolio would likely cost in excess of £25m and take a minimum of 6 years work
No other challenge study service provider has such a comprehensive portfolio

World's first Coronavirus challenge model – Controlled human infection model

- In March 2020 hVIVO have initiated the development of a coronavirus challenge model
- Like our other challenge models, the model will involve recruiting healthy volunteers, inoculating them with coronavirus in quarantine, monitoring the disease and returning the subject to health
- This will aid in fast-tracking the testing of antiviral and vaccines against the coronavirus family
- The model will initially be developed using a common coronavirus strain from the same virus family, such as OC-43, that causes more mild symptoms
- Since the middle of April 2020 we are now also developing an attenuated COVID-19 virus challenge study model
- The model will also facilitate a greater understanding of the type and durability of the immune response coronavirus infections elicit
- Two phases are involved in the mode development: Manufacture of the challenge virus and clinical testing to determine the appropriate viral dose to elicit the appropriate levels of disease.
  The model is then ready for product testing
- Graph below shows progression of a volunteer while in our quarantine clinic over a typical 2 week trial



hVIVO - competitive position

Industry leading services provider in viral challenge studies and laboratory services

Dominant market position in viral challenge studies

- Largest range of viral challenge models and experience in GMP[1] virus manufacturing
  - Specialist know-how and insights invaluable to customers developing vaccine and antiviral products
- Three virus types available in 8 validated challenge models: FLU[2], RSV[3] and HRV[4]
- No other challenge study service provider in the world has a fraction of the 8 models that hVIVO has
- Purpose-built quarantine unit and laboratory with high levels of infection control allows multiple studies and virus-types to be used simultaneously

High barriers to entry limit competition

- Cost and complexity of virus manufacture and characterisation (8 viral models which would take in excess of £25m and many years to attempt to replicate by any competitor)
- Establishment of a single viral challenge model not straightforward – can take up to 6 years
- Need for specialist facilities, staff, and experience
- Established one of the only validated RSV challenge models commercially available and developed additional older population model
- Established large volunteer pool - critical to source susceptible subjects to meet recruitment requirements
- Central London unit location attractive to volunteers
- Only one commercial competitor in flu challenge in Europe and one in US
- Other competition from academic groups and US government funded organisations have limited capability to deliver larger studies quickly as demanded by larger pharmaceutical companies

Notes: (1) Good manufacturing practice, (2) Influenza, (3) Respiratory Syncytial Virus, (4) Human Rhinoviruses

Development assets: Imutex

Open Orphan management team optimistic as to the potential to monetise these assets

Overview

- In April 2016 hVIVO formed Imutex Limited ("Imutex") with the SEEK Group to develop vaccines against influenza (FLU-v) and universal mosquito-borne diseases (AGS-v)
- hVIVO contributes management oversight over the future direction of the development of the vaccine candidates, but makes no capital investment to the ongoing development work undertaken
- The most advanced asset is FLU-v, a robust and differentiated advanced-stage influenza vaccine candidate. Imutex is also establishing schedules for meetings with key regulatory authorities, FDA and EMEA, where it hopes to gain further insight into some of the key areas of interest expressed by potential partners
- An additional early stage asset, AGS-v, is an experimental vaccine designed to protect against many different mosquito-borne diseases
- hVIVO owns 49% of Imutex and both assets are wholly owned by Imutex

Assets

Candidate	Phase: Pre-clinical / I / II / III	Status
FLU-v *Influenza*		• Safety and immunogenicity endpoints met in Phase II field study (UNISEC Consortium in the EU) and efficacy endpoints met in a challenge study in collaboration with NIAID/NIH • Scheduling end of Phase II meetings with FDA & EMEA
AGS-v **AGS-v PLUS** *Mosquito-borne Diseases*		• **AGS-v** Phase Ib study completed by NIH – Preliminary results positive, complete results expected in due course • **AGS- PLUS** Second Phase I study commenced July 19 by NIH – additional peptide