John Perry Prize

COVID-19 Population Risk Assessment, powered by QCOVID®

Professor Julia Hippisley-Cox – Professor of Clinical Epidemiology and General Practice,
University of Oxford **Professor**

Oct 2021

John Perry

John Perry was born in East London in 1929. His father, who had fought in the trenches in the First World War, worked for many years after this as a clerk for the Great Western Railway, and in the evenings ran a flourishing boys' club.

No-one in his family had ever been to university, but John showed early the ability to think things out for himself, and when, at the age of about eight, he read in the Boys' Own magazine about some choirboys who kept bees, he decided that he would like to be one of them. As it happened he was naturally musical with a beautiful treble voice and, after some very basic music lessons from the local church organist, the curate arranged for him to have a voice trial at Christ Church Cathedral in Oxford. He was offered a place in the choir and at the choir school, but when his parents realised that there were school fees to pay they decided against it. Fortunately this was followed by a voice trial at St Paul's Cathedral in London where the places at the school were free, and so in 1939 he became a Chorister at St Paul's Cathedral.

John Perry moves to Oxford to work on the Oxford Record Linkage Project in 1970

In 1970 he moved to work at Oxford after being recruited by the Regius Professor there to work in association with the Oxford Record Linkage Project to look into the practicalities of automated collection of clinical data from general practices for use in epidemiological research. With this brief he started the Oxford Community Health Project. To work with him on this project, he recruited a dozen group practices based in Oxfordshire and in Buckinghamshire, in what was to become the new city of Milton Keynes.

The Oxford Record Linkage Study: A Review of the Method with some Preliminary Results

by E D Acheson DM MRCP and
J G Evans MB MRCP
(*Nuffield Department of Clinical Medicine, Oxford University*)

Introduction

We have begun an experiment in Oxford in re-organizing the medical information routinely recorded in a community, so that it can be exploited to the full both as a weapon for research into the ætiology and natural history of disease, and as a means of increasing the efficiency and quality of the services rendered to the patient (Acheson 1964).

OXFORD RECORD LINKAGE AREA 1962-3

POPULATION 325,000

Banbury
Oxford
London

Fig 1 *England and Wales showing ORLS area*

"System of medical information worthy of special opportunities"

Perhaps I may be permitted to look forward to the day when the national 10% sample of hospital admissions, currently collected by the Hospital In-patient Enquiry and based on date of birth, is extended to cover other types of event, such as school medical examination and selected types of out-patient data, and is linked with birth and death certificates. If such a system, which I now know to be a practical proposition, were supplemented by two or three local studies with 100% coverage of a population of a million, this would permit family aggregations of disease also to be studied. We would then have in this country a system of medical information worthy of our special opportunities.

From: "david.stables@endeavourhealth.org" <david.stables@endeavourhealth.org>
Date: Saturday, 9 May 2020 at 09:04
To: Julia Hippisley-Cox <julia.hippisley-cox@phc.ox.ac.uk>

Subject: Q-Covid

Hi Julia

Am I right in assuming you are working on this one ahead of the game as usual?

"The ask for a personalised risk score is now more or less constant from the GPs providing advice to media".

Ambition: Identify and protect the **Clinically Extremely Vulnerable**

Context:

- Shielded patient list established on expert consensus

- May 2020 **CMO** for England **commissioned a predictive model** for a data driven approach to COVID-19 risk assessment

- NERVTAG & Oxford University developed **QCOVID®** - a multi-variable risk prediction model

Aim:

- Implement QCOVID®, applying it to **patient records nationally** through a central **technological platform** to run the COVID-19 **Population Risk Assessment** (PRA), reducing burden on GPs

- Identify, **protect** and **prioritise vaccination** for high-risk groups to reduce poor outcomes and enhance patient safety
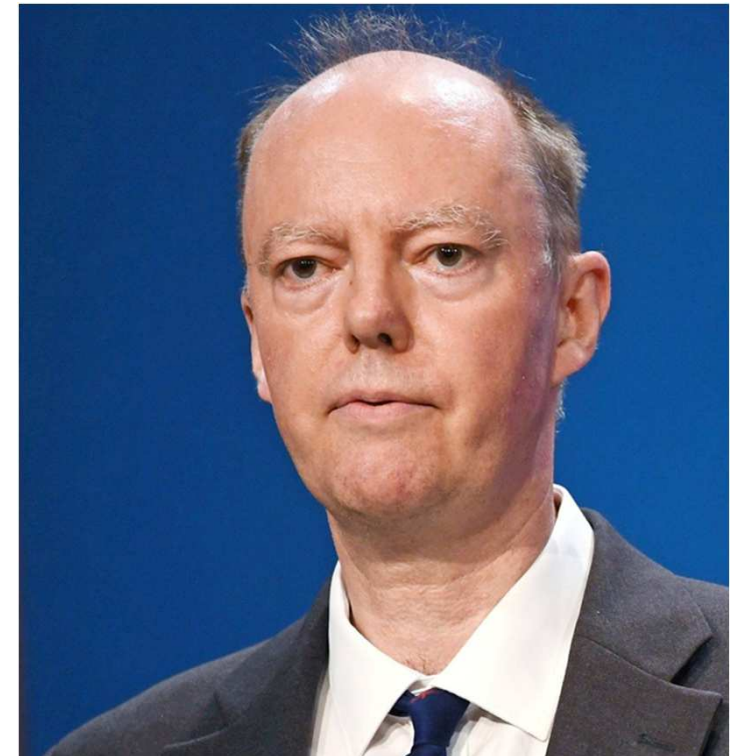
Covid-19 PRA met the **highest standards** of assurance for **patient safety**

RESEARCH

BMJ: first published as 10.1136/bmj.m3

Living risk prediction algorithm (QCOVID) for risk of hospital admission and mortality from coronavirus 19 in adults: national derivation and validation cohort study

Ash K Clift,[1] Carol A C Coupland,[2] Ruth H Keogh,[3] Karla Diaz-Ordaz,[3] Elizabeth Williamson,[3] Ewen M Harrison,[4] Andrew Hayward,[5] Harry Hemingway,[6] Peter Horby,[7] Nisha Mehta,[8] Jonathan Benger,[9] Kamlesh Khunti,[10] David Spiegelhalter,[11] Aziz Sheikh,[4] Jonathan Valabhji,[12] Ronan A Lyons,[13] John Robson,[14] Malcolm G Semple,[15] Frank Kee,[16] Peter Johnson,[12] Susan Jebb,[1] Tony Williams,[17] Julia Hippisley-Cox[1]

An external validation of the QCovid risk prediction algorithm for risk of mortality from COVID-19 in adults: a national validation cohort study in England

Vahé Nafilyan, Ben Humberstone, Nisha Mehta, Ian Diamond, Carol Coupland, Luke Lorenzi, Piotr Pawelek, Ryan Schofield, Jasper Morgan, Paul Brown, Ronan Lyons, Aziz Sheikh, Julia Hippisley-Cox

Summary
Background Public policy measures and clinical risk assessments relevant to COVID-19 need to be aided by risk prediction models that are rigorously developed and validated. We aimed to externally validate a risk prediction algorithm (QCovid) to estimate mortality outcomes from COVID-19 in adults in England.

Lancet Digit Health 2021; 3: e425–33

Published Online
May 25 2021

NHS Digital

Office for National Statistics

MHRA Regulating Medicines and Medical Devices

8

Outcomes: Nationwide **patient safety** improvements

Improved patient safety by:

- Enabling **820k individuals** to be offered COVID-19 **vaccine earlier**

- **Identifying c1.5m** high risk individuals for **shielding support**

- Raising **public awareness** of key COVID-19 **risk factors**

Contributed to high-quality patient care by:

- Providing accompanying **clinical tool**, enabling **personalised care** discussions

- Quality improvement at national level for **gestational diabetes care**

Outcomes: 'Watershed moment' in **recognising intersectional nature** of health inequalities

- Enabled identification and protection of individuals with **multifactorial risk profiles**

- Systematically accounted for risk factors not previously possible to include (e.g. **ethnicity**, **deprivation**)

- Local authorities with largest additions to the SPL - **Tower Hamlets, Newham** and **Birmingham**
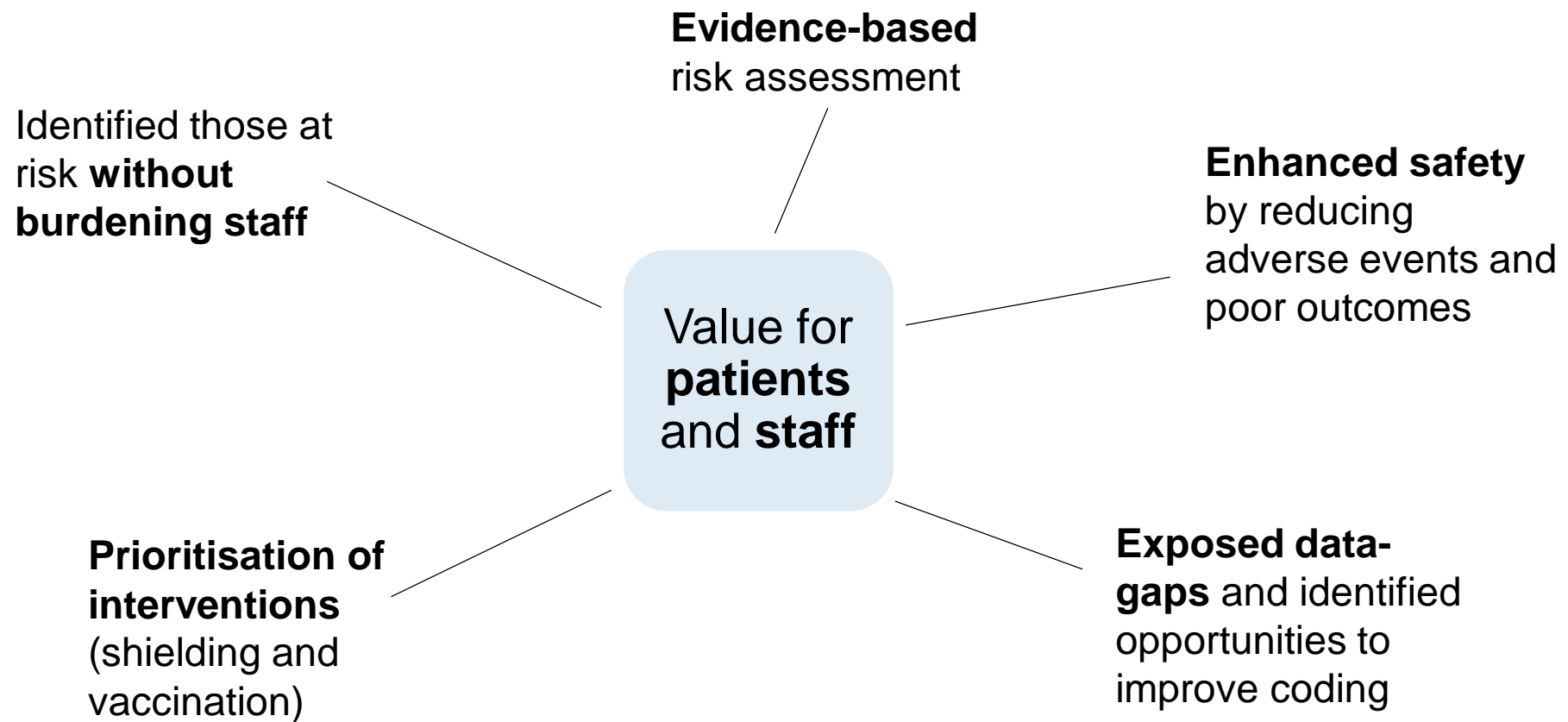
← **Tweet**

Runnymede Trust @RunnymedeTrust · 16 Feb

Our CEO @Halima_Begum on @BBCNews this evening - this announcement is a watershed moment, signalling a recognition that class and race impacts your vulnerability to #COVID19

Patient Quote

"Personally, I greatly appreciate the opportunity to evaluate my own risk of becoming infected with, hospitalized, and dying from COVID-19. At the moment I feel powerless to make any meaningful decisions about how to live my life because I have no way of knowing the risk - and this creates a tremendous amount of anxiety and mental distress."

Value

Evidence-based risk assessment

Identified those at risk **without burdening staff**

Value for **patients** and **staff**

Enhanced safety by reducing adverse events and poor outcomes

Prioritisation of interventions (shielding and vaccination)

Exposed data-gaps and identified opportunities to improve coding

Spread: The first known **precision public health** intervention of its kind

Future applications of **population health** stratification:

- Other potential uses in the Covid-19 pandemic, e.g. **targeting treatments**

- Learning for **future pandemics**

- UK **Devolved Administrations**

- Use in wider health sector for **population health management**

- **International reach** – requests for use in Australia and Cambodia
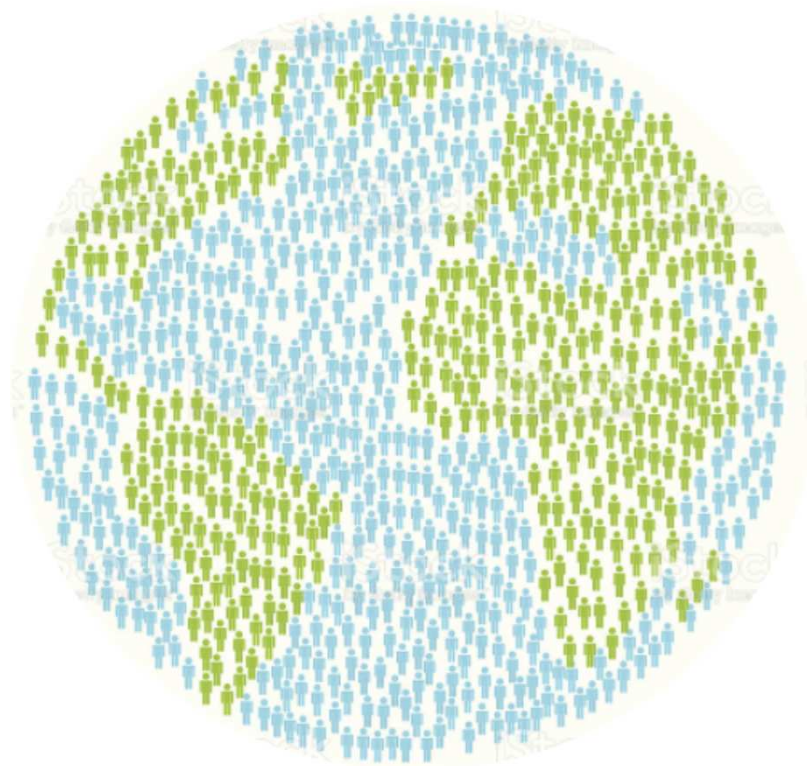
Involvement

Patient involvement

- Engaged **charity and patient stakeholder** groups (48 organisations)

- **Patient centred communication**

- Worked with **health charities** to **improve QCOVID®** e.g. IBD added as a new risk factor

Patient Quote:
"This project has great value in aiding the response to the pandemic as it will help to give people some degree of reassurance that everyone is being considered and their own circumstances being taken into account."

Multiple stakeholders

- Regular communication with **decision makers**, **clinical leaders** and **experts**

- Worked with **RCGP** to develop **e-learning resources**

- Liaised with **JCVI** on vaccine prioritisation

- Feedback to NHSD led to **improvements** and **resolution** of common queries

The COVID-19 PRA should win the *John Perry Prize*

1. Led to **nationwide improvements in patient safety**: identified 1.5m high risk individuals for SPL addition, 820k offered vaccine earlier

2. Met the **highest standards of assurance** for patient safety

3. First known **precision public health intervention** of this nature in the world, leveraging the **unique power of NHS Data**

4. **Relieved burden** on general practice and the healthcare system at a time of intense pressure

5. Provides a **blueprint for the future**

Acknowledgements

Department of Health & Social Care

NHS Digital

UNIVERSITY OF OXFORD

QCovid® Risk assessment

Scottish Government
Riaghaltas na h-Alba
gov.scot

RCGP Royal College of General Practitioners

Llywodraeth Cymru
Welsh Government

Northern Ireland Executive

Office for National Statistics

NHS England

Royal College of Physicians

EMIS connecting healthcare

QRESEARCH