



**OHE Annual
Report** to the
Charity Commission
for the year 2017

About OHE

OHE's mission statement

To support better health care policies by providing insightful economic and statistical analyses.

How we are organised

OHE is a charity with registered charity number 1170829. OHE is managed by a senior management team. Its governance is the responsibility of its Board of Trustees. In 2017 the Board of Trustees had three sub-committees with advisory roles: a Research and Policy Committee, which provided advice and guidance to OHE on its research programme; an Editorial Committee, which reviewed OHE's in-house publications, ensuring their intellectual rigour and value; and a Management Committee, which assisted OHE with its operational and business planning.

The ultimate parent undertaking and controlling party of the company is The Association of the British Pharmaceutical Industry Limited ("the ABPI"), registered in England and Wales 09826787, by virtue of it being the sole member of the company.

OHE's consulting work is carried out by OHE Consulting Limited, a for-profit company with registered company number 09853113. OHE Consulting Limited is wholly owned by The Office of Health Economics. For consulting projects, the client has a proprietary right to any intellectual property arising from the work, distinct from research projects where OHE retains the intellectual property.

Who we are and where we work

In 2017 the OHE team comprised three Directors, one Principal Economist, three Senior Economists, 11 Economists, one Head of Operational Research and Data Analysis, one Business Information Specialist, three administrative support staff, and five honorary visiting fellows.

OHE is based in London, but we undertake projects both in the UK and internationally. We work collaboratively with a wide network of academics and other partners across the world.

How we are funded

OHE's work programme is supported by research grants and consultancy revenues from a wide range of UK and international sources. OHE receives an annual research grant from the Association of the British Pharmaceutical Industry (ABPI), and undertakes consulting work for ABPI and other commercial clients, surplus from which is used to self-fund research we identify as priorities. Our research programme is also funded by grants obtained from UK research councils and other national and international research funders, including the National Institute for Health Research (NIHR), the Medical Research Council (MRC), the EuroQol Research Foundation, and a number of charitable and other organisations.

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Our Year in numbers



Administrative information

Board of Trustees

Prof Michael Drummond (chair)
Ms Lisa Anson [appointed 24 May 2017]
Mr Benjamin Hickey [appointed 24 March 2017]
Mr Peter Michael Thompson
Mr John Kearney [resigned 24 May 2017]
Prof Bengt Jönsson
Mr Ryan Hollingsworth [resigned 24 March 2017]

Registered Office

7th floor, Southside
105 Victoria Street
London SW1E 6QT
Charity number: 1170829
Company number: 09848965

Auditor

BDO LLP
Statutory Auditor & Chartered Accountants
2 City Place
Beehive Ring Road
Gatwick
West Sussex RH6 0PA

Bankers

National Westminster Bank Plc
PO Box 113
Cavell House
2A Charing Cross Road
London WC2H 0PD

Senior Management Team

Director – Prof Adrian Towse
Deputy Director – Prof Paula Lorgelly
Director of Research – Prof Nancy Devlin

Introduction from the Chair and Director



We are delighted to submit this report to the Charity Commission for England and Wales, OHE's first since becoming a registered charity in December 2016.



OHE's charitable status represents an important watershed in OHE's evolution as a health economics research organisation. It reflects the considerable hard work of the entire OHE team, as well as the

dedication of OHE's senior leadership, advisory committees and Board of Trustees to OHE's mission 'to support better health care policies by providing insightful economic and statistical analyses'.

“ There are many things that make OHE unique as an organisation. ”

OHE is the world's oldest health economics research unit. It was established in 1962, pre-dating the publication of Kenneth Arrow's seminal paper on uncertainty and the welfare economics of medical care in 1963, which is generally associated with the beginnings of health economics as a sub-discipline of economics.

OHE is also distinctive, among UK health economics research organisations, in combining expertise on topics within the usual terrain of British health economics, with the theory and methods of industrial economics. This enables OHE to provide distinctive analysis and policy insights into the interaction between the issues of health systems and the economics of health care technology, innovation and dynamic efficiency.

In this report, we provide an overview of OHE's principal activities, achievements and performance in 2017, our first year as a registered charity. The body of work described here illustrates OHE's remarkable transition.

When it was established in 1962 OHE was wholly funded by the Association of the British Pharmaceutical Industry (ABPI). It commissioned and undertook largely descriptive analyses of health care policy issues from an economics perspective, with a principal focus on the UK, publishing these in-house via a monograph series. The OHE team now undertakes original theoretical and empirical analysis, with demonstrable impacts for policy and decision making. OHE also conducts innovative methodological work in health economics that has impacts on the way other health economists conduct research. Much of OHE's work is published in peer-reviewed journals. And OHE's research is now truly international, with projects underway in multiple countries, and the issues we address are often global in nature. The financial support we receive from ABPI remains important to OHE's research programme, but is now supplemented by income from public sector, not-for-profit, and for-profit organisations in the UK, the rest of Europe, and North America.

We submit this report, which, in our judgment, demonstrates some of the ways in which OHE has met its charitable objects: namely, to advance the education of the public in general/health care payers/policy makers on the subject of health economics and health care policy.

The importance of health economics to evidence-based health policy and health care management ensures that there is an important role for OHE's work. We are confident that OHE will continue to grow in stature, reputation and impact.

Professor Adrian Towse, Director of OHE

Professor Mike Drummond, Chair of the OHE Board of Trustees

Charitable Objects

To advance the education of the public in general/health care payers/policy makers (and particularly patients and health care professionals) on the subject of health economics and health care policy.

Activities in furtherance of this will include in particular, but not exclusively:

- promotion of evidence-based health care policy, by carrying out research on the economics of health, health care systems and the life sciences industry;
- promotion of effective and efficient use of health care resources, by advancing the use of economic approaches to support decision making; and
- the facilitation of decision making and awareness of health care policy issues, by encouraging debate and dissemination of relevant health economics research.

For the avoidance of doubt, the term “health economics” shall mean the application of economic theory, models and empirical techniques to the analysis of decision making by people, health care providers and governments with respect to health and health care.

OHE became a registered charity in December 2016 (registration number 1170829).

Activities Undertaken in 2017

Introduction

OHE undertakes research and research-related activities in health economics. All of our research is policy relevant, and aims to support better health care policies, consistent with our mission statement.

Within the broad field of health economics, in 2017 OHE focused its efforts on six principal programmes of research.



Economics of drug development



Programme lead: Francois Maignen

The application of economic theory and methods of industrial organisation to explore questions relating to the structure, conduct and

performance of the life sciences industry. This research programme is concerned with policy issues relating to research and development, including pricing and price regulations, the economics of innovation, patents, and dynamic efficiency.



Improving decision making



Programme lead: Martina Garau

Decisions in health care are often complex, involving weighing up multiple considerations. Decisions can be made using purely deliberative processes,

or can be structured in various ways, using the methods of multi-criteria decision analysis (MCDA). Research in this field considers whether, and how, MCDA can be used by decision makers (e.g. patients and doctors, budget holders and HTA bodies) to improve decision making.



Incentivising quality in health care



Programme lead: Yan Feng

Research concerning the intrinsic or extrinsic factors that incentivise actors in health care markets, and how these create certain

behaviours and outcomes. By understanding these factors, reimbursement and other aspects of the health care system can be designed to improve the quality of care for patients.



Judging value for money



Programme lead: Adrian Towse

Health technology assessment (HTA) organisations typically assess new technologies in terms of their cost-effectiveness. How to judge what constitutes good value

for money is a critical issue that affects patients' access to treatment and the efficiency of the health care system.



Maximising effectiveness of treatment



Programme lead: Paula Lorgelly

Innovative diagnostic and genetic profiling enable treatments to be better targeted at individuals and patient sub-groups where they are most effective. This

has implications for patients, health care budget holders and volumes and prices in the life sciences industry.

Within each of these research programmes, OHE undertakes and publishes research, and actively disseminates research findings to stakeholders via academic conferences and OHE workshops, seminars and events. In these ways, the activities of the research programmes contribute to OHE's charitable objective to facilitate decision making and awareness of health care policy issues by encouraging debate and dissemination of relevant health economics research.

OHE also contributes more widely to the field of health economics through its *pro bono* work including, *inter alia*, participation in NICE committees, leadership roles in professional associations (including the International Society for Pharmacoeconomics and Outcomes Research), invited lectures, government advisory groups, and peer reviewing for health economics journals.



Measuring health outcomes



Programme lead: Nancy Devlin

Much of health care concerns making people feel better, and there is increasing recognition that the patient is the best source of information on how he

or she feels. Health economists have an important role in designing questionnaires to enable patients to self-report their health in a systematic manner across disease areas, and in developing ways of summarising self-reported health in a way that reflects people's stated preferences about health.

An example of our work:

Economies of scale and scope

In collaboration with colleagues from RAND Europe, and supported by a grant from the UK Medical Research Council, Karla Hernandez-Villafuerte worked on a highly policy relevant study of the economies of scope and scale in biomedical and health research.

Publicly funded biomedical and health research is expected to achieve the best return possible for society. It is therefore important to know whether that research is more productive if it is concentrated in a few research groups or is spread across many. In other words, does undertaking two different research activities in the same place lead to greater output per pound spent than undertaking the same two activities separately?

An important part of the research project was a systematic review of the literature on the economies of scope and scale in research, published in 2017 in the open access journal *Health Research Policy and Systems*.

To help classify and understand that literature, a prior review was undertaken of econometric literature discussing models for analysing the economies of scope and/or scale in research generally, i.e. not limited specifically to biomedical and health research. The review revealed a large and disparate literature; and 60 empirical studies that were relevant to biomedical and health research were analysed.

At the level of universities or research institutes, studies more often point to positive economies of scale than to diseconomies of scale or constant returns to scale in biomedical and health research. However, all three of these possible results were found in at least one study in each case, along with inverse U-shaped relationships (meaning that there are economies of scale initially as larger and larger research units are considered, but eventually diseconomies set in). At the level of individual research units, laboratories or projects, the numbers of studies in the literature are smaller. The evidence from them is also mixed.

Concerning economies of scope, the literature more often suggests that there are positive economies of scope rather than diseconomies, but again the picture is mixed. The effect of varying the scope of activities by a research group was less often reported than the effect of scale, and the results were more mixed with respect to scope than with respect to scale.

Overall there was no clear finding for or against the existence of economies of scale or scope in biomedical and health research. The policy implication is that there remains a continuing need for case by case decisions when distributing biomedical and health research funding, rather than a general policy either to concentrate funding in a few centres or to disperse it across many.

Hernandez-Villafuerte, K., Sussex, J., Robin, E., Guthrie, S. and Wooding, S., 2017. Economies of scale and scope in publicly funded biomedical and health research: evidence from the literature. *Health Research Policy and Systems*, 15(3). DOI: 10.1186/s12961-016-0167-3

Projects supported by research grants won in 2017

In 2017, OHE received external funding to complete **19 research projects**. These are listed below, organised by OHE's research programmes. Of these externally funded projects, **26%** were funded by the private sector (largely the life sciences industry) and **74%** were funded by the public and third sectors, including higher education institutions and grant making bodies.

Economics of drug development

Incentives for new drugs to tackle anti-microbial resistance

Funder: Pfizer

OHE investigators: Adrian Towse, Jimena Ferraro, Jorge Mestre-Ferrandiz*

* OHE Visiting Fellow

Innovative payment models focussing on multi-indication pricing

Funder: IQVIA (formerly Quintiles IMS)

OHE investigators: Adrian Towse (PI), Amanda Cole, Paula Lorgelly

External investigators: Richard Sullivan (King's College London)

Incentivising quality

Economic analysis of the value of international volunteering and placements to the health care sector in the UK

Funder: Health Education England

OHE investigators: Bernarda Zamora (PI), Yan Feng

External investigator: Karla Hernandez-Villafuerte (now DKFZ German Cancer Research Center)

Effectiveness and Value for Money of Prescribed Specialised Services Commissioning for Quality and Innovation (CQUIN) interventions 2016/17 to 2018/19

Funder: National Institute for Health Research Policy Research Programme

OHE investigators: Yan Feng (PI), Paula Lorgelly, Marina Rodés Sánchez

External investigators: Søren Rud Kristensen (Imperial College London); Luigi Siciliani (University of York); Matt Sutton, Rachel Meacock (both University of Manchester)

The impact of introducing Any Qualified Provider on hospital performance in England

Funder: Health Foundation and Imperial College London

OHE investigators: Yan Feng (PI), Nancy Devlin

External investigators: Anita Charlesworth (Health Foundation); Carol Propper (Imperial College London); Jon Sussex (RAND Europe)

Understanding the relationship between clinical quality of primary care and patient self-reported health on the EQ-5D in England

Funder: EuroQol Research Foundation

OHE investigators: Yan Feng (PI), Nancy Devlin

External investigator: Hugh Gravelle (University of York)

Judging value for money

Examining the clinical threshold

Funder: Association of the British Pharmaceutical Industry

OHE investigators: Adrian Towse (PI), Nancy Devlin, Yan Feng, David Parkin*, Bernarda Zamora

External investigator: Karla Hernandez-Villafuerte (now DKFZ German Cancer Research Center)

* OHE Senior Visiting Fellow

Value frameworks

Funder: PhRMA Foundation

OHE investigators: Adrian Towse (PI), Lou Garrison*, Bernarda Zamora

External investigators: Meng Li (University of Washington); Karla Hernandez-Villafuerte (now DKFZ German Cancer Research Center)

* OHE Senior Visiting Fellow

Maximising effectiveness of treatment

Foresight study on European stakeholder appraisal of diagnostics to manage anti-microbial resistance

Funder: Medical Research Council

OHE investigators: Grace Hampson, Jorge Mestre-Ferrandiz*, David Mott, Adrian Towse

External investigators: Michael Hopkins, (PI) Josie Coburn, Frederique Lang (all University of Sussex); Martin Llewelyn (Brighton and Sussex Medical School)

* OHE Visiting Fellow

Health Economic Analysis of iPredict (Incorporating complex PRofiling of patients to Enroll onto molecularly-Directed Cancer Therapeutics) flagship of the MGHA

Funder: Victorian Government (Australia)

OHE investigators: Paula Lorgelly (PI), Grace Hampson

External investigators: James Buchanan (University of Oxford), Melbourne Genomic Health Alliance

Measuring outcomes

An online discrete choice experiment study to support the development of an EQ-5D-Y value set for the UK: including an adolescent arm in the study

Funder: EuroQol Research Foundation

OHE investigators: Nancy Devlin (co-PI), David Mott, Koonal Shah

External investigators: Oliver Rivero-Arias (co-PI) (University of Oxford); Juan Manuel Ramos-Goñi (EuroQol Office)

Creating a laboratory for testing differences between the 3L and 5L index in patient populations: simulating profile and valuation data

Funder: EuroQol Research Foundation

OHE investigators: David Parkin* (co-PI), Nancy Devlin (co-PI), Yan Feng, Bernarda Zamora

External investigator: Ben van Hout (University of Sheffield)

* OHE Senior Visiting Fellow

Comparing the EQ-5D-3L and EQ-5D-5L in a cohort of cancer patients

Funder: EuroQol Research Foundation

OHE investigators: Paula Lorgelly, (co-PI) Patricia Cubí-Mollá

External investigators: Richard Norman (co-PI) (Curtin University); Mark Pennington (King's College London)

Comparing the performance of the EQ-5D-3L and EQ-5D-5L in a diabetes patient sample

Funder: Eli Lilly and Company

OHE investigators: Nancy Devlin (PI), David Mott

External investigator: Brendan Mulhern (University of Technology Sydney)

Extending the QALY

Funder: MRC Industry Collaboration Award

OHE investigator: Nancy Devlin

External investigators: John Brazier (PI), Tessa Peasgood, Clara Mukuria, Jill Carlton, Donna Rowen, Aki Tsuchiya, Monica Hernandez, Ben van Hout, Janice Connell, Julie Johnson (all University of Sheffield); Stacey Rand, Karen Jones (both University of Kent); Rosie Lovett (NICE)

Guidance on methods for analysing data from EQ-5D instruments

Funder: EuroQol Research Foundation

OHE investigators: Nancy Devlin (PI), David Parkin*

* OHE Senior Visiting Fellow

Making outcomes based payments a reality in the NHS

Funder: Cancer Research UK

OHE investigators: Paula Lorgelly (PI), Amanda Cole, Patricia Cubí-Mollá, Nancy Devlin

External investigators: Jon Sussex, Miaoqing Yang, Carla Cox, Sonja Marjanovic (all RAND Europe); Richard Sullivan (King's College London)

Workshop to discuss the legitimacy, estimation, and uses of the minimal important difference (MID) with EQ-5D

Funder: EuroQol Research Foundation

OHE investigators: Mike Herdman* (PI), Nancy Devlin, David Mott

External investigators: Fatima Al Sayah, Arto Ohinmaa, Jeffrey Johnson (all University of Alberta)

* OHE Visiting Fellow

Other areas of research

Economic impact of developmental coordination disorder

Funder: Waterloo Foundation

OHE investigator: Paula Lorgelly

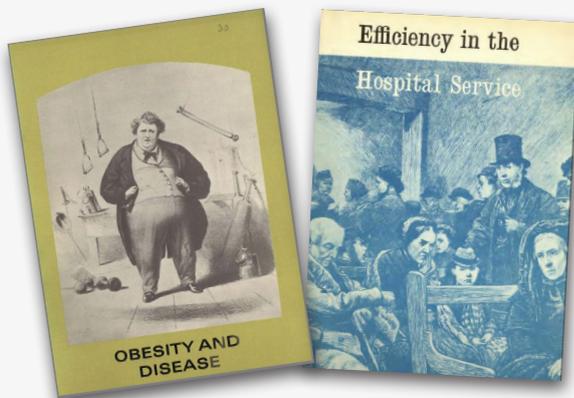
External investigator: Amanda Kirby (PI) (University of South Wales)

Publications published in 2017

OHE releases several in-house and external publications throughout the year in order to facilitate decision making and awareness of health care policy issues, thereby helping to meet its charitable objectives.

OHE publications

OHE launched 24 in-house publications in 2017 (seven Research Papers, seven Consulting Reports, two Seminar Briefings, seven Briefings and one Monograph).



All OHE publications, dating back to 1962, are freely available to download from <https://www.ohe.org/publications>.

Policy Options for Formulary Development in Middle-income Countries

Hernandez-Villafuerte, K., Garau, M., Towse, A., Garrison, L. and Grewal, S.
Consulting Report, January 2017

Policy Options for Formulary Development in Middle-income Countries: Mexico Case Study

Hernandez-Villafuerte, K., Garau, M., Towse, T. and Garrison, L.
Consulting Report, January 2017

What is the Normative Basis for Selecting the Measure of 'Average' Preferences for Use in Social Choices?

Devlin, N., Shah, K.K., and Buckingham, K.
Research Paper, February 2017

Exploring the Assessment and Appraisal of Regenerative Medicines and Cell Therapy Products: Is the NICE Approach Fit for Purpose?

Marsden, G. and Towse, A.
Consulting Report, February 2017

Delivering an Outcomes-based NHS: Creating the Right Conditions

Hicks, N.
Seminar Briefing, February 2017

Gene Therapy: Understanding the Science, Assessing the Evidence, and Paying for Value

Marsden, G., Towse, A., Pearson, S.D., Dreitlein, B. and Henshall, C.
Research Paper, March 2017

Comparing Access to Orphan Medicinal Products (OMPs) in the United Kingdom and other European countries

Zamora, B., Maignen, F., O'Neill, P., Mestre-Ferrandiz, J. and Garau, M.
Consulting Report, March 2017

Comparing the UK EQ-5D-3L and the English EQ-5D-5L Value Sets

Mulhern, B., Feng, Y., Shah, K., van Hout, B., Janssen, B., Herdman, M. and Devlin, N.
Research Paper, March 2017

Age and Utilities: Issues for HTA

Cubi-Molla, P., Shah, K.K., Garside, J., Herdman, M. and Devlin, N.
Research Paper, April 2017

Assessing Value, Budget Impact and Affordability to Inform Discussions on Access and Reimbursement: Principles and Practice, with Special Reference to High Cost Technologies [HTAi Asia Policy Forum 2016]

Hampson, G., Towse, A. and Henshall, C.
Briefing, April 2017

How Can HTA Meet the Needs of Health System and Government Decision Makers?

[HTAi Asia Policy Forum 2015]

Hampson, G., Towse, A. and Henshall, C.
Briefing, April 2017

Transferability of HTA [HTAi Asia Policy Forum 2014]

Barnsley, P., Hampson, G., Towse, A. and Henshall, C.
Briefing, April 2017

HTA and Decision Making in Asia: How Can the Available Resources Be Used Most Effectively to Deliver High Quality HTA That Can Be Used by Health System Decision Makers? [HTAi Asia Policy Forum 2013]

Towse, A. and Henshall, C.
Briefing, April 2017

Incentives for New Drugs to Tackle Anti-Microbial Resistance

Ferraro, J., Towse, A., and Mestre-Ferrandiz, J.
Briefing, May 2017

'Macro' Evaluation of the NIHR Oxford Biomedical Research Centre

Hampson, G., Lichten, C., Berdud, M., Pollitt, A., Mestre-Ferrandiz, J., Sussex, J., and Towse, A.
Research Paper, May 2017

Additional Elements of Value for Health Technology Assessment Decisions

Karlsberg Schaffer, S., West, P., Towse, A., Henshall, C., Mestre-Ferrandiz, J., Masterson, R., and Fischer, A.
Briefing, May 2017

Ten Years of the NIHR: Achievements and Challenges for the Next Decade

Davies, Sally C.
Monograph, June 2017

Why Do Immigrants Report Lower Life Satisfaction?

Yaman, F. and Cubi-Molla, P.
Research Paper, July 2017

Interventions that Encourage High-value Nursing Home Care: Lessons for the UK

Grabowski, D.
Seminar Briefing, August 2017

A New Valuation Method: Directly Eliciting Personal Utility Functions

Devlin, N., Shah, K., Mulhern, B., Pantiri, K. and van Hout, B.
Research Paper, August 2017

Data Governance Arrangements for Real-World Evidence: South Korea.

Lee, E.K., Park, J.A., Cole, A., and Mestre-Ferrandiz, J.
Consulting Report, September 2017

Antimicrobials Resistance: A Call for Multi-disciplinary Action. How Can HTA Help?

Neri, M. and Towse, A.
Briefing, October 2017

Routine Funding in the NHS in the UK of Medicines Authorised Between 2011 and 2016 via the European Centralised Procedure

Zamora, B., Maignen, F., and Lorgelly, P.
Consulting Report, December 2017

Public Health and Economic Implications of the United Kingdom Exiting the EU and the Single Market

Maignen, F., Berdud, M., Hampson, G., and Lorgelly, P.
Consulting Report, December 2017

External publications by OHE authors

Research and commentary by OHE team members appear regularly in external publications. See below for a list of 29 publications from 2017. Please note that some of these publications may have been published as 'early view' articles in 2016 and were subsequently published in full in 2017.

Abimanyi-Ochom, J., **Lorgelly, P.K.**, Hollingsworth, B. and Inder, B., 2017. Invisible work: Child work in households with a person living with HIV/AIDS in central Uganda. *SAHARA-J: Journal of Social Aspects of HIV/AIDS*, 14(1), pp.93-109.

Bogosian, A., Hurt, C.S., Vasconcelos, E Sa D., Hindle, J.V., McCracken, L. and **Cubí-Mollá, P.**, 2017. Distant delivery of a mindfulness-based intervention for people with parkinson's disease: The study protocol of a randomised pilot trial. *Pilot Feasibility Studies*, 3(4).

Clarke, P., Dalziel, K., Tew, M., **Lorgelly, P.** and Stevens, A., 2017. *Prostheses benefit setting framework: Comparative analysis of benefit setting models*. Melbourne: University of Melbourne.

Cowles, E., **Marsden, G., Cole, A.** and **Devlin, N.**, 2017. A review of NICE methods and processes across health technology assessment programmes: Why the differences and what is the impact? *Applied Health Economics and Health Policy*, 15(4), pp.469-477.

Cubí-Mollá, P., Jofre-Bonet, M. and Serra-Sastre, V., 2017. Adaptation to health states: Sick yet better off? *Health Economics*, 26(12), pp.1826-1843.

Devlin, N.J. and Brooks, R., 2017. EQ-5D and the EuroQol Group: Past, present and future. *Applied Health Economics and Health Policy*, 15(2), pp.127-137.

Devlin, N. and **Lorgelly, P.**, 2017. QALYs as a measure of value in cancer. *Journal of Cancer Policy*, 11, pp.19-25.

Doble, B., John, T., Thomas, D., Fellowes, A., Fox, S. and **Lorgelly, P.**, 2017. Cost-effectiveness of precision medicine in the fourth-line treatment of metastatic lung adenocarcinoma: An early decision analytic model of multiplex targeted sequencing. *Lung Cancer*, 107, pp.22-35.

Elbarazi, I., **Devlin, N.J.**, Katsaiti, M.S., Papadimitropoulos, E.A., **Shah, K.K.** and Blair, I., 2017. The effect of religion on the perception of health states among adults in the United Arab Emirates: A Qualitative Study. *BMJ Open*, 7, e016969.

Feng, Y., Herdman, M., van Nooten, F., Cleeland, C., Parkin, D., Ikeda, S., Igarashi, A. and **Devlin, N.**, 2017. An exploration of differences between japan and two european countries in the self-reporting and valuation of pain and discomfort on the EQ-5D. *Quality of Life Research*, 26(8), pp.2067-2078.

Feng, Y., Watt, T., Charlesworth, A., **Marsden, G.**, Roberts, A., Sussex, J., 2017. What determines the health care expenditure of high income countries? A dynamic estimation. *Applied Economics and Finance*, 4(6), pp.1-16.

Garau, M. and **Devlin, N.**, 2017. Using MCDA as a decision aid in health technology appraisal for coverage decisions: opportunities, challenges and unresolved questions. In: Marsh, K., Goetghebeur, M., Thokala, P., Baltussen, R. (eds.) *Multi-criteria decision analysis to support healthcare decisions*. Cham: Springer, pp.277-298.

Garrison, L., Kamal-Bahl, S. and **Towse, A.**, 2017. Toward a broader concept of value: identifying and defining elements for an expanded cost-effectiveness analysis. *Value in Health*, 20(2), pp.213-216.

Hakimi, Z., **Herdman, M.**, Pavesi, M., **Devlin, N.**, Nazir, J., Hoyle, C. and Odeyemi, I.A., 2017. Using EQ-5D-3L and OAB-5D to assess changes in the health-related quality of life of men with lower urinary tract symptoms associated with benign prostatic hyperplasia. *Quality of Life Research*, 26(5), pp.1187-1195.

Hampson, G., Henshall, C., and **Towse, A.**, 2017. Assessing value, budget impact and affordability in Asia. *International Journal of Technology Assessment in Health Care*, 33(2), pp.315-322.

Herdman, M., Nazir, J., Hakimi, J., Siddiqui, E., Huang, M., Pavesi, M., MacDiamid, S., Drake, M.J., and **Devlin, N.**, 2017. Assessing preference-based outcome measures for overactive bladder: an evaluation of patient-reported outcome data from the BESIDE clinical trial. *The Patient*, 10(6), pp.677-686.

Hernandez-Villafuerte, K., Sussex, J., Robin, E., Guthrie, S. and Wooding, S., 2017. Economies of scale and scope in publicly funded biomedical and health research: Evidence from the literature. *Health Research Policy and Systems*, 15(3).

Hoque, D.M.E., Sampurno, F., Ruseckaite, R., **Lorgelly, P.** and Evans, S.M., 2017. Study protocol of an equivalence randomized controlled trial to evaluate the effectiveness of three different approaches to collecting patient reported outcome measures (PROMs) data using the Prostate Cancer Outcomes Registry-Victoria (PCOR-VIC). *BMC Health Services Research*, 17(75).

Knott, R., Black, N., **Lorgelly, P.** and Hollingsworth, B., 2017. Differential item functioning in quality of life measurement: An analysis using anchoring vignettes. *Social Science and Medicine*, 190, pp.247-255.

Knott, R.J., Black, N., Hollingsworth, B. and **Lorgelly, P.K.**, 2017. Response-scale Heterogeneity in the EQ-5D. *Health Economics*, 26(3), pp.387-394.

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OHE's seminar programme

OHE stimulates debate and dissemination of health economics research (part of its charitable objectives) via its seminar programme. In 2017, OHE organised five lunchtime seminars. OHE also held its flagship Annual Lecture in June, and organised a workshop at the ISPOR European Congress in November.



Why are Mortality Rates Rising for Middle-Aged White Non-Hispanic Americans? Could it Happen in Europe?

OHE Annual Lecture

Professor Anne Case, Princeton University; Professor Sir Angus Deaton, Princeton University

15 June 2017

Summary:

The New York Times headline "Death Rates Rising for Middle-Aged White Americans" summarised Professors Case and Deaton's 2015 findings on US mortality and morbidity in the 21st Century.

The change they detected is a reversal of decades of progress in reducing mortality and was unique to the United States; no other rich country has to date seen a similar turnaround. The reversal was confined to white non-Hispanics. Black non-Hispanics and Hispanics at midlife, and those aged 65 and above in every racial and ethnic group, continued to see mortality rates fall. In March 2017 they followed up with a new paper looking at reasons why this is happening – summarised by Forbes Magazine as "Explaining Why White Middle-aged America is Killing Itself."

In the 2017 OHE Annual Lecture, Professors Case and Deaton set out their latest thinking and the policy implications. In particular, they set out and discussed their findings of a:

- marked increase in the all-cause mortality of middle-aged white non-Hispanic men and women in the United States between 1998 and 2015;
- parallel increase in midlife morbidity;

- rise in death rates from drug and alcohol poisonings and suicide supporting evidence of growing midlife distress;
- preliminary but plausible story of cumulative disadvantage over life, in the labour market, in marriage and child outcomes, and in health;
- conclusion that these findings have profoundly negative implications for policies – even ones that successfully improve earnings and jobs, or redistribute income, will take many years to reverse the mortality and morbidity increase.

The lecture has been written up as an OHE Monograph.

Professor Anne Case is the Alexander Stewart 1886 Professor of Economics and Public Affairs at Princeton University, where she is the Director of the Research Program in Development Studies. She has been awarded the Kenneth J. Arrow Prize in Health Economics from the International Health Economics Association, for her work on the links between economic status and health status in childhood, and the Cozzarelli Prize from the Proceedings of the National Academy of Sciences for her research on midlife morbidity and mortality. In April 2017 she was elected as a Fellow of the American Academy of Arts and Sciences.

Professor Sir Angus Deaton is Senior Scholar and the Dwight D. Eisenhower Professor of Economics and International Affairs Emeritus at the Woodrow Wilson School of Public and International Affairs and the Economics Department at Princeton University. In 2015 he won the Nobel Memorial Prize in Economic Sciences. In 2016, he was made a Knight Bachelor for services to economics and international affairs.

Interventions that Encourage High-Value Nursing Home Care: Lessons for the United Kingdom

OHE Lunchtime Seminar

Professor David Grabowski, Harvard University

19 April 2017

Summary:

Countries around the world are struggling with how to provide high-value nursing home care. Many countries are plagued with low-quality care, supply problems and rising public expenditures. These problems will only increase in the coming years with the aging of the baby boom generation. There are also significant implications for the health care system. In the UK, the knock-on implications of supply shortages for 'bed blocking' in the NHS add to the challenges for our health and social care systems, as do admissions to hospitals from nursing homes that could have been avoided with better care management.

Poor quality has been documented in the US nursing home sector for decades. Economists have generally pointed towards three potential explanations: low public reimbursement, supply constraints, and incomplete information on the part of consumers. Historically, the US government relied on regulation as the key mechanism to encourage quality. Newer efforts have explored the use of market mechanisms such as pay-for-performance and report cards to encourage quality competition.

This seminar offered a health economics perspective on how payment and delivery interventions can encourage high-value nursing home care. It took lessons from the US effort to encourage high-value care and applied them to the UK where we have similarly relied on regulation as the key guarantor of quality.





Management in the NHS

OHE Lunchtime Seminar

Professor Carol Propper, Imperial College London

5 September 2017

Summary:

Better management has been shown to be associated with better firm performance in many countries and in many settings, including in organisations which provide public services. There are many studies of management in the NHS. Most have concluded that management is important.

This seminar examined how much the CEOs of NHS hospitals can influence different factors of production of hospital care. Using a sample of over 100 managers in nearly 200 large NHS hospitals over 15 years, it examined the effect a CEO has on clinical performance, staffing, financial performance, waiting times and other measures of hospital performance.

How Cost-Effective are New Cancer Drugs in the United States?

OHE Lunchtime Seminar

Professor Frank Lichtenberg, Columbia University

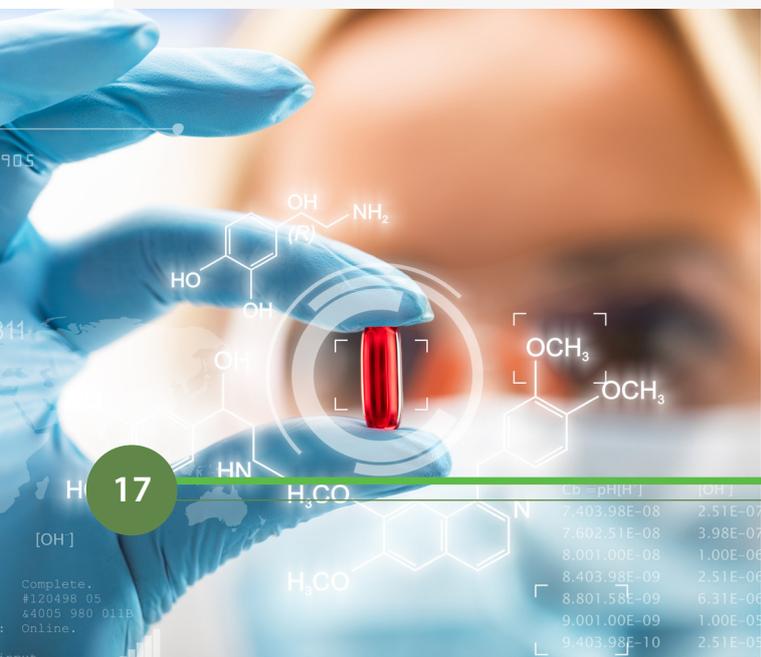
19 September 2017

Summary:

The number of drugs approved by the FDA for treating cancer has increased substantially during the last 40 years. Moreover, cancer drug innovation has been accelerating: more than 8 times as many new cancer drugs were approved during 2005-2015 as were approved during 1975-1985 (66 vs. 8). During the period 2010-2014, the average annual growth rate of cancer drug expenditure was 7.6% - more than 3.6 times the average annual growth rate of nominal US GDP. This has contributed to a lively debate about the value and cost-effectiveness of new cancer drugs.

This lecture offered an assessment of the average cost-effectiveness in the US in 2014 of new cancer drugs approved by the FDA during 2000-2014. Cost-effectiveness is measured as the ratio of the impact of new cancer drugs on medical expenditure to their impact on the number of years of potential life lost due to cancer. The latter is estimated using a difference-in-difference research design, to determine whether cancers that had larger increases in the number of drugs approved had larger declines in premature mortality, controlling for the change in cancer incidence and mean age at time of diagnosis.

The estimates indicate that cancer drugs approved during 2000-2014 reduced the number of years of potential life lost before age 75 in 2014 by 719,133, and that cancer drugs approved between 1989 and 2005 reduced the number of hospital days in 2013 by 1.55 million, and hospital cost in 2013 by \$4.8 billion. The baseline estimate of the cost per life-year gained in 2014 from cancer drugs approved during 2000-2014 is \$7853.



NHS Agency Staffing and the Impact of Recent Interventions

OHE Lunchtime Seminar

Chris Mullin, Department of Health

6 October 2017

Summary:

Temporary agency staffing has been a major area of focus for the NHS in England over the last five years. In the context of the financial challenges across the NHS provider sector, the spotlight fell on the sharp increase in agency expenditure, which by 2014/15 had reached over £3 billion. In addition, individual examples of expensive shifts attracted major news coverage.

In November 2015, NHS Improvement stepped in and introduced national price caps on the rates NHS providers could pay for individual agency shifts. This was a novel approach, not without controversy from an economics perspective given experiences from other sectors and uncertainty over what the implications on staffing would be.

At the same time, rules were introduced that required providers to procure agency staff through approved frameworks, which were retendered to align to the price caps, and financial targets were introduced on providers' annual expenditure on agency staff. NHS Improvement also targeted dedicated improvement support on agency staffing and workforce management.

In this seminar, Chris Mullin, Chief Economist at the Department of Health, considered the economics of the NHS agency market, the incentives facing the agents involved and how the design of these interventions sought to address market imperfections and minimise the risk of supply shortages. He then reflected upon the impact to date of the measures and what lessons might be drawn for the future, both for health and other sectors facing similar issues.

The UK Biotech Sector and Brexit: Past Performance and Future Prospects

OHE Lunchtime Seminar

Sir Geoffrey Owen, London School of Economics;

Professor Michael Hopkins, University of Sussex

2 November 2017

Summary:

In their book 'Science, the State and the City: Britain's struggle to succeed in biotechnology' (Oxford University Press, 2016), Owen and Hopkins examined the evolution of an important new industrial sector, founded on high hopes for the commercial exploitation of emerging applications for biotechnology. In this seminar, Owen and Hopkins updated the analysis in their book to discuss the implications of Brexit.

The US has led in commercialising biotechnology, and it has been difficult for firms in other economically advanced countries, including the UK, to match leading US companies. By focusing on the institutions and policies which have underpinned US success, it is possible to identify several interlocking elements that provided the US with a powerful competitive advantage in biotechnology – and in particular in the development of innovative therapeutics. These include: a higher education system which has close links to industry; massive support from the Federal government for biomedical research; and a financial system which is well equipped to support young entrepreneurial firms in a science-based industry.

While the US sector has enjoyed a virtuous cycle of commercial success and re-investment, the UK sector has suffered from a pronounced boom and bust in the financing of emergent biotech firms following from a series of clinical trial failures. Although the UK sector has enjoyed a revival in recent years, Brexit brings new challenges and, perhaps, opportunities.

Will the prospects of the sector be improved or damaged by Brexit? This seminar reviewed the lessons of the past – looking in particular at the role of government and its agencies – and to assess the implications for the sector of the UK's departure from the EU.

Sustainable Funding and Fair Pricing for Orphan Drugs: What Are the Solutions?

Workshop at the ISPOR (International Society for Pharmacoeconomics and Outcomes Research) European Congress

Martina Garau, OHE; Mike Drummond, University of York; Saskia Knies, National Health Care Institute, Netherlands

6 November 2017

Summary:

Since the inception of the European regulation on orphan drugs, there has been a debate as to whether conventional economic evaluation methods should be applied to assess these treatments and whether their funding is sustainable in healthcare systems facing substantial budgetary pressures. The evidence in support of paying a premium for orphan drugs is mixed but in practice many countries in Europe provide access to them. From a manufacturer's perspective, it might be challenging to recoup R&D costs and earn a return on

investment at the standard cost-per-QALY thresholds given small patient populations and development risks. Recent changes in the NICE Highly Specialised Treatments introduce a higher cost effectiveness threshold to judge value-for-money of treatments for very rare conditions, which represent only a fraction of orphan drug approvals.

The purpose of the workshop was to discuss options to make the funding of valuable orphan drugs sustainable for healthcare systems and to provide a 'fair' reward to manufacturers investing in areas of high unmet need.

OHE's Martina Garau introduced the session, providing evidence on the rate of HTA approval and reimbursement of orphan drugs across Europe. Saskia Knies (National Health Care Institute, The Netherlands) offered insights on and learnings from the Dutch approach to appraising orphan drugs. Mike Drummond (University of York) explained a new method to adjust the cost-effectiveness threshold to reflect the difference between the population size of orphan and non-orphan treatments. To engage with the audience, Martina asked, and facilitated discussion around, a series of questions via an online poll relating to the appraisal of orphan drugs.



External presentations and dissemination activities

OHE team members presented health economics research and economics analysis of health policy issues to a wide range of audiences in 2017, giving over 80 presentations in total. OHE staff presented at all major international health economics conferences (International Health Economics Association (iHEA); International Society for Pharmacoeconomics and Outcomes Research (ISPOR)) and at the principal health economics and outcomes conferences in the UK (e.g. Health Economists' Study Group (HESG)), as well as giving invited presentations at a number of other events such as advisory boards, lectures, seminars, workshops, and assorted meetings. A selection of some of these are provided below, for illustrative purposes:

Use of patient reported outcomes in children:
Development of a value set for the EQ-5D-Y



Event: Advances in Patient Reported Outcomes Research Conference, Oxford, UK

Presenter: Koonal Shah

Koonal presented the methods and preliminary findings of two OHE-led research studies intended to generate stated preference data to support the development of a value set for the EQ-5D-Y, the 'youth' version of the EQ-5D. The presentation discussed the normative and methodological challenges associated with valuing health in children. The audience comprised multi-disciplinary researchers interested in patient-reported outcomes.

Adjusting for differential item functioning in the EQ-5D-5L using externally-collected vignettes



Event: ISPOR Congress, Boston, US

Presenter: Paula Lorgelly

There is a growing concern that responses to questions on subjective scales will be inaccurate if certain groups of people systematically differ in their interpretation and use of the response categories. This is known as differential item functioning (DIF). It has been shown that it is possible to correct for DIF by using vignette responses collected externally to the main dataset of interest. Paula's presentation applied this approach to the EQ-5D-5L to demonstrate how this adjustment method can be used in practice to obtain quality-adjusted life year measures that are comparable across different population groups.

Establishing a fair price for an orphan drug

Event: iHEA World Congress, Boston, US



Presenter: Mikel Berdud

This research discusses a way to set prices based on rates of return from investments in developing orphan drugs. In his presentation Mikel suggested that the price for an orphan drug should not sustain rates of return greater/lower than the industry average after adjustments for risk and any other relevant factors – i.e. fair to the manufacturer and fair to society.

Are existing health technology assessment requirements inadequate for establishing value for potentially transformative gene therapies?

Event: ISPOR European Congress, Glasgow, UK



Presenter: Adrian Towse

Adrian shared his perspective on approaches to evaluating the cost-effectiveness of gene therapies, considering the high upfront costs and potential long-term and/or transformative benefits, as discussed at the Institute for Clinical and Economic Review Gene Therapy Summit.

Is NICE ready for the next level?

Event: ISPOR European Congress, Glasgow, UK



Presenter: Nancy Devlin

In the light of NICE's recent position statement regarding use of the EQ-5D-5L, this workshop considered the issues for NICE's health technology appraisals of using the EQ-5D-5L and its English value set. Nancy Devlin, representing the EuroQol Group, provided an overview of the evidence comparing the EQ-5D-3L and EQ-5D-5L descriptive systems, concluding that evidence points to the 5L being a better descriptive system than the 3L: it more accurately describes patients' health.

MCDA in Latin America

Event: ISPOR Latin America, Sao Paulo, Brazil



Presenter: Martina Garau

Martina's presentation provided an overview of some key applications and challenges to the use of MCDA, including how the decision criteria are selected and weighted, whose values should be used, and how budget constraints and opportunity costs are addressed.

Measuring outcomes from health care: the role, use and limitations of patient reported outcomes data

Event: Measuring health service efficiency and productivity, Bank of England/Office for National Statistics/Royal Statistical Society, London, UK



Presenter: Nancy Devlin

There is increasing interest in the use of patients' self-reported health as a means of measuring outcomes from health care. Patient reported outcome (PRO) measures have been used for decades to inform the appraisal of new technologies but their routine use in the context of health care delivery (PROMs programmes) is relatively new.

Nancy's presentation explained the rationale for seeking PRO data and considered the types of PRO data that are required to inform various decisions. The English NHS PROMs programme was also reviewed, and conclusions were drawn about what has worked and what can be learned. Challenges for the effective use of PROMs data was also discussed, including how to ensure the data benefit patients, how to extend measurement to health and social care outcomes, and the potential for comparing outcomes between the public and privately funded health care sectors.

Selected examples of self-funded projects

Below we provide three examples of research activities to illustrate the nature of work that OHE funds from the ABPI annual research grant and the surplus from externally funded projects. These projects demonstrate how OHE achieves its charitable objective to promote the effective and efficient use of health care resources by advancing the use of economic approaches to support decision making.

Valuing health at the end of life

In 2009, the National Institute for Health and Care Excellence (NICE) introduced a special policy for the appraisal of life-extending end of life treatments. The policy indicates that under certain circumstances, such treatments may be recommended for use in the NHS even if they would not normally be considered a cost-effective use of health care resources. NICE's policy was justified in part by claims that it reflected the preferences of society, but little evidence was available to support the premise that society favours such an 'end of life premium'.

Koonal Shah, in collaboration with Professors Aki Tsuchiya and Allan Wailoo (both University of Sheffield), has been undertaking a programme of research examining whether members of the public wish to place greater weight on a unit of health gain for end of life patients than on that for other types of patients. He undertook a review of the literature on social preferences, and a series of empirical studies that used hypothetical choice exercises to elicit the stated preferences of the UK general public regarding the value of health gains for end of life patients (total n=6,441). A variety of preference elicitation techniques, modes of administration and analytical approaches were used.

Results varied across studies, but overall the evidence was not found to be consistent with an end of life premium. Whereas NICE's end of life policy applies to

life-extending treatments, there is some evidence that quality of life improvements are more highly valued than life extensions for end of life patients. The results of all four studies suggest that where a

preference for prioritising the treatment of end of life patients *does* exist, this preference may be driven by concerns about how long the patients have known about their prognosis rather than how long they have left to live *per se*.

In 2017, Koonal was awarded a PhD from the University of Sheffield for his research on this topic. He also presented his findings at the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Congress, the 7th Meeting of the International Academy of Health Preference Research (ISPOR), and the Pharmaccess Leaders Forum. Papers arising from his PhD research have been published in *Social Science and Medicine* and the *European Journal of Health Economics*.

Shah, K.K., 2017. *Valuing health at the end of life*. PhD thesis. Sheffield: University of Sheffield. Available at: <http://etheses.whiterose.ac.uk/17579/>.



NICE methods and processes across health technology assessment programmes

OHE regularly offers summer research placements to postgraduate students undertaking MSc courses in health economics or health policy. As part of these placements, OHE staff act as the primary supervisors to the students' dissertations. In 2017, OHE hosted two students: Marina Rodés Sánchez (MSc Health Economics, City University London) and Rachel Rosen (MSc Health Policy, Planning and Financing, London School of Economics and Political Science).

A previous placement project involved a review of the methods used in the various health technology assessment (HTA) programmes run by the National Institute for Health and Care Excellence (NICE). The research was undertaken by Emma Brockis (OHE placement student in 2015), in collaboration with OHE's Grace Hampson, Amanda Cole and Nancy Devlin.

The research involved a systematic comparison of five of NICE's HTA programmes: Technology Appraisal Programme; Medical Technologies Guidance; Diagnostic Assessment Programme; Highly Specialised Technologies Programme; and Clinical Guidelines. The aim was to establish how differences in methods and processes between the programmes may impact on allocative efficiency within the NHS. Key differences between programmes were found in the methods of evaluation, specifically the provision of a reference case, the requirement for and type of economic analysis, and the decision-making criteria used for appraisal.

The research was published originally as an OHE Research Paper (Brockis et al., 2016 [OHE website downloads: 398, known citations: 3]), and a revised version published subsequently in *Applied Health Economics and Health Policy* (Cowles et al., 2017 [known citations: 4]).

Brockis, E., **Marsden, G., Cole, A., and Devlin, N.** 2016. A Review of NICE Methods Across Health Technology Assessment Programmes: *Differences, Justifications and Implications*. London: Office of Health Economics.

Cowles, E., **Marsden, G., Cole, A. and Devlin, N.,** 2017. A review of NICE methods and processes across health technology assessment programmes: Why the differences and what is the impact? *Applied Health Economics and Health Policy*. 15(4), pp.469-477.

Journal of Cancer Policy special issue on 'Value and Cancer'

Professor Bengt Jönsson, a member of OHE's Research and Policy Committee, guest edited a special issue of the *Journal of Cancer Policy* in March 2017 entitled 'Value and Cancer'. The issue covered a range of topics related to the assessment of the value conferred by cancer treatments. It includes three articles authored by OHE researchers.

The first article (available open access), authored by Nancy Devlin and Paula Lorgelly, discusses the use of the quality-adjusted life year (QALY) as a measure of value in cancer. The authors describe how some aspects of benefit to patients and society are not captured by QALYs, and they explore the issues with applying generic patient-reported outcome measures to cancer patients. The paper sets out the further research required to consider the feasibility of broadening the definition of value beyond QALYs.

Devlin, N. and Lorgelly, P., 2017. QALYs as a measure of value in cancer. *Journal of Cancer Policy*, 11, pp.19-25.

The second article, authored by Adrian Towse and Lou Garrison (OHE Senior Visiting Fellow), focuses on precision cancer medicine. The authors identify and discuss key conceptual, implementation and policy issues in applying value assessment in precision cancer medicine. The value of test-drug combinations goes beyond health gain and health system cost-offsets to include several elements

related to the value of knowing, such as the value of reduced uncertainty. The paper highlights the need for flexible value-based pricing for cancer drugs and diagnostic tests based on incremental value to encourage personalised medicine.

Towse, A. and Garrison, L., 2017. Value assessment in precision cancer medicine. *Journal of Cancer Policy*, 11, pp.48-53.

The third article (available open access), authored by Koonal Shah, examines whether willingness to pay is higher for cancer prevention and treatment than for other types of activity. The extent of support for a 'cancer premium' is assessed through a review of empirical public preference studies, including selected studies from the literature on the value of a statistical life and the value of a prevented fatality. The paper also discusses the policy context in the UK, where special assessment criteria and funding arrangements are in place for certain cancer drugs. The author concludes that the evidence available is not sufficiently strong to conclude whether willingness to pay is higher for cancer prevention and treatment than for activities unrelated to cancer.

Shah, K.K., 2017. Is willingness to pay higher for cancer prevention and treatment? *Journal of Cancer Policy*, 11, pp.60-64.



OHE's *pro bono* activities

OHE engages in a wide variety of *pro bono* activities, including participation on advisory boards, serving on committees, supervising student placements, examining doctoral research theses, and undertaking reviews (journal manuscript submissions, conference abstracts, etc.).

OHE staff hold a number of honorary and visiting positions at academic institutions, and serve on several external boards and committees.

Board and committee memberships:

- **Patricia Cubí-Mollá** – Member of the EvaluAES Special Interest Group on the evaluation of health policies and health care services (supported by the Spanish Health Economic Association)
- **Nancy Devlin** – Member of the ISPOR Board of Directors (Director)
- **Nancy Devlin** – Co-chair of the 3L/5L Taskforce, EuroQol Group
- **Nancy Devlin** – Member of the Valuation Working Group, EuroQol Group
- **Grace Hampson** – Member of the Clinical Guidelines Updates Standing Committee, National Institute for Health and Care Excellence
- **Mike Herdman** – Member of the Executive Committee, EuroQol Group
- **Koonal Shah** – Scientific co-chair of the EuroQol Group Plenary Meeting
- **Koonal Shah** – Member of the advisory group for the MRC-funded Extending the QALY project
- **Adrian Towse** – Member of the ISPOR Special Task Force on US Value Assessment Frameworks
- **Adrian Towse** – Member of the ISPOR Board of Directors (Past President)

Academic appointments:

- **Patricia Cubí-Mollá** – Visiting Lecturer, City University of London
- **Nancy Devlin** – Honorary Professor, City University of London
- **Nancy Devlin** – Honorary Professor, University of Sheffield
- **Paula Lorgelly** – Adjunct Associate Professor, Monash University
- **Paula Lorgelly** – Visiting Professor, King's College London
- **Koonal Shah** – Honorary Research Fellow, University of Sheffield
- **Adrian Towse** – Senior Visiting Researcher, University of Oxford
- **Adrian Towse** – Visiting Professor, London School of Economics and Political Science

OHE staff completed a total of 36 peer reviewing tasks in 2017, including grant reviewing. One OHE team member also acted as a PhD examiner.

OHE supervised two MSc students – Marina Rodés Sánchez (City University; supervised by Yan Feng) and Rachel Rosen (London School of Economics and the London School of Hygiene and Tropical Medicine; supervised by Koonal Shah) – in 2017.

Selected examples of achievements and performance

Notable successes

Improving decision-making

Martina Garau and Nancy Devlin were part of the faculty running the short course on *Using Multi-Criteria Decision Analysis (MCDA) in Health Care Decision Making: Approaches & Applications* at the ISPOR European Congress in November 2017. Their part of the course explained the rationale for using MCDA in health technology assessment (HTA), reviewed the current landscape of MCDA applications, and discussed critical issues that still need to be addressed to support further use of MCDA. The course was well received by participants, who engaged in practical model-building exercises, selected criteria and elicited preferences across them, and took part in a series of polls around the opportunities and challenges of applying MCDA in HTA.

At the same ISPOR European Congress, Nancy participated as an invited panellist in a session on MCDA and incremental cost-effectiveness ratios, speaking alongside Charles Phelps, Lou Garrison and Maarten IJzerman. Martina also participated as an invited panellist in a session on *MCDA in Latin America* at the ISPOR Latin America Conference in September.



Martina and Nancy also co-authored a chapter on using MCDA as a decision aid in HTA in the new book *Multi-Criteria Decision Analysis to Support Healthcare Decisions* (edited by Marsh et al.). The authors explain the rationale behind the application of MCDA in

HTA, and how economic principles should be reconciled with MCDA practices. In particular, they discuss issues such as how the decision criteria are selected and weighted; whose values should be used; how budget constraints and opportunity costs are addressed; and how uncertainty in evidence is handled.

Garau, M. and Devlin, N., 2017. *Using MCDA as a decision aid in Health Technology Appraisal for coverage decisions: opportunities, challenges and unresolved questions.* In: Marsh, K., Goetghebeur, M., Thokala, P., Baltussen, R., eds. *Multi-Criteria Decision Analysis to Support Healthcare Decisions.* Springer.

Maximising effectiveness of treatment

OHE has been involved in a range of projects on the topic of regenerative medicines. Grace Hampson (née Marsden) and Adrian Towse co-authored a report presenting an analysis of the significant clinical potential of gene therapy and the unique challenges in developing and evaluating evidence on their effectiveness and value. Special attention is given to pricing and payment mechanisms, including new approaches to payment based on long-term amortization of initial costs. The report was released as a research paper, jointly published by OHE and the Institute for Clinical and Economic Review (ICER). A version was also published in the *Journal of Comparative Effectiveness Research*.

Grace was invited to speak at the Gene Therapy for Rare Disorders conference (<http://genetherapy-conference.com/>) on the topic of 'Options for Managing Budget Impact of High Cost Gene Therapies'. This conference, held in November 2017, brought together drug developers in this therapy area to explore how they can progress gene therapies to market more effectively.

Adrian was approached to be a key advisor on a Methodology Working Group for the assessment and appraisal of CART-cell therapies. This is an OHE Consulting project funded by a biopharmaceutical company and organised by an external consultancy organisation. This working group is looking to identify challenges faced by these types of therapies and suggest

ways forward. There are three 'key' documents upon which the project is based, two of which are OHE reports. Grace is also part of the Methodology Working Group.

Hampson, G., Towse, A., Pearson, S.D., Dreitlein, W.B. and Henshall, C., 2018. Gene therapy: evidence, value and affordability in the US health care system. *Journal of Comparative Effectiveness Research*, 7(1), pp.15-28.

Marsden, G., Towse, A., Pearson, S.D., Dreitlein, B., and Henshall, C., 2017, *Gene Therapy: Understanding the Science, Assessing the Evidence, and Paying for Value*. Report from the 2016 ICER Membership Policy Summit.

Marsden, G. and Towse, A., 2017. *Exploring the Assessment and Appraisal of Regenerative Medicines and Cell Therapy Products: Is the NICE Approach Fit for Purpose?* London: OHE Consulting.

Adrian Towse spoke on an issue panel entitled *Are Existing HTA Requirements Inadequate for Establishing Value for Potentially Transformative Gene Therapies?* At the ISPOR European Congress in November 2017. Gene therapies offer promise of one-time treatment leading to transformative and lifelong benefits for patients with rare/orphan diseases. Evaluating effectiveness of gene therapies at launch is daunting using existing approaches to assess benefit. The high cost of gene therapies may make it difficult to evaluate value, due to concerns related to affordability by payers/society. Adrian discussed the need for a new model of pricing/reimbursement for gene therapies, and the need for new/modified HTA methodologies.

Paula Lorgelly was invited to speak at the Economics of Precision Medicine Workshop in January 2017, organised to launch a new research theme at the Health Economics and Health Technology Assessment (HEHTA) research group, University of Glasgow. The workshop was attended by staff from Stratified Medicines Scotland, NHS and clinical researchers and health economists. Paula spoke on three key challenges going forward for precision medicine: new elements of value; paying for value; and evidence of value.

Measuring outcomes

OHE conducted innovative methodological work on patient-reported outcomes in 2017, both in the UK and internationally, in countries such as Australia, Canada, China, Ireland, New Zealand, Sweden and the United Arab Emirates.

Nancy Devlin was invited to present OHE's research at numerous high-profile forums (such as the ISPOR European Congress, where she spoke alongside representatives from NICE and the NICE Decision Support Unit). In November 2017 she gave an invited presentation on *Measuring outcomes from health care: role use and limitations of PROMs* at a one-day joint meeting of the Office for National Statistics, Royal Economic Society and Royal Statistical Society on measuring NHS productivity and efficiency, hosted by the Bank of England (see page 21).

Impact case study

Developing methods to elicit and model EQ-5D-5L values

Research team: Nancy Devlin (OHE) & Ben van Hout (joint principal investigators); Koonal Shah and Yan Feng (OHE), Brendan Mulhern and Aki Tsuchiya (University of Sheffield).

Overview of the body of work

The EQ-5D is a patient reported health questionnaire that is widely used to measure and value changes in health-related quality of life around the world – and is recommended by NICE for use in evidence submitted to it. It is widely used in clinical trials, population health surveys and the NHS Patient Reported Outcome Measurements programme. The original instrument included three severity 'levels' for each dimension. A new 5-level instrument has been developed: EQ-5D-5L. Requests for EQ-5D-5L use now supersede requests for EQ-5D(-3L) (Devlin and Brooks, 2017).

Working in collaboration with the University of Sheffield, the aims of OHE's work have been:

- a) to develop and test new methods for developing a scoring system ('value set') for the EQ-5D-5L, that could be used around the world;
- b) to apply those methods in England and the UK to produce an EQ-5D-5L value set that can be used to inform health care decision making.

Initial projects developed and tested a new approach to the TTO, the lead time TTO, demonstrating it to be feasible and a potential improvement on conventional approaches (Devlin et al., 2010). We subsequently compared various 'lead-time' TTO approaches with a 'lag-time' TTO (Devlin et al., 2013), as well as exploring the effect of different ways of implementing valuation tasks (Shah et al., 2013). The methods developed and tested in our research were incorporated into an international protocol for the valuation of EQ-5D-5L (Oppe et al., 2014).



The programme of work culminated in a study to use that protocol to produce an English value set for the EQ-5D-5L. We collected preference data from a representative sample of the general public. Using a range of innovative modelling approaches (Feng et al., 2018), we produced an English value set for the EQ-5D-5L (Devlin et al., 2018).

Managing our research to maximise its impact

OHE and the University of Sheffield worked in close liaison with the EuroQol Group, who developed the EQ-5D instruments. This ensured that our methodological work in projects in England could directly inform their development of an international protocol for valuing the EQ-5D-5L, to be used in

all countries wishing to undertake such studies. In addition to the principal papers from these projects, additional outputs from our work included interviewer training materials and data quality assurance processes, which have subsequently been adapted for use by study teams internationally.

We also ensured that key decision makers and potential users of the value set (including the Department of Health for England, NICE technical appraisals team, and health economists in academia and industry who use the value sets in conducting economic evaluations) were kept informed of our work via dissemination activities throughout the project. In the case of the value set study, a steering group was established by the Department of Health, comprising key stakeholders including senior staff from the Department of Health and NICE as well as from academic health economists, to provide guidance and oversight of our work.

We were committed to early dissemination. The two principal papers arising from the value set study, (Devlin et al., 2018; Feng et al., 2018) were released via our open-access working paper series, OHE Research Papers, in 2016 in order to disseminate early findings and promote discussion and feedback. The OHE Research Paper reporting the value set itself has been downloaded around 7,000 times from OHE's website. The papers were simultaneously released as University of Sheffield Discussion Papers.

There has been intense interest in using the value sets we have produced from our work to analyse data from clinical trials, observational data and routine (PROMs) data collection. We have presented our work to the NICE technical appraisals team, to the Department of Health and to pharmaceutical companies via a series of face to face briefings, seminars, workshops and webinars from 2015 onwards, in addition to academic and other conferences.

Supporting code (STATA, SPSS, SAS) to enable users to readily apply the value set in their analysis of EQ-5D-5L data (e.g. from clinical trials, or NHS PROMs initiatives) were also provided open-access on OHE's website.

Since the project's completion, the research team has continued to work on follow-up studies to aid understanding of the implications of the value set for users and decision makers (Mulhern et al., 2018; Devlin et al., 2018).

Evidence of the impact of our work

The body of work described here has had:

- a) impact on the methods being used by other researchers around the world to conduct similar studies;
- b) impact on the way patient health is measured in evidence on the quality, effectiveness and cost effectiveness of services considered by a range of decision makers.

The impact of the initial methodological research was reported in a case study submitted to the 2014 UK REF exercise by City University of London¹ and was judged by the sub-panel as **'demonstrating very considerable impact in terms of reach and significance'**.

The international protocol which was informed by our research in projects is reported in Oppe et al. (2014). Studies using our methods have subsequently been undertaken in over a dozen countries, including Canada, China, Japan, Netherlands, Spain, Australia, Korea, Singapore, with further studies planned in most continents.

The impact of our methodological work and value set study was selected by the NIHR to be highlighted in its 2016 10-year anniversary report ('NIHR at 10'), which noted that the impact of this research **'is worldwide and highly significant in improving health and health care decision making'**.

The implications of the Devlin et al. (2018) value set for estimates of QALY gains, cost effectiveness ratios and NICE decisions has been the focus of considerable attention since its publication. The value set already in use in cost effectiveness analyses and other analyses (e.g. comparing preferences around the world). It has been cited over 180 times since publication, and has been the focus of numerous commentaries, blogs and journal articles. The NICE Decision Support Unit has been commissioned to undertake a number of studies to help NICE understand the effect on its decisions.

The relevance and importance of the value set to decision making by NICE and the Department of Health is also reflected in it being subject to a formal external review (NICE, 2017).

This review is currently underway and is expected to report in late 2018.

1 - Where Professor Devlin was Dean of Social Sciences prior to joining OHE in 2009, and where she holds an honorary professorship.

Key deliverables:

Devlin, N., Tsuchiya, A., Buckingham, K. and Tilling, C., 2010. A uniform time trade off method for states better and worse than dead: feasibility study of the 'lead time' approach. *Health Economics*, 20(3), pp.348-361

Devlin, N., Buckingham, K., **Shah, K.**, Tsuchiya, A., Tilling, C., **Wilkinson, G.** and van Hout, B., 2013. A comparison of alternative variants of the lead and lag time TTO. *Health Economics*, 22(5), pp.517-532.

Shah, K.K., Lloyd, A., Oppe, M. and **Devlin, N.J.**, 2013. One-to-one versus group setting for conducting computer-assisted TTO studies: Findings from pilot studies in England and the Netherlands. *European Journal of Health Economics*, 14(1Suppl), pp.66-73.

Devlin, N., **Shah, K.**, **Feng, Y.**, Mulhern B, van Hout B., 2018. Valuing health-related quality of life: An EQ-5D-5L value set for England. *Health Economics*, 27(1), pp.7-22.

Feng, Y., **Devlin, N.**, **Shah, K.**, Mulhern, B. and van Hout, B., 2018. New methods for modelling EQ-5D-5L value sets: An application to English data. *Health Economics*, 27(1), pp.23-38.

Other references:

Devlin, N. and Brooks, R., 2017. EQ-5D and the EuroQol Group: past, present, future. *Applied Health Economics and Health Policy*, 15(2), pp.127-137.

Devlin, N., Brazier, J., Pickard, A.S. and Stolk, E., 2018. 3L, 5L, what the L? A NICE conundrum. *Pharmacoeconomics*, 36(6), pp.637-640

Oppe, M., **Devlin, N.**, van Hout, B., Krabbe, P.F.M. and de Charro, F., 2014. A programme of methodological research to arrive at the new international EQ-5D-5L valuation protocol. *Value in Health*, 17(4), pp.445-453.

Devlin, N. and Krabbe, P., 2013. The development of new research methods for the valuation of EQ-5D-5L. *European Journal of Health Economics*, 14(Suppl1), pp.1-3.

Mulhern, B., **Feng, Y.**, **Shah, K.**, Janssen, M.F., **Herdman, M.**, van Hout, B. and **Devlin, N.**, 2018. Comparing the UK EQ-5D-3L and English EQ-5D-5L Value Sets. *Pharmacoeconomics*, DOI: 10.1007/s40273-018-0628-3

Other examples of impact and citations by policy makers and influencers

Citations of OHE research in key texts

Two papers authored by Nancy Devlin (Buckingham and Devlin, 2006; Oppe, Devlin et al., 2014) were cited in the highly influential second edition of *Cost-effectiveness in health and medicine* (Neumann et al., 2017), a revised and expanded edition of the seminal Gold et al. book, authored by a newly convened panel of experts drawn from the highest ranks of academia, government and health care administration.

Buckingham, K. and **Devlin, N.**, 2006. A theoretical framework for TTO valuations of health. *Health Economics*, 5(10), pp.1149-1154.

Oppe, M., **Devlin, N.**, van Hout, B., Krabbe, P.F.M. and de Charro, F., 2014. A program of methodological research to arrive at the new international EQ-5D-5L valuation protocol. *Value in Health*, 17(4), pp.445-453.

Neumann, P.J., Sanders, G.D., Russell, L.B., Siegel, J.E. and Ganiats, T.G. (eds.), 2016. *Cost-effectiveness in health and medicine*. Oxford University Press.

OHE research on measuring and valuing health outcomes featured heavily in the second edition of the popular textbook *Measuring and valuing health benefits for economic evaluation* (Brazier et al., 2017). In total the book included citations of nine different papers authored by OHE researchers. Nancy Devlin and Koonal Shah both appear in the book's index.

Brazier, J., Ratcliffe, J., Salomon, J. and Tsuchiya, A. 2017. *Measuring and valuing health benefits for economic evaluation*. Second edition. Oxford University Press.

Citations of OHE research by decision makers and policy influencers

In April 2017, OHE's analysis of the uptake of new medicines was cited in the Office for Life Sciences *Life Science Competitiveness Indicators* report.

In July 2017, Public Health England cited OHE's research on historical causes of death in England and Wales (Baillie and Hawe, 2012) in its a report entitled *Health Profile for England*.

Baillie, L. and Hawe, E., 2012. *Causes of Death: A Study of a Century of Change in England and Wales*. OHE Briefing. London: Office of Health Economics.

In September 2017, Professor Dame Sally Davies (Chief Medical Officer for England and Chief Medical Advisor to the UK Government), who gave the *2016 OHE Annual Lecture*, used a two-page summary of OHE's paper on health technology assessment and anti-microbial resistance when she went to speak to the United Nations General Assembly about anti-microbial resistance.

Koonal Shah's research on societal preferences featured in the teaching of the *Foundations of Economic Evaluation in Health Care* York Summer Workshop (led by Professors Mike Drummond and Mark Sculpher of the Centre for Health Economics).

Other citations and achievements

In March 2017, an OHE-led paper on the returns to medical research spending (Sussex et al., 2016) was cited in the Medical Research Council's *Economic Impact Report* detailing the positive impact on health, the wider society and the economy of investing in medical research. OHE's *Medical Research: What's it worth?* publication (in collaboration with RAND Europe and the Health Economics Research Group, Brunel University) was also cited in the report.

Sussex, J., **Feng, Y.**, Mestre-Ferrandiz, J., Pistollato, M., Hafner, M., Burrridge, P. and Grant, J., 2016. Quantifying the economic impact of government and charity funding of medical research on private research and development funding in the United Kingdom. *BMC Medicine*, 14(1).

In the first half of 2017, Nancy Devlin's paper *EQ-5D and the EuroQol Group: Past, Present and Future* was one of the five most downloaded articles published by the journal *Applied Health Economics and Health Policy*.

Devlin, N.J. and Brooks, R., 2017. EQ-5D and the EuroQol Group: Past, Present and Future. *Applied Health Economics and Health Policy*, 15(2), pp.127-137.

Financial Review

OHE's financial structure

The Office of Health Economics (OHE) undertakes research and related activity in line with its charitable objectives. OHE employed an average of 20 staff during 2017.

OHE owns the sole share in OHE Consulting Limited. The purpose of owning OHE Consulting is threefold:

- It enables OHE to employ a larger staff team than would be possible using research income alone.
- Staff gain knowledge, skills and experience undertaking consulting projects that can be carried across into research and research-related projects.
- The profits generated from consultancy work can be Gift Aided to OHE, subject to the agreement of the Directors of OHE Consulting Limited. This was an important source of income for OHE in 2017.

OHE's financial performance in 2017

Consolidated turnover (i.e. combining both OHE and OHE Consulting Limited) was £3.03m. Expenditure totalled £3.01m leaving a small net income of £21,512.

Of the £3.01m expenditure, staff costs amounted to £1.72m, i.e. 57%. Support services for the consolidated businesses accounted for £0.38m.

The consolidated accounts for OHE are included as an Annex to this report.

Sources of funding

The consolidated income of £3.03m comprises:

	£000
Donations	762.9
Income from charitable (research) activities	716.5
Interest	0.1
Total research income	1,479.6
OHE Consulting Income	1,551.0
Total Income	3030.6

Donations are from the ABPI and are for two distinct purposes:

	£000
Support for core research activities	380.0
Grant towards financing of support activities	382.9
Total	762.9



Income from charitable (research) activities came from a number of sources. Major research projects and funders included:

- Incentives for new drugs to tackle anti-microbial resistance, funded by Pfizer
- Innovative payment models focussing on multi-indication pricing, funded by IQVIA (formerly Quintiles IMS)
- Effectiveness and Value for Money of Prescribed Specialised Services Commissioning for Quality and Innovation (CQUIN) interventions 2016/17 to 2018/19, funded by National Institute for Health Research Policy Research Programme
- The impact of introducing Any Qualified Provider on hospital performance in England, funded by Health Foundation and Imperial College London
- Examining the clinical threshold, funded by Association of the British Pharmaceutical Industry
- Foresight study on European stakeholder appraisal of diagnostics to manage anti-microbial resistance, funded by Medical Research Council
- An online discrete choice experiment study to support the development of an EQ-5D-Y value set for the UK: including an adolescent arm in the study, funded by EuroQol Research Foundation
- Comparing the EQ-5D-3L and EQ-5D-5L in a cohort of cancer patients, funded by EuroQol Research Foundation
- Extending the QALY, funded by MRC Industry Collaboration Award
- Making outcomes based payments a reality in the NHS, funded by Cancer Research UK

Consultancy income was received by OHE Consulting Limited from a number of commercial and public sector clients in the UK, the rest of Europe, and North America.

OHE Consulting Limited generated profits for the year of £405,671 which were Gift Aided to OHE and so provided an important source of income for OHE's charitable research activities.

Plans for 2018

OHE's plans for 2018 have been developed on the basis of feedback and advice received from the OHE Research and Policy Committee, which maintains oversight of our research performance, from the OHE Editorial Committee, and from new opportunities and directions identified by the OHE team throughout 2017. These have informed specific objectives set for OHE in 2018 by its Board of Trustees.

In 2018 OHE will continue to pursue research and research-related activities directed toward the achievement of its mission statement and charitable objects.

Key changes to be implemented in 2018 include:

- Restructuring of the six research programmes indicated in this 2017 report. In 2018, OHE's research activity will instead be led and reported in terms of four principal 'themes', in order to better focus our efforts and impact: (a) Economics of innovation; (b) Incentivising quality; (c) Judging value for money and improving decision-making; and (d) Measuring and valuing outcomes.
- A revised structure for OHE's committees. The Research and Policy Committee will continue to be the principal scientific and policy advisory sub-committee of the Board of Trustees, and its membership will be strengthened. The Editorial Committee will be replaced with an expanded Editorial Panel to peer-review OHE publications. The Management Committee will be disbanded: financial oversight of OHE is the responsibility of the Board of Trustees, and operational matters are the responsibility of the senior management team.

A key focus in 2018 will be succession planning for the OHE Director role. OHE's Director, Adrian Towse, plans to retire from the role at the end of December 2018.

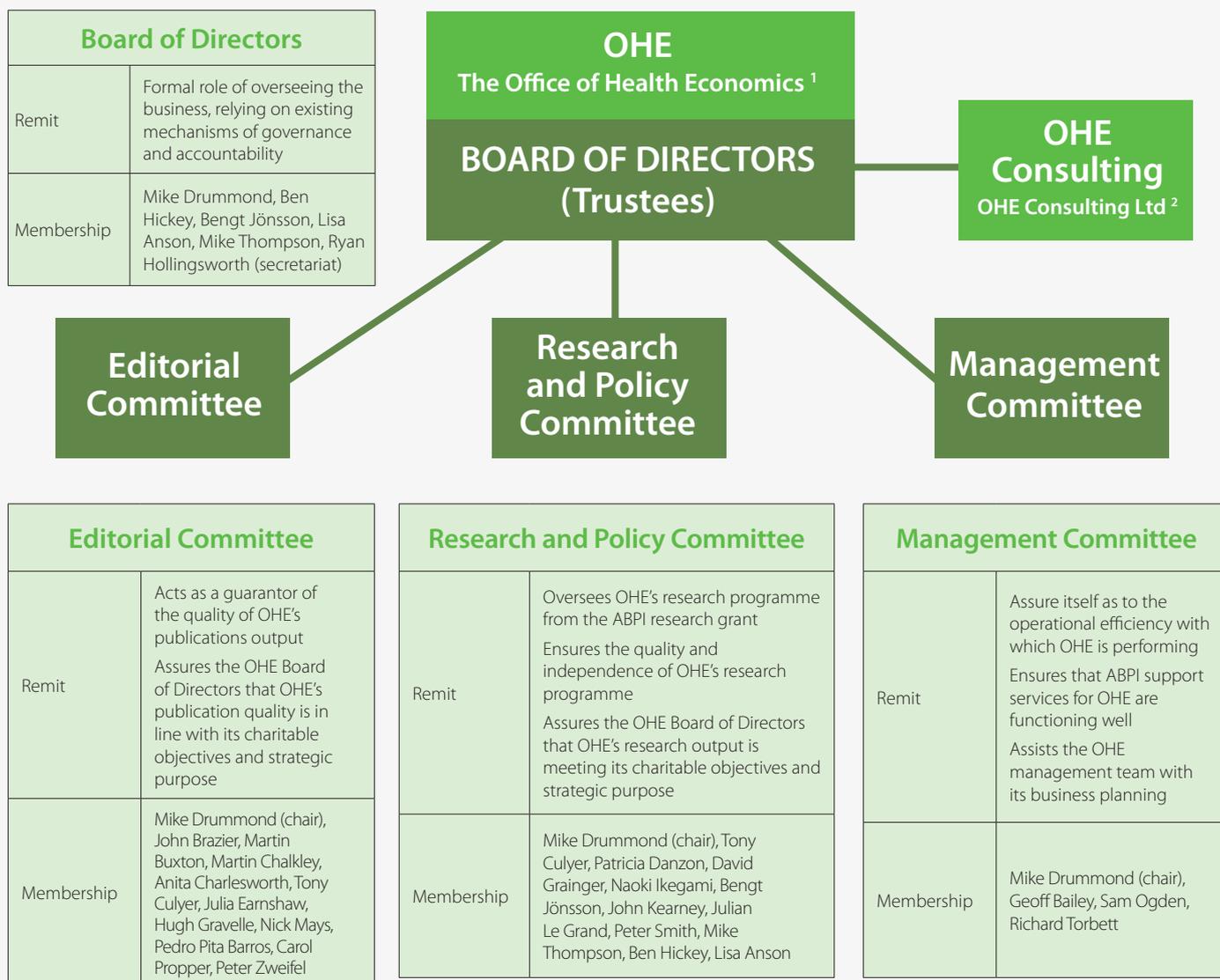
Structure Governance and Management

The overall management of OHE is carried out by the Director, Prof Adrian Towse. The Director is part of the Senior Management Team, which in 2017 comprised the Director, Prof Adrian Towse, the Deputy Director, Prof Paula Lorgelly, and the Director of Research, Prof Nancy Devlin. The Senior Management Team reports to the Trustees on a quarterly basis.

OHE employed an average of 14.98 FTE research staff based at its offices in London. The majority of these were

Economists, each of whom were line managed by a Senior Economist or a Principal Economist. We also employed in 2017 a Business Executive, a Personal Assistant, and a Team Assistant.

In addition to the governance of the Board of Trustees, OHE was also advised by a Research and Policy Committee, an Editorial Committee and a Management Committee. The members of each committee and their reporting lines are given in the figure below.



1 - The Office of Health Economics (a charity of registered number 1170829 & company limited by guarantee of registered number 09848965)

2 - OHE Consulting Ltd (a registered company number 09853113)

Independent Auditor's Report

We have audited the financial statements of The Office of Health Economics ("the parent Charitable Company") and its subsidiaries ("the Group") for the year ended 31 December 2017 which comprise the consolidated statement of financial activities, the consolidated and parent charitable company balance sheets, the consolidated cash flow statement and notes to the financial statements, including a summary of significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including Financial Reporting Standard 102 *The Financial Reporting Standard applicable in the UK and Republic of Ireland* (United Kingdom Generally Accepted Accounting Practice).

In our opinion, the financial statements:

- give a true and fair view of the state of the Group's and of the Parent Charitable Company's affairs as at 31 December 2017 and of the Group's incoming resources and application of resources for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Companies Act 2006.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the Group and the Parent Charitable Company in accordance with the ethical requirements relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Conclusions related to going concern

We have nothing to report in respect of the following matters in relation to which the ISAs (UK) require us to report to you where:

- the Trustees' use of the going concern basis of accounting in the preparation of the financial statements is not appropriate; or
- the Trustees have not disclosed in the financial statements any identified material uncertainties that may cast significant doubt about the Group or the Parent Charitable Company's ability to continue to adopt the going concern basis of accounting for a period of at least twelve months from the date when the financial statements are authorised for issue.

Other information

The other information comprises the information included in the Trustees' Report and Financial Statements, other than the financial statements and our auditor's report thereon. The other information comprises the Trustees' Report. The Trustees are responsible for the other information.

Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

Opinions on other matters prescribed by the Companies Act 2006

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the Trustees' Report, which includes the Directors' Report prepared for the purposes of Company Law, for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the Directors' Report, which is included in the Trustees' Report, has been prepared in accordance with applicable legal requirements.

Matters on which we are required to report by exception

In the light of the knowledge and understanding of the Group and the Parent Charitable Company and its environment obtained in the course of the audit, we have not identified material misstatement in the Trustee's report.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion;

- adequate accounting records have not been kept by the Parent Charitable Company, or returns adequate for our audit have not been received from branches not visited by us; or
- the Parent Charitable Company financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of Directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit; or
- the Trustees were not entitled to prepare the financial statements in accordance with the small companies regime; or were not entitled to take advantage of the small companies' exemptions in preparing the directors' report and from the requirement to prepare a strategic report.

Responsibilities of Trustees

As explained more fully in the Trustees' responsibilities statement, the Trustees (who are also the directors of the charitable company for the purposes of company law) are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the Trustees determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Trustees are responsible for assessing the Group's and the Parent Charitable Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Trustees either intend to liquidate the Group or the Parent Charitable Company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

We have been appointed as auditor under section 144 of the Charities Act 2011 and report in accordance with the Act and relevant regulations made or having effect thereunder.

This report is made solely to the Charitable Company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the Charitable Company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Charitable Company and the Charitable Company's members as a body, for our audit work, for this report, or for the opinions we have formed.

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

A further description of our responsibilities for the audit of the financial statements is located at the Financial Reporting Council's ("FRC's") website at: <https://www.frc.org.uk/auditorsresponsibilities>. This description forms part of our auditor's report.

Phil Cliftlands (Senior Statutory Auditor)

For and on behalf of BDO LLP, statutory auditor

Gatwick

Date:

BDO LLP is a limited liability partnership registered in England and Wales (with registered number OC305127).

Consolidated statement of financial activities incorporating income and expenditure account for the year ended 31 December 2017

	Note	Unrestricted funds 2017 £	Total funds 2017 £	As Restated Total funds 2016 £
Income from:				
Donations research grants	16	762,940	762,940	935,498
Charitable activities		716,481	716,481	569,317
Other trading activities		1,551,001	1,551,001	1,550,806
Interest receivable	2	162	162	1,238
Total income		3,030,584	3,030,584	3,056,859

Expenditure on:				
Costs of other trading activities	5	1,145,429	1,145,429	1,283,055
Charitable activities	5	1,863,643	1,863,643	1,773,804
Total expenditure		3,009,072	3,009,072	3,056,859

Net income for the year / period		21,512	21,512	-
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Reconciliation of funds:				
Total funds brought forward		-	-	-
Total funds carried forward		21,512	21,512	-

All activities relate to continuing operations.

Other trading activities includes the activities of the company's wholly owned subsidiary, OHE Consulting Limited.

The notes on pages 43 to 50 form part of these financial statements.

Consolidated balance sheet as at 31 December 2017

	Note	2017 £	2017 £	2016 £	2016 £
Current assets					
Debtors	10	631,132		483,856	
Cash at bank and in hand	14	283,930		1,036,570	
		915,062		1,520,426	
Creditors: amounts falling due within one year	11	(893,550)		(1,520,426)	
Net current assets			21,512		
Net assets			21,512		-
Charity Funds-					
Unrestricted funds			21,512		-
Total funds			21,512		-

Financial statements were approved and authorised for issue by the Trustees and signed on their behalf by:

Trustee:

Trustee:

Date:

Date:

The notes on pages 43 to 50 form part of these financial statements.

Company balance sheet as at 31 December 2017

	Note	2017 £	2017 £	2016 £	2016 £
Fixed assets					
Investments	18		2		2
Current assets					
Debtors	10	437,069		177,955	
Cash at bank		112,403		473,182	
		549,472		651,137	
Creditors: amounts falling due within one year	11	(527,962)		(651,139)	(2)
Net current assets/(liabilities)			21,510		-
Net assets			21,512		-
Charity Funds-					
Unrestricted funds			21,512		
Total funds			21,512		

Financial statements were approved and authorised for issue by the Trustees and signed on their behalf by:

Trustee:

Trustee:

Date:

Date:

The notes on pages 43 to 50 form part of these financial statements.

Consolidated statement of cash flows for the year ended 31 December 2017

	Note	Year ended 31 December 2017 £	Period ended 31 December 2016 £
Cash flows from operating activities			
Net cash (used in)/provided by operating activities	13	(752,640)	1,036,570
Change in cash and cash equivalents in the year		(752,640)	1,036,570
Cash and cash equivalents brought forward		1,036,570	-
Cash and cash equivalents carried forward	14	283,930	1,036,570

The notes on pages 43 to 50 form part of these financial statements.

Notes to the financial statements

For the year ended 31 December 2017

1. Accounting policies

1.1 Basis of preparation of financial statements

The financial statements have been prepared in accordance with Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their accounts in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) (effective 1 January 2015) - (Charities SORP (FRS 102)), The Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) and the Companies Act 2006.

The Office of Health Economics ("the company") meets the definition of a public benefit entity under FRS 102. Assets and liabilities are initially recognised at historical cost or transaction value unless otherwise stated in the relevant accounting policy.

The Statement of financial activities (SOFA) and Balance sheet consolidate the financial statements of the company and its subsidiary undertaking. The results of the subsidiary are consolidated on a line by line basis.

No separate SOFA has been presented for the company alone as permitted by section 408 of the Companies Act 2006.

The net income and expenditure for the period dealt with in the accounts of the parent company was £21,512 (2016 - £Nil).

1.2 Company status

The company is a company limited by guarantee. The members of the company are the Trustees named on page 1. In the event of the company being wound up, the liability in respect of the guarantee is limited to £10 per member of the company.

1.3 Fund accounting

General funds are unrestricted funds which are available for use at the discretion of the Trustees in furtherance of the general objectives of the company and which have not been designated for other purposes.

Restricted funds are funds which are to be used in accordance with specific restrictions imposed by donors or which have been raised by the company for particular purposes. The costs of raising and administering such funds are charged against the specific fund. The aim and use of each restricted fund is set out in the notes to the financial statements.

1.4 Income

All income is recognised once the company has entitlement to the income, it is probable that the income will be received and the amount of income receivable can be measured reliably.

Consultancy project income is included to the extent that it has been earned in the period by reference to appropriate project milestones or project completion. Payments received in advance for consultancy projects are included in Creditors (Other Creditors) to the extent that these have not been earned in the period.

The company changed its revenue recognition policy during the year to exclude netting off in the accounts, in accordance with UK accounting standards. As such, the prior year figures have been restated, however there has been no impact on the company, or group's profits.

1.5 Expenditure

Expenditure is recognised once there is a legal or constructive obligation to transfer economic benefit to a third party, it is probable that a transfer of economic benefits will be required in settlement and the amount of the obligation can be measured reliably. Expenditure is classified by activity. The costs of each activity are made up of the total of direct costs and shared costs, including support costs involved in undertaking each activity. Direct costs attributable to a single activity are allocated directly to that activity. Shared costs which contribute to more than one activity and support costs which are not attributable to a single activity are apportioned between those activities on a basis consistent with the use of resources. Central staff costs are allocated on the basis of time spent, and depreciation charges allocated on the portion of the asset's use.

Support costs are those costs incurred directly in support of expenditure on the objects of the company and include project management. Governance costs are those incurred in connection with administration of the company and compliance with constitutional and statutory requirements.

Costs of generating funds are costs incurred in attracting voluntary income, and those incurred in trading activities that raise funds.

Charitable activities and Governance costs are costs incurred on the company's educational operations, including support costs and costs relating to the governance of the company apportioned to charitable activities.

1.6 Debtors

Trade and other debtors are recognised at the settlement amount after any trade discount offered. Prepayments are valued at the amount prepaid net of any trade discounts due.

1.7 Cash and Cash Equivalents

Cash and cash equivalents includes cash and short term highly liquid investments with a short maturity of three months or less from the acquisition date or opening of a deposit or similar account.

1.8 Liabilities and provisions

Liabilities are recognised when there is an obligation at the Balance sheet date as a result of a past event, it is probable that a transfer of economic benefit will be required in settlement, and the amount of the settlement can be estimated reliably. Liabilities are recognised at the amount that the company anticipates it will pay to settle the debt or the amount it has received as advanced payments for the goods or services it must provide. Provisions are measured at the best estimate of the amounts required to settle the obligation.

Where the effect of the time value of money is material, the provision is based on the present value of those amounts, discounted at the pre tax discount rate that reflects the risks specific to the liability. The unwinding of the discount is recognised within interest payable and similar charges.

1.9 Financial instruments

The company only has financial assets and financial liabilities of a kind that qualify as basic financial instruments.

Basic financial instruments are initially recognised at transaction value and subsequently measured at their settlement value with the exception of bank loans which are subsequently measured at amortised cost using the effective interest method.

1.10 Foreign currencies

The company's and group's functional and presentational currency is GBP.

Monetary assets and liabilities denominated in foreign currencies are translated into sterling at rates of exchange ruling at the balance sheet date.

Transactions in foreign currencies are translated into sterling at the rate ruling on the date of the transaction.

Exchange gains and losses are recognised in the Consolidated Statement of Financial Activities incorporating income and expenditure account.

1.11 Pensions

Another group entity operates a defined contribution pension scheme and the pension charge represents the amounts which have been recharged by another group entity in respect of staff pensions payable to the funds in respect of the period.

1.12 Critical accounting estimates and areas of judgment

Estimates and judgments are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances.

Critical accounting estimates and assumptions:

The company makes estimates and assumptions concerning the future. The resulting accounting estimates and assumptions will, by definition, seldom equal the related actual results.

The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below.

Critical areas of judgment:

(a) Impairment of trade and other debtors

The company makes an estimate of the recoverable value of trade and other debtors. When assessing impairment of trade and other debtors, management considers factors including the credit rating of the debtor, ageing profile of the debtors and historical experience. See Note 10 for the net carrying amount of debtors.

(b) Accrued and deferred income

The group estimates the amount of any income generated but not invoiced to customers at the year end, or vice versa, based on the extent of services provided and what is expected to be invoiced after the period end, or already been invoiced before the period end.

2. Interest receivable

	Unrestricted funds 2017 £	Total funds 2017 £	Total funds 2016 £
Bank interest receivable	162	162	1,238

3. Charitable activities

	Unrestricted £	Total 2017 £	As Restated Total 2016 £
Direct charitable expenditure	1,646,133	1,646,133	1,566,527
Support costs – governance (Note 4)	40,020	40,020	34,886
Support costs – general (Note 4)	177,490	177,490	172,391
	1,863,643	1,863,643	1,773,804

Included within Direct charitable expenditure are staff costs totalling £969,303 (2016 - £1,021,437). A further £750,316 (2016 - £824,936) of staff costs are included within OHE Consulting Limited trading activities within Note 5. An analysis of total staff costs of £1,719,619 (2016 - £1,846,373), is provided in Note 7.

4. Support Costs

	Governance £	General £	Total 2017 £	Total 2016 £
Legal and professional related costs	7,250	-	7,250	7,864
Accountancy related costs	32,770	-	32,770	27,022
Human resources related costs	-	22,920	22,920	19,100
Facilities related costs	-	7,040	7,040	5,949
IT related costs	-	34,960	34,960	53,600
Other office support related costs	-	112,570	112,570	93,742
	40,020	177,490	217,510	207,277
At 31 December 2016	34,886	172,391	207,277	

5. Analysis of Expenditure by expenditure type

	Other costs 2017 £	As Restated Other costs 2016 £
OHE Consulting trading activities	1,145,429	1,283,055
	1,145,429	1,283,055
Direct charitable expenditure	1,646,133	1,566,527
General support costs	177,490	172,391
Charitable activities	1,823,623	1,738,918
Expenditure on governance	40,020	34,886
	1,863,643	1,773,804
Total expenditure	3,009,072	3,056,859

6. Auditors' remuneration

	Year ended 31 December 2017 £	Period ended 31 December 2016 £
Fees payable to the company's auditor and its associates in respect of:		
Audit related assurance services	6,000	-

In 2016, the audit fees in relation to the company audit were borne by another group company and no recharges made to the company.

7. Staff costs

Staff costs, including key management personnel (see Note 8), were as follows:

	Total 2017 £	Total 2016 £
Wages and salaries	1,449,464	1,547,796
Social security costs	172,602	182,872
Cost of defined contribution scheme (Note 15)	97,553	115,705
	1,719,619	1,846,373

Included within staff costs are settlement payments of £Nil (2016 - £72,265) to an ex employee for leaving office.

The average number of employees during the period was as follows:

	Year ended 31 December 2017 No.	Period ended 31 December 2016 No.
Executive management team	3	3
Administrative staff	17	18
	20	21

The number of higher paid employees was:

	Year ended 31 December 2017 No.	Period ended 31 December 2016 No.
In the band £60,001 - £70,000	3	2
In the band £70,001 - £80,000	1	0
In the band £80,001 - £90,000	1	0
In the band £120,001 - £130,000	0	1
In the band £140,001 - £150,000	1	1
In the band £170,001 - £180,000	1	0
In the band £180,001 - £190,000	0	1
In the band £270,001 - £280,000	0	1
In the band £280,001 - £290,000	1	0

The above bandings include salary, performance related bonus and any cash allowances. For the highest paid individual this includes an allowance to replace a previous final salary pension benefit.

8. Key management personnel

	Total 2017 £	Total 2016 £
Wages and salaries	596,370	546,226
Social security costs	77,112	81,138
Cost of defined contribution scheme (Note 15)	30,459	22,206
	703,941	649,570

In addition to the Board of Trustees, there were 3 key management personnel, 2 of which accrued benefits under another group entity's defined contribution pension scheme during the period.

9. Trustees' fees

	Year ended 31 December 2017 £	Period ended 31 December 2016 £
Fees for services provided and reimbursed expenses	18,654	26,134

B Jönsson, Trustee, received fees for services provided during the period, including reimbursed expenses, of £3,357 (2016 - £14,240).

M Drummond, Trustee, received fees for services provided during the period, including reimbursed expenses, of £15,297 (2016 - £11,894).

The fees and expenses paid to the two Trustees noted above during the period related to the provision of consultancy and advisory services in respect of direct charitable activities. This directly contributed to the company achieving its' objectives.

The services provided by the Trustees relates to advice in respect of specialist areas within health economics and healthcare policy and hence it would have proven difficult to obtain these services from a third party.

No Trustees received fees for being Trustees and no other remuneration or expenses were paid to Trustees during the period.

The above payments were made in line with the authority contained within the Charity's memorandum and articles of association.

10. Debtors: Amounts falling due within one year

	Group		Company	
	2017 £	2016 £	2017 £	2016 £
Trade debtors	630,362	483,856	161,563	177,955
Amounts owed by subsidiaries	-	-	274,736	-
Other debtors	770	-	770	-
	631,132	483,856	437,069	177,955

11. Creditors: Amounts falling due within one year

	Group		Company	
	2017 £	2016 £	2017 £	2016 £
Trade creditors	9,551	11,043	9,520	2,648
Amounts owed to parent company	419,871	987,292	239,730	270,359
Other taxation and social security	79,219	16,220	10,265	14,215
Accruals and deferred income	384,909	505,871	268,447	363,917
	893,550	1,520,426	527,962	651,139

12. Financial instruments

	Year ended 31 December 2017 £	Period ended 31 December 2016 £
Financial assets measured at fair value through income and expenditure	283,930	1,036,570
Financial assets measured at amortised cost	631,132	483,856
	915,062	1,520,426
Financial liabilities measured at amortised cost	709,437	1,165,528

Financial assets measured at fair value through income and expenditure comprise of cash and cash equivalents.

Financial assets measured at amortised cost comprise of debtors falling due within one year.

Financial liabilities measured at amortised cost comprise of creditors falling due within one year, excluding deferred income.

13. Reconciliation of net movement in funds to net cash flow from operating activities

	Group	
	Year ended 31 December 2017 £	Period ended 31 December 2016 £
Net income for the year	21,512	-
Adjustment for:		
Increase in debtors	(147,276)	(483,856)
(Decrease)/increase in creditors	(626,876)	1,520,426
Net cash (used in)/provided by operating activities	(752,640)	1,036,570

14. Cash and cash equivalents

	Group	
	Year ended 31 December 2017 £	Period ended 31 December 2016 £
Cash at bank and in hand	283,930	1,036,570

15. Pension commitments

The ultimate parent entity operates a defined benefit contribution pension scheme. The assets of the scheme are held separately from those of the company in an independently administered fund. The pensions cost charge represents contributions which were payable to the fund, and were recharged by another group entity for staff undertaking work on behalf of the OHE Group, and amounted to £97,553 (2016 - £115,705).

16. Related party transactions

During the period two Trustees received fees for services totalling £18,654 (2016 - £26,134) (refer to Note 9 for details). At the balance sheet date no amount of this was outstanding.

During the period the company received grants totalling £762,940 (2016 - £935,498) from the ABPI (refer to Note 17 below).

During the period, the group and company incurred support costs totalling £382,940 and £217,570 respectively, which were recharged by the ABPI (refer to Note 17 below).

During the current and comparative period, the company received a transfer of profits from OHE Consulting Limited, which were transferred via Gift Aid (refer to Note 18 below).

17. Ultimate parent undertaking and controlling party

The ultimate parent undertaking and controlling party is considered to be the Association of the British Pharmaceutical Industry Limited ("the ABPI"), registered in England and Wales 09826787, by virtue of it being the sole member of the company. The Association represents innovative research based biopharmaceutical companies, large, medium and small, leading an exciting era of bioscience in the UK. This company prepares consolidated financial statements. These are available to the public and may be obtained from 7th Floor, Southside, 105 Victoria Street, London, SW1E 6QT.

18. Principal subsidiaries

OHE Consulting Limited

Company name	Country of incorporation	Percentage Shareholding	Description
OHE Consulting Limited	United Kingdom	100 %	Provision of policy and strategic expertise on healthcare and related matters.

During the period, OHE Consulting Limited, registered company number 09853113, generated income totalling £1,551,001 (As restated for 2016 - £1,550,806), and incurred expenditure totalling £1,145,429 (As restated for 2016 - £1,283,055), generating profits for the period of £405,671 (2016 - £268,377). OHE Consulting Limited elected to transfer its profits, by Gift Aid, to the company leaving aggregated assets in OHE Consulting Limited of £Nil at the period end.

List of Acronyms

ABPI	Association of the British Pharmaceutical Industry
CART	Chimeric Antigen Receptor T-Cell
CEO	Chief Executive Officer
CQUIN	Commissioning for Quality and Innovation
DOI	Digital Object Identifier
DIF	Differential Item Functioning
EQ-5D	EuroQol Five-Dimension
EQ-5D-3L	EuroQol Five-Dimension Three-Level
EQ-5D-5L	EuroQol Five-Dimension Five-Level
EQ-5D-Y	EuroQol Five-Dimension Youth
EU	European Union
FDA	Food and Drug Administration
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
HESG	Health Economists' Study Group
HEHTA	Health Economics and Health Technology Assessment (University of Glasgow)
HTA	Health Technology Assessment
HTAi	Health Technology Assessment International
ICER	Institute for Clinical and Economic Review [can also denote Incremental Cost-Effectiveness Ratio]
ISPOR	International Society for Pharmacoeconomics and Outcomes Research
MCDA	Multi-Criteria Decision Analysis
MGHA	Melbourne Genomics Health Alliance
MID	Minimally Important Difference
MRC	Medical Research Council
NHS	National Health Service

NICE	National Institute for Health and Care Excellence
NIHR	National Institute for Health Research
OHE	Office of Health Economics
PI	Principal Investigator
PRO	Patient-Reported Outcome
PROM	Patient-Reported Outcome Measure
QALY	Quality-Adjusted Life Year
REF	Research Excellence Framework
SPSS	Statistical Package for the Social Sciences
SAS	Statistical Analysis System
TTO	Time Trade-Off
UK	United Kingdom (of Great Britain and Northern Ireland)
US	United States (of America)

