EHDEN

EUROPEAN HEALTH DATA & EVIDENCE NETWORK

EHDEN and the Oxford Study-a-thon

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imi innovative medicines initiative

efpia

OHDSI OBSERVATIONAL HEALTH DATA SCIENCES AND INFORMATICS

EHDEN: Vision and Mission

Vision

The European Health Data & Evidence Network (EHDEN) aspires to be the trusted observational research ecosystem to enable better health decisions, outcomes and care

Mission

Our mission is to provide a new paradigm for the discovery and analysis of health data in Europe, by building a large-scale, federated network of data sources standardised to a common data model

EHDEN CONSORTIUM

Innovative Medicines Initiative (IMI) Project

www.imi.europe.eu

Start date: 1 Nov 2018
End date: 30 Apr 2024
Duration: 66 months

22 partners

Almost €29 million

Universities, public bodies and research organisations

Erasmus MC Universitair Medisch Centrum Rotterdam — **Academic coordinator**

Uppsala Monitoring Centre

universidade de aveiro

NICE National Institute for Health and Care Excellence

Tartu Ülikool 1632 Universitas Tartuensis

University of Oxford

Small to medium-sized companies

SYNAPSE Research Management Partners

thehyve

ODYSSEUS Data Services Inc

Non-for-profit organisations

EPF European Patients Forum

ICHOM

EFPIA & Associated partners

Janssen Pharmaceutical Companies of Johnson & Johnson — **EFPIA Lead**

Bayer

Celgene

Pfizer

Lilly

abbvie

AstraZeneca

Sanofi

UCB

Novartis

Servier

imi innovative medicines initiative efpia OHDSI Observational Health Data Sciences and Informatics

EHDEN IS ABOUT ...

FEDERATION

Creation of an EU-wide architecture for federated analyses of real world data

HARMONISATION

Harmonise more than 100 million anonymised health records to the OMOP common data model

COMMUNITY

Establish a self-sustaining open science collaboration in Europe, supporting academia, industry, regulators, payers, government, NGOs and others

OUTCOMES

Enabling outcomes driven healthcare at a European level

EDUCATION

The establishment of an EHDEN Academy, webinars and face-to-face training sessions to train all stakeholders

Call Process for Data Partners and Small to Medium-Sized Enterprise (SMEs)

Harmonisation fund

Data Partners

Open calls

Tailored for project objectives and sustainability

Grant Awarding

Evaluated via a pre-defined set of criteria by the Data source prioritisation committee

Data sources can choose the SME from the pool of EHDEN certified SMEs

THE EHDEN ACADEMY

academy.ehden.eu

Aim

To develop an **e-learning** environment **to train all stakeholders** in the project in the use of the tools and processes that are being adopted in EHDEN and OHDSI

Collaboration

Course development on the OMOP Common Data Model and the rich set of OHDSI tools are developed in collaboration with the **OHDSI community**

Infrastructure

The EHDEN Academy is developed in **Moodle** and is hosted in the **Amazon AWS cloud**

- Academy Pilot running with approx.50 users
- Planned to be opened to full OHDSI community end of this year!

SME CERTIFICATION

Goal: to provide the SME all the skills to perform the data standardisation task to the OMOP-CDM and train them on the installation of the analytical infrastructure

- 28 SMEs signed up from X countries
- 11 currently following the e-learning curriculum

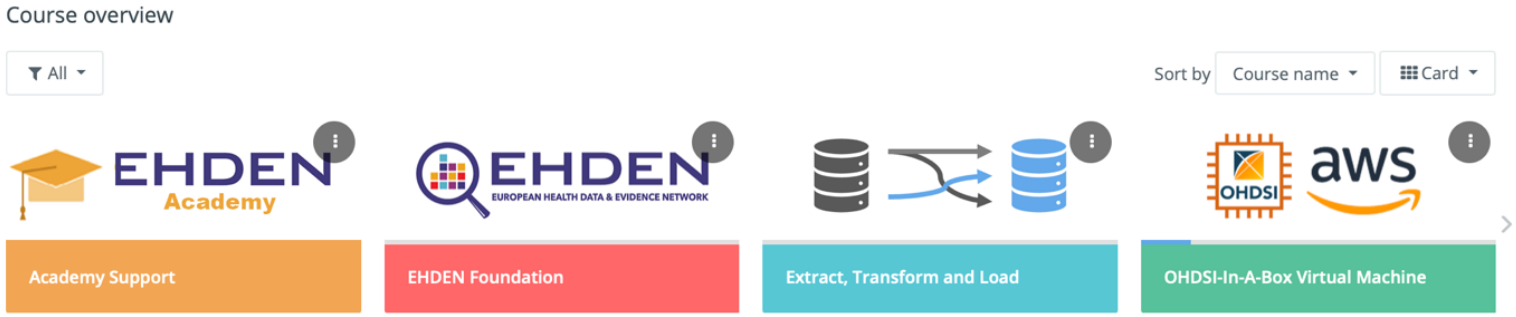
Training

1) EHDEN Foundation: Introduction to IMI, EHDEN, OHDSI
2) OHDSI-IN-A-BOX Virtual Machine
3) OMOP CDM and Standardized Vocabularies
4) Extract, Transform and Load
5) Analytical Infrastructure

Certification

- Final certification will contain a two days face-to-face meeting at the Erasmus MC in Rotterdam with all SMEs in the current batch. Multiple persons per SME can participate.
- Final assessment will contain a mapping exercise and installation of the Analytical Infrastructure.

More course will be added in the EHDEN Academy in the near future.



Open Call for Data Partners

- Draft Call Description has been made available on the website for public review since July. Pilot call opened Sept 1st and closed Sept 15th. Multiple Calls during the project for a total amount of 17 Million Euro financial support.

- Different types of grants (max 100.000 Euro):
  - Create new Data Transformation and Analytical Infrastructure
  - Revise Existing Data Transformation and Analytical Infrastructure
  - Inspect Completed Data Transformation and Analytical Infrastructure

- Data Partners from EU Member States and H2020 countries can apply through online application portal.

- X Data Partners showed interest in mapping
- X Applications Submitted
- X Countries
- Inpatient, Outpatient, Registry, etc.
- X number of patient records

For more information about the Open Calls see the EHDEN website: www.ehden.eu

Work Package Structure

WP1: Evidence Workflow Development

Incorporating the use cases for supporting development and validation of the EHDEN socio-technical approach, inclusive of BD4BO projects

WP2: Outcome Driven Healthcare

Related to all activities specific to e.g. BD4BO projects outcome focus, and ICHOM standards incorporation

WP3: Personalized Medicine

Focusing on the support of outcomes/value based healthcare, inclusive of clinical prediction models, with the incorporation of 'novel' patient data

WP4: Technical Implementation

Key priority is socio-technical development of the EHDEN federated framework and relevant services

WP5: Data Workflow Implementation & Service Deployment

Development, oversight and evaluation of the ecosystem development from SME qualification/ certification to data source engagement, OMOP CDM mapping and evaluation

WP6: Outreach and Sustainability

Ensuring the development of value propositions for key stakeholders, and developing the sustainable operational model for EHDEN during and post IMI phase

WP7: Project Management and Dissemination

Concentrating on intra-project project management, internal communications and external dissemination, and responding to IMI deliverables

QUICK UPDATES

- Data Quality Tool Development
- Portal Development to bring together multiple tools, e.g. Database Catalogue, Arachne Central, Atlas, EHDEN Academy
- Database Catalogue containing extrinsic and intrinsic meta data and visualisation on Database and Network level (**see Forum Post**)
- QueryLibrary developments for community training (200+ queries): https://github.com/OHDSI/QueryLibrary
- Tantalus vocabulary comparison tool: https://github.com/OHDSI/Tantalus
- Mapping of the Article 57th Database of European Medicines Agency (X % of codes currently mapped)
- Methods Research, e.g. Heterogeneity of Treatment Effect Package: https://github.com/OHDSI/XXXX (see poster and Shiny App)

ADD SCREENSHOTS

EHDEN

EUROPEAN HEALTH DATA & EVIDENCE NETWORK

Oxford Study-a-thon

EHDEN and OHDSI in Action

imi innovative medicines initiative

efpia

OHDSI

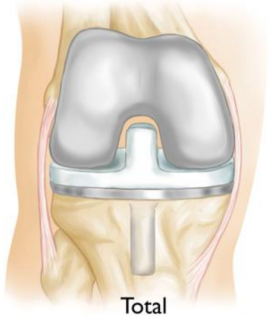
OBSERVATIONAL HEALTH DATA SCIENCES AND INFORMATICS

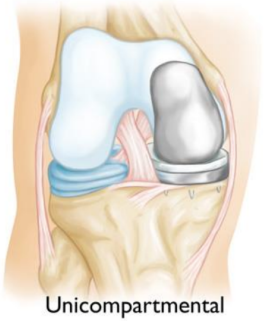
The Oxford Study-Athon

(based on true events)

Our journey with OHDSI and EHDEN to real-world useful evidence

Important clinical question





Patient-level data in CDM

Data partners standardized to OMOP CDM:
Iqvia
Janssen

ATLAS

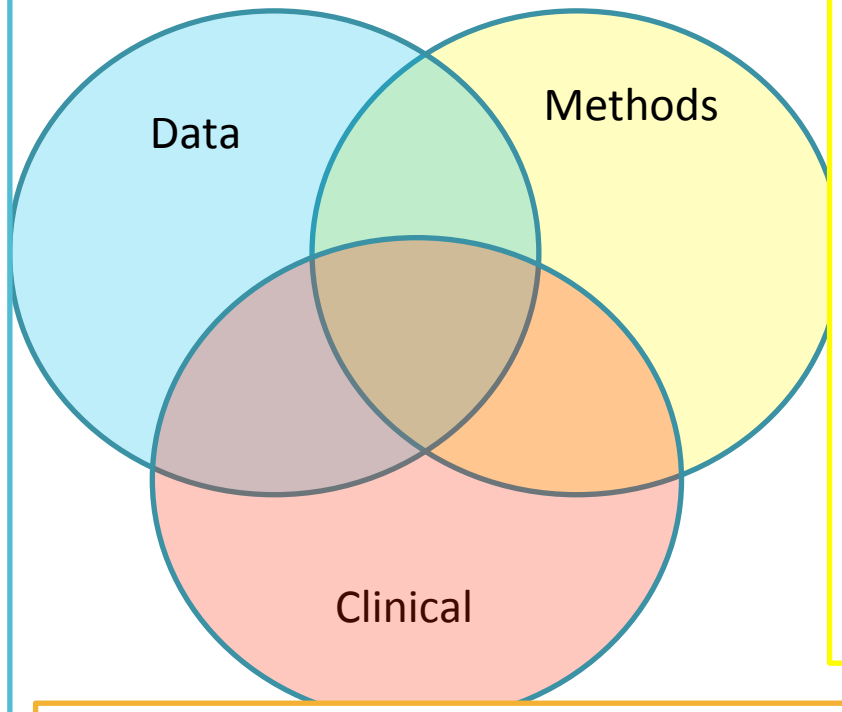
Standardized analysis tools from OHDSI

Reliable evidence

Valuable clinical answers disseminated to medical decision-makers

What we needed in the mix …

Hands-on knowledge of 1+ data source/s, including its structure and content, the provenance of the underlying population and data capture process, data quality issues and temporal variability, so that you can responsibly use the data to generate reliable evidence and recognize its limitations



Hands-on knowledge in designing studies and executing statistical methods to generate aggregate summary statistics from patient-level data. Different expertise required for clinical characterization, patient-level prediction, and population-level effect estimation

Direct knowledge of the diagnosis, treatment, and management of severe knee OA, including healthcare delivery, natural history and patient prognosis

Expertise required

- Clinical knowledge in knee oa/arthroplasty?
- UK electronic health records (THIN)?
- US claims (MarketScan, Optum, PharMetrics)?
- OHDSI tools?
- R programming?
- Literature review?
- Publication writing?

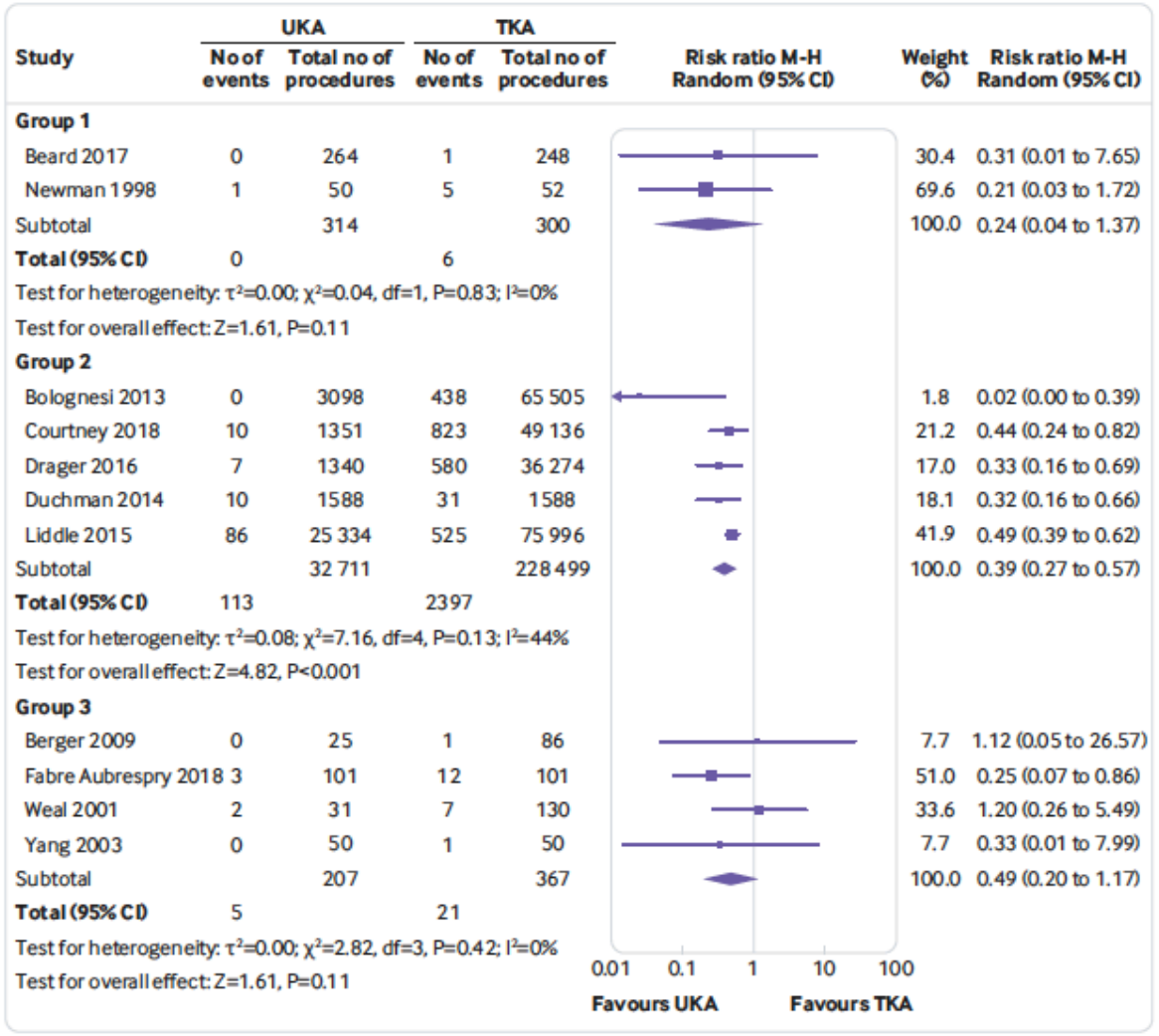
Who has all of these prerequisites?

THE VOTED RESEARCH QUESTION …

"To compare the risk of **post-operative complications (infection, venous thrombo-embolism, mortality) and long-term implant revision** between **unicompartmental** *vs* **total knee replacement**."

What we knew before we started …

- N = 60 acceptable quality studies
- From 1998 to 2018 (20 years of research!!)
- Reduced risk of VTE with UKR



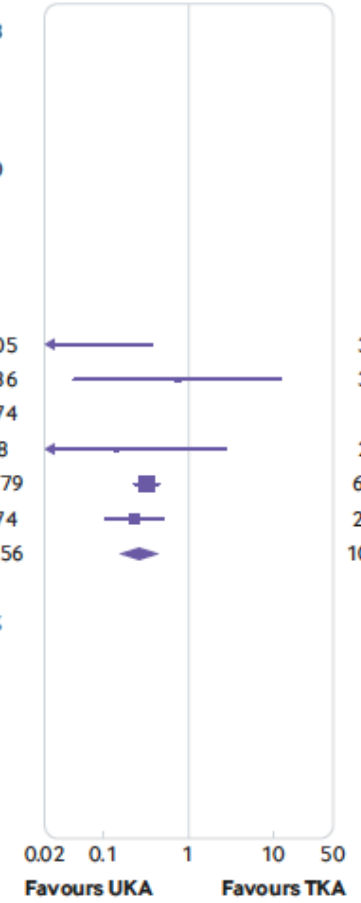
Study	UKA No of events	UKA Total no of procedures	TKA No of events	TKA Total no of procedures	Risk ratio M-H Random (95% CI)	Weight (%)	Risk ratio M-H Random (95% CI)
Group 1							
Beard 2017	0	264	1	248		30.4	0.31 (0.01 to 7.65)
Newman 1998	1	50	5	52		69.6	0.21 (0.03 to 1.72)
Subtotal		314		300		100.0	0.24 (0.04 to 1.37)
Total (95% CI)	0		6				
Test for heterogeneity: τ^2=0.00; χ^2=0.04, df=1, P=0.83; I^2=0%							
Test for overall effect: Z=1.61, P=0.11							
Group 2							
Bolognesi 2013	0	3098	438	65 505		1.8	0.02 (0.00 to 0.39)
Courtney 2018	10	1351	823	49 136		21.2	0.44 (0.24 to 0.82)
Drager 2016	7	1340	580	36 274		17.0	0.33 (0.16 to 0.69)
Duchman 2014	10	1588	31	1588		18.1	0.32 (0.16 to 0.66)
Liddle 2015	86	25 334	525	75 996		41.9	0.49 (0.39 to 0.62)
Subtotal		32 711		228 499		100.0	0.39 (0.27 to 0.57)
Total (95% CI)	113		2397				
Test for heterogeneity: τ^2=0.08; χ^2=7.16, df=4, P=0.13; I^2=44%							
Test for overall effect: Z=4.82, P<0.001							
Group 3							
Berger 2009	0	25	1	86		7.7	1.12 (0.05 to 26.57)
Fabre Aubrespry 2018	3	101	12	101		51.0	0.25 (0.07 to 0.86)
Weal 2001	2	31	7	130		33.6	1.20 (0.26 to 5.49)
Yang 2003	0	50	1	50		7.7	0.33 (0.01 to 7.99)
Subtotal		207		367		100.0	0.49 (0.20 to 1.17)
Total (95% CI)	5		21				
Test for heterogeneity: τ^2=0.00; χ^2=2.82, df=3, P=0.42; I^2=0%							
Test for overall effect: Z=1.61, P=0.11							

Fig 3 | Forest plot comparing risk of venous thromboembolism after unicompartmental (UKA) versus total knee replacement (TKA). Also appears in the supplementary material as supplementary figure 5. M-H=Mantel-Haenszel test

What we knew before we started (2) …

- Possibly a reduction in post-operative mortality …
- [although little data available on this]

Study	UKA No of events	UKA Total no of procedures	TKA No of events	TKA Total no of procedures	Risk ratio M-H Random (95% CI)	Weight (%)	Risk ratio M-H Random (95% CI)
Group 1							
Beard 2017	0	260	0	248			Not estimable
Costa 2011	0	34	0	34			Not estimable
Newman 1998	0	50	0	52			Not estimable
Sun 2010	0	28	0	38			Not estimable
Subtotal		314		300			
Total (95% CI)	0		6				
Test for heterogeneity: Not applicable							
Test for overall effect: Not applicable							
Group 2							
Bolognesi 2013	0	3098	455	65 505		3.3	0.02 (0.00 to 0.37)
Courtney 2018	0	1351	24	49 136		3.2	0.74 (0.05 to 12.9)
Drager 2016	0	1340	0	36 274			Not estimable
Duchman 2014	0	1588	3	1588		2.9	0.14 (0.01 to 2.76)
Hunt 2014	33	40,428	1,183	467779		61.6	0.32 (0.23 to 0.46)
Liddle 2015	7	25358	90	76 074		29.1	0.23 (0.11 to 0.50)
Subtotal		75,163		696356		100.0	0.27 (0.16 to 0.46)
Total (95% CI)	40		1755				
Test for heterogeneity: τ^2=0.08; χ^2=5.04, df=4, P=0.13; I^2=21%							
Test for overall effect: Z=5.02, P<0.001							
Group 3							
Yang 2003	0	50	0	50			Not estimable
Subtotal		50		50			
Total (95% CI)	0		0				
Test for heterogeneity: Not applicable							
Test for overall effect: Not applicable							



g 4 | Forest plot comparing risk of early mortality (at 45 days) after unicompartmental (UKA) versus total knee placement (TKA). Also appears in the supplementary material as supplementary figure 7. M-H=Mantel-Haenszel test

What we knew before we started (3) …

- Loads of data on pain and function and PROMs
- Most pointing towards a further improvement with UKR vs TKR

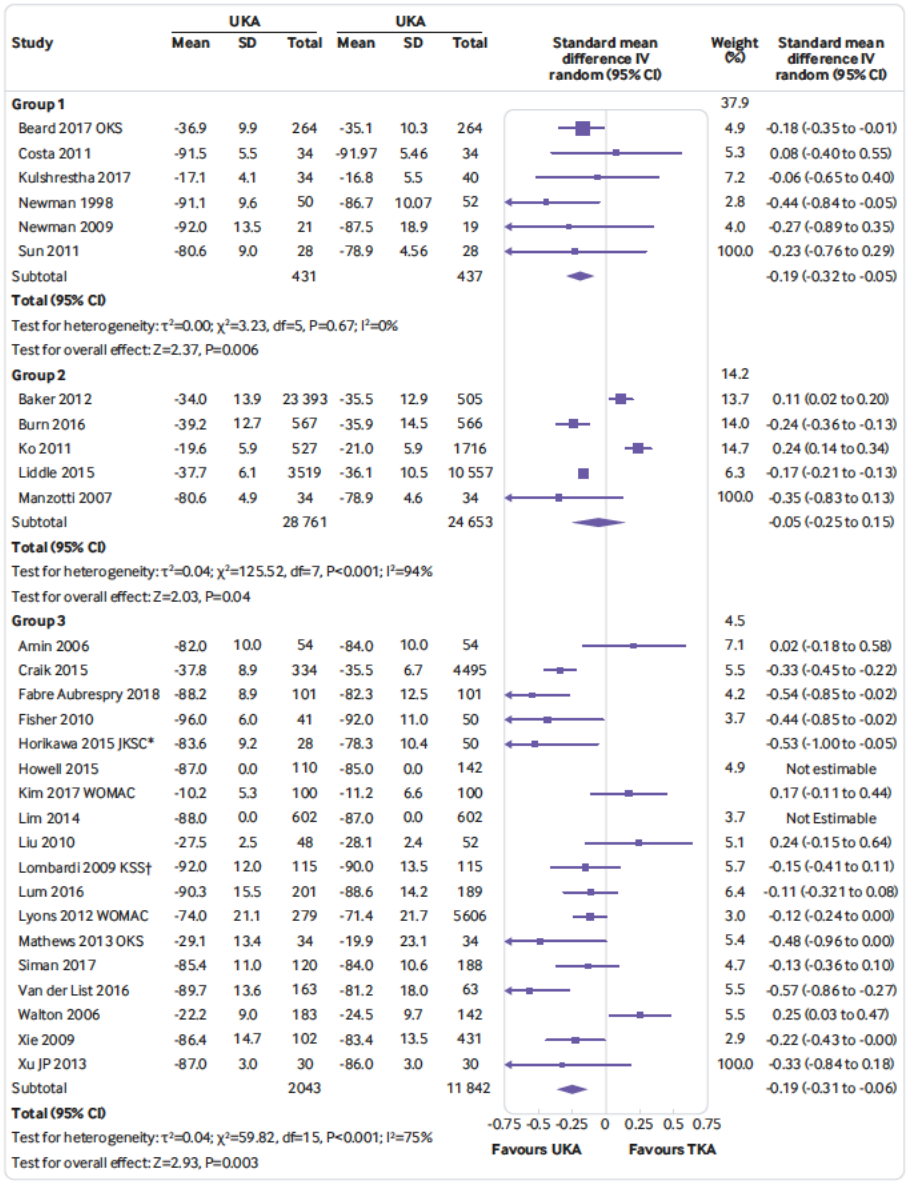
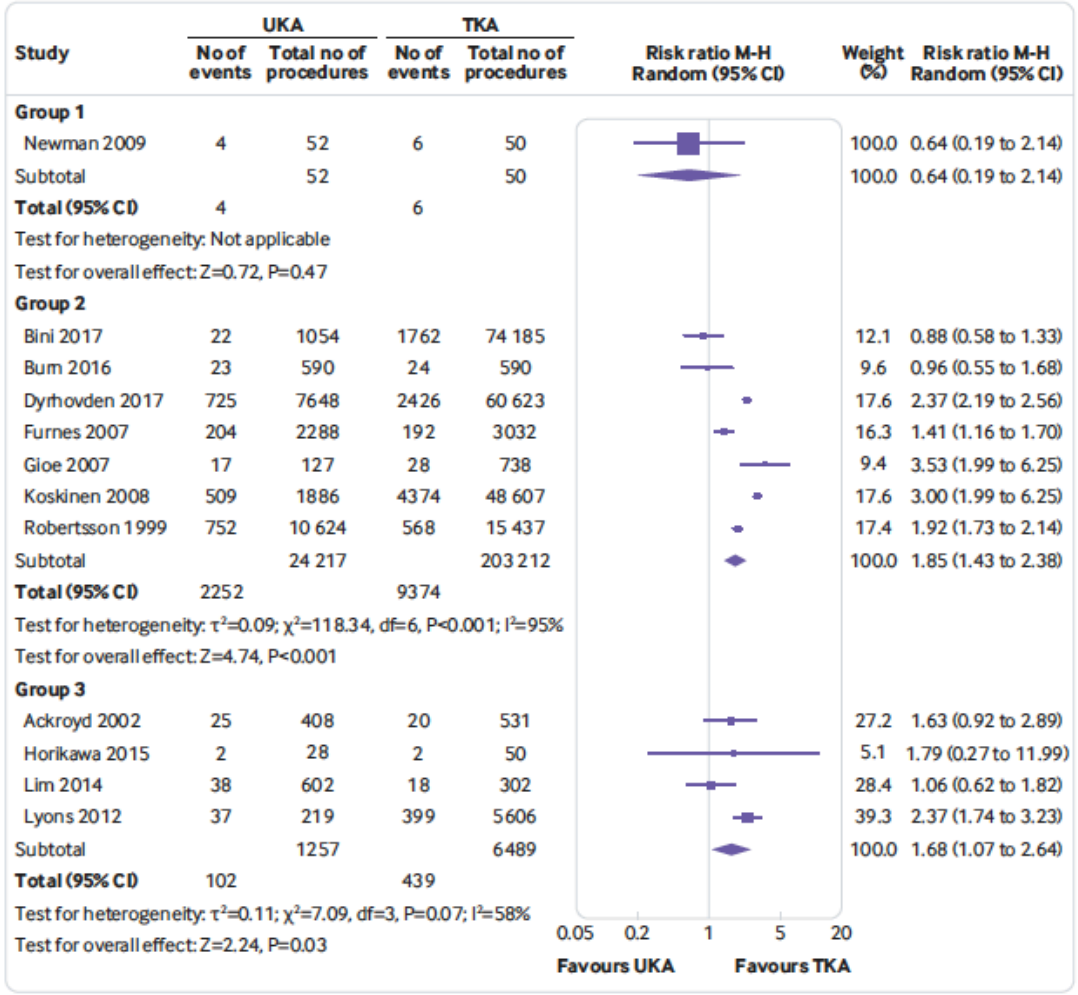


Fig 5 | Forest plot comparing combined pain and function measured using knee specific patient reported outcome measures after unicompartmental (UKA) versus total knee replacement (TKA). Also appears in the supplementary material as supplementary figure 10. IV=inverse variance weighting; OKS=Oxford knee score; JKSC=Japanese knee osteoarthritis score; WOMAC=Western Ontario McMaster Universities osteoarthritis index; KSS=Knee Society Score; JOA=Japanese orthopaedic association score

What we knew before we started (4) …

- … BUT
- An increase in long-term revision risk



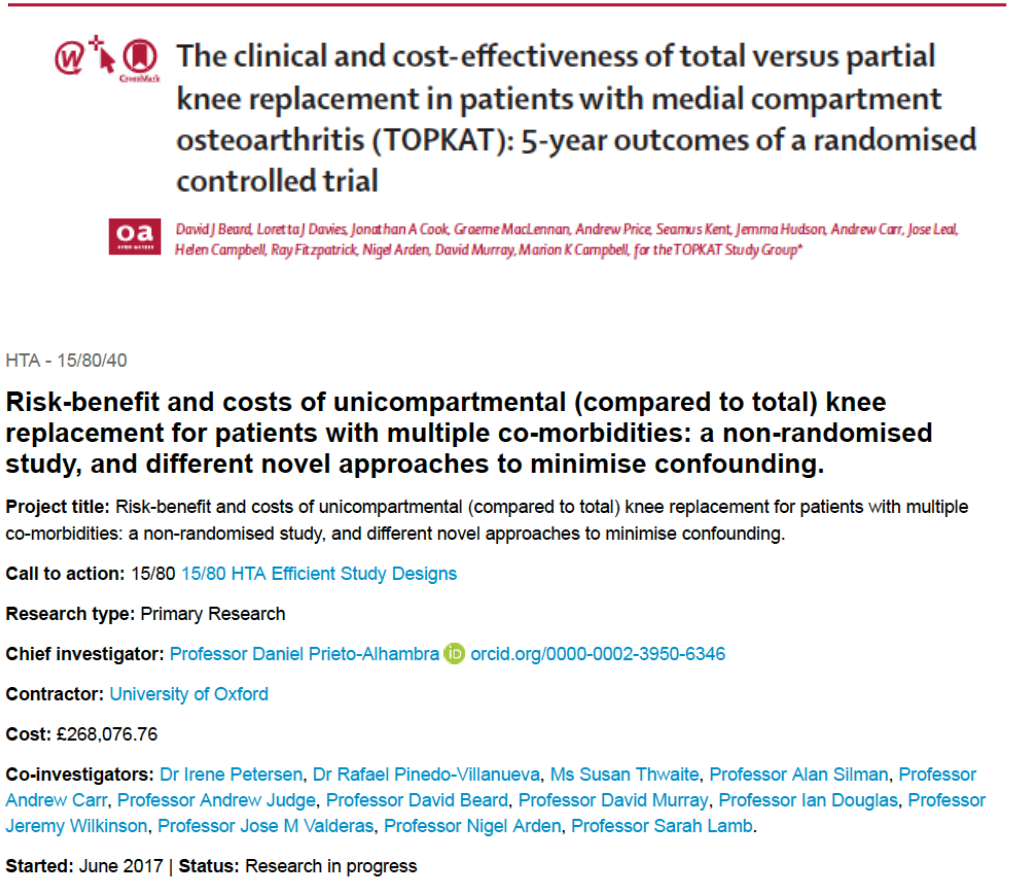
Study	UKA No of events	UKA Total no of procedures	TKA No of events	TKA Total no of procedures	Risk ratio M-H Random (95% CI)	Weight (%)	Risk ratio M-H Random (95% CI)
Group 1							
Newman 2009	4	52	6	50		100.0	0.64 (0.19 to 2.14)
Subtotal		52		50		100.0	0.64 (0.19 to 2.14)
Total (95% CI)	4		6				
Test for heterogeneity: Not applicable							
Test for overall effect: Z=0.72, P=0.47							
Group 2							
Bini 2017	22	1054	1762	74 185		12.1	0.88 (0.58 to 1.33)
Burn 2016	23	590	24	590		9.6	0.96 (0.55 to 1.68)
Dyrhovden 2017	725	7648	2426	60 623		17.6	2.37 (2.19 to 2.56)
Furnes 2007	204	2288	192	3032		16.3	1.41 (1.16 to 1.70)
Gioe 2007	17	127	28	738		9.4	3.53 (1.99 to 6.25)
Koskinen 2008	509	1886	4374	48 607		17.6	3.00 (1.99 to 6.25)
Robertsson 1999	752	10 624	568	15 437		17.4	1.92 (1.73 to 2.14)
Subtotal		24 217		203 212		100.0	1.85 (1.43 to 2.38)
Total (95% CI)	2252		9374				
Test for heterogeneity: τ^2=0.09; χ^2=118.34, df=6, P<0.001; I^2=95%							
Test for overall effect: Z=4.74, P<0.001							
Group 3							
Ackroyd 2002	25	408	20	531		27.2	1.63 (0.92 to 2.89)
Horikawa 2015	2	28	2	50		5.1	1.79 (0.27 to 11.99)
Lim 2014	38	602	18	302		28.4	1.06 (0.62 to 1.82)
Lyons 2012	37	219	399	5606		39.3	2.37 (1.74 to 3.23)
Subtotal		1257		6489		100.0	1.68 (1.07 to 2.64)
Total (95% CI)	102		439				
Test for heterogeneity: τ^2=0.11; χ^2=7.09, df=3, P=0.07; I^2=58%							
Test for overall effect: Z=2.24, P=0.03							

Fig 7 | Forest plot comparing incidence of revision at 10 years after unicompartmental (UKA) versus total knee replacement (TKA). Also appears in the supplementary material as supplementary figure 16. M-H=Mantel-Haenszel test

What we knew before we started (5) …

- Caveats with quality of these 60 papers (and 20y) of data (mostly observational and from different sources)

- NIHR UK-funded
  - 1 surgical RCT (TOPKAT)
  - 1 observational study (UTMOST)



The clinical and cost-effectiveness of total versus partial knee replacement in patients with medial compartment osteoarthritis (TOPKAT): 5-year outcomes of a randomised controlled trial

David J Beard, Loretta J Davies, Jonathan A Cook, Graeme MacLennan, Andrew Price, Seamus Kent, Jemma Hudson, Andrew Carr, Jose Leal, Helen Campbell, Ray Fitzpatrick, Nigel Arden, David Murray, Marion K Campbell, for the TOPKAT Study Group*

HTA - 15/80/40

Risk-benefit and costs of unicompartmental (compared to total) knee replacement for patients with multiple co-morbidities: a non-randomised study, and different novel approaches to minimise confounding.

Project title: Risk-benefit and costs of unicompartmental (compared to total) knee replacement for patients with multiple co-morbidities: a non-randomised study, and different novel approaches to minimise confounding.

Call to action: 15/80 15/80 HTA Efficient Study Designs

Research type: Primary Research

Chief investigator: Professor Daniel Prieto-Alhambra orcid.org/0000-0002-3950-6346

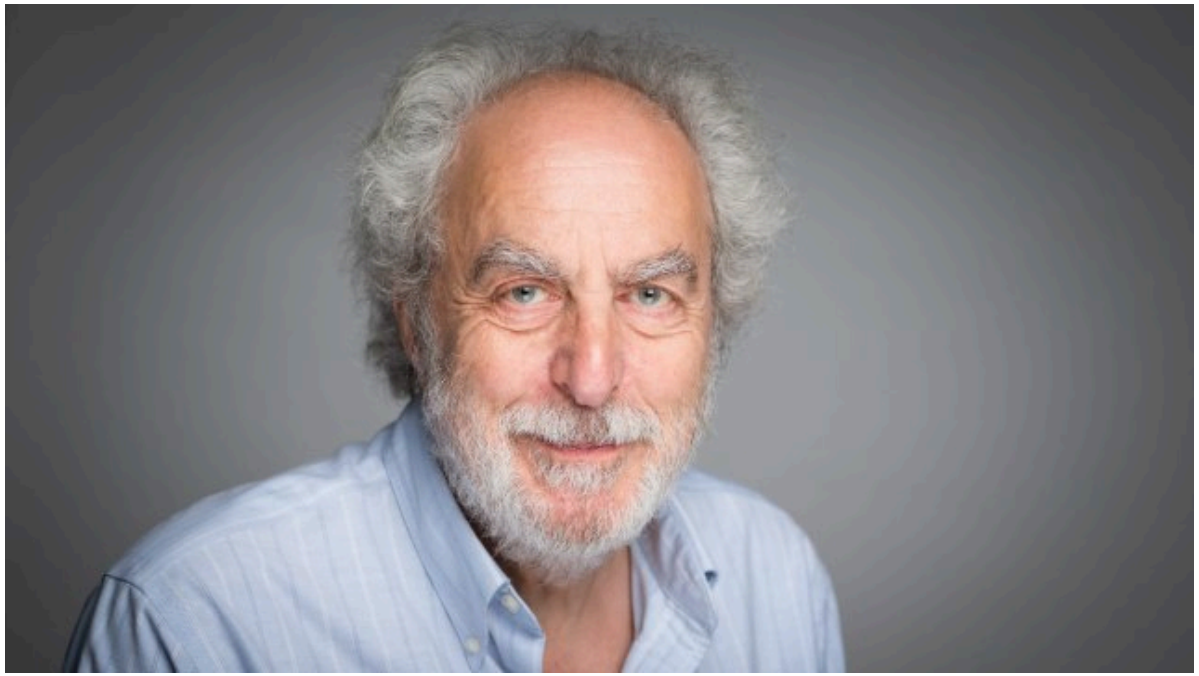
Contractor: University of Oxford

Cost: £268,076.76

Co-investigators: Dr Irene Petersen, Dr Rafael Pinedo-Villanueva, Ms Susan Thwaite, Professor Alan Silman, Professor Andrew Carr, Professor Andrew Judge, Professor David Beard, Professor David Murray, Professor Ian Douglas, Professor Jeremy Wilkinson, Professor Jose M Valderas, Professor Nigel Arden, Professor Sarah Lamb.

Started: June 2017 | **Status:** Research in progress

MOTIVATION



"We need less research, better research,
And research done for the right reasons"

Ie, CAN WE DO IN A WEEK AND 1 STUDY WHAT HAS TAKEN SO FAR 20+ YEARS, 60+ PAPERS AND LOADS OF CASH?

Intended for healthcare professionals

thebmj

Editorials

The scandal of poor medical research

BMJ 1994 ; 308 doi:
https://doi.org/10.1136/bmj.308.6924.283
(Published 29 January 1994)
Cite this as: *BMJ* 1994;308:283

Linked Opinion
Richard Smith: Medical research—still a scandal

D G Altman

We need less research, better research, and research done for the right reasons

RATIONALE

- **Surgical/Device RCTs are rare, costly, and difficult:**
  - *Logistics (eg "blinding")*
  - *Ethics (placebo/sham surgery)*
  - *Not always required (by regulators)*

- **New US and EU regulation will increase the need for observational data in this field**

RATIONALE (2)

- **Methodological challenges in the area of surgery/device observational research**
  - *Confounding due to patient characteristics*
  - *… but also due to **surgeon/centre features***
  - *Modelling difficulties (propensity score building to include surgeon/ hospital characteristics)*

- **Little experience/investment to date …**
- **EHDEN provides an unprecedented opportunity**

BACKGROUND – UKR vs TKR

- **UKR** is a less invasive, partial replacement, of the knee
- **TKR** is an established procedure with excellent results in terms of safety and effectiveness

- **(Some) surgeons prefer UKR in younger, fit patients**

BACKGROUND (2) – UKR vs TKR

- **But research to date suggests UKR leads to:**
  - **Less complications**
  - **More revision/s**

- So maybe best for **older patients with complex medical history**

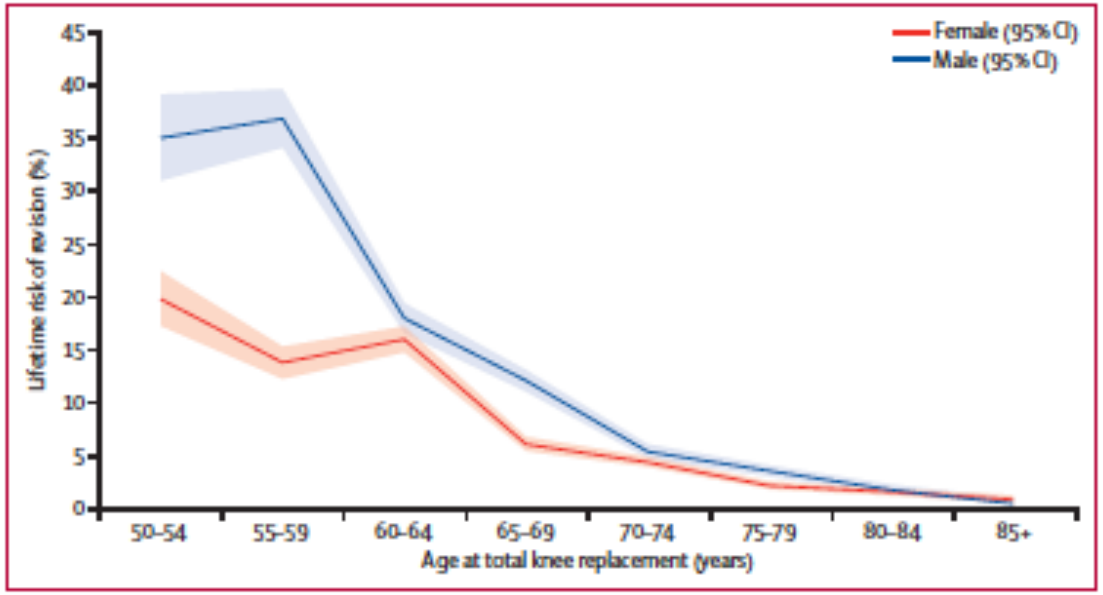


Figure 3: Lifetime risk of revision after total knee replacement
Plot showing estimates of lifetime risk of total knee replacement revision against age at the time of primary total knee replacement surgery (in 5-year age bands) and stratified by sex (results adjusted for lost and censored population).

BACKGROUND (3) – UKR vs TKR

- **An on going surgical RCT comparing UKR vs TKR is reporting 5-year data published NOW in the Lancet!!! [Beard D et al. Lancet]**
- As usual in RCTs, they have excluded old complex patients with co-morbidity etc (ASA 3+) …
- Also as usual, they are not powered for safety (complications)
- And the trial will be run in specialized treatment centres …

OUR AIMS!

- **Can we 'predict' the TOPKAT results (on complications) before they publish?**

- **And more:**
  - **can we report on the results of UKR (vs TKR) in the older, more complex patients, excluded from TOPKAT?**
  - **Can we predict who is likely to have a post-operative complication following knee replacement surgery**

WE CAN DO THIS IN ONE WEEK (STUDY-A-THON)??

"To compare the **risk** of post-operative **complications** and **mortality** between unicompartmental *vs* total knee replacement."

Monday

Group consensus on the **problem**
Draft cohort definitions

Tuesday

Review clinical characterisation
Draft patient-level prediction design

Wednesday

Review patient-level prediction results
Externally validate prediction model

Thursday

Draft population-level effect estimation design
Review population-level effect estimation diagnostics

Friday

Review of results
Plan for completing **publications**

(EHDEN 1st Study-a-thon, Oxford, December 2018)

First OHDSI-EHDEN Study-Athon!
Our final (refined) research question!!

"To compare the risk of **post-operative complications (infection, revision, and venous thrombo-embolism) and mortality** between **unicompartmental** *vs* **total knee replacement**."

EHDEN
EUROPEAN HEALTH DATA & EVIDENCE NETWORK

Let’s start collaborating!

- Open the shared group notes:

https://docs.google.com/document/d/17Valb33sl64laDq307PpoMZd4drIsVoja0zpYE6ZXe8/edit?usp=sharing

- Ground rules:
  - During group exercises, take all your notes here together
  - During breakout exercises, assign one person in your team to make sure notes are recorded so other groups can learn from our experience

Let's start writing our papers!

- Patient-Level Prediction: https://docs.google.com/document/d/13GlkdulRmU2nbrqM58G2neWPV0U4PoTh8w13UihLgLc/edit?usp=sharing

- Population-Level Effect Estimation:

https://docs.google.com/document/d/1BC6-cBR1by0GNeRc4zatzdSkOOmtvWfMpZrePIn0XaE/edit?usp=sharing

Let's start learning ATLAS!

- Public version from OHDSI (v2.6, simulated data), go to: http://ohdsi.org/web/ATLAS

- Private version from Iqvia (v2.4, THIN data), go to: https://training.atlasplus.imshealth.com

SO WHAT DID WE LEARN (by Friday!!)

- Population-level effect estimation:

  http://data.ohdsi.org/UkaTkaSafetyEffectiveness/

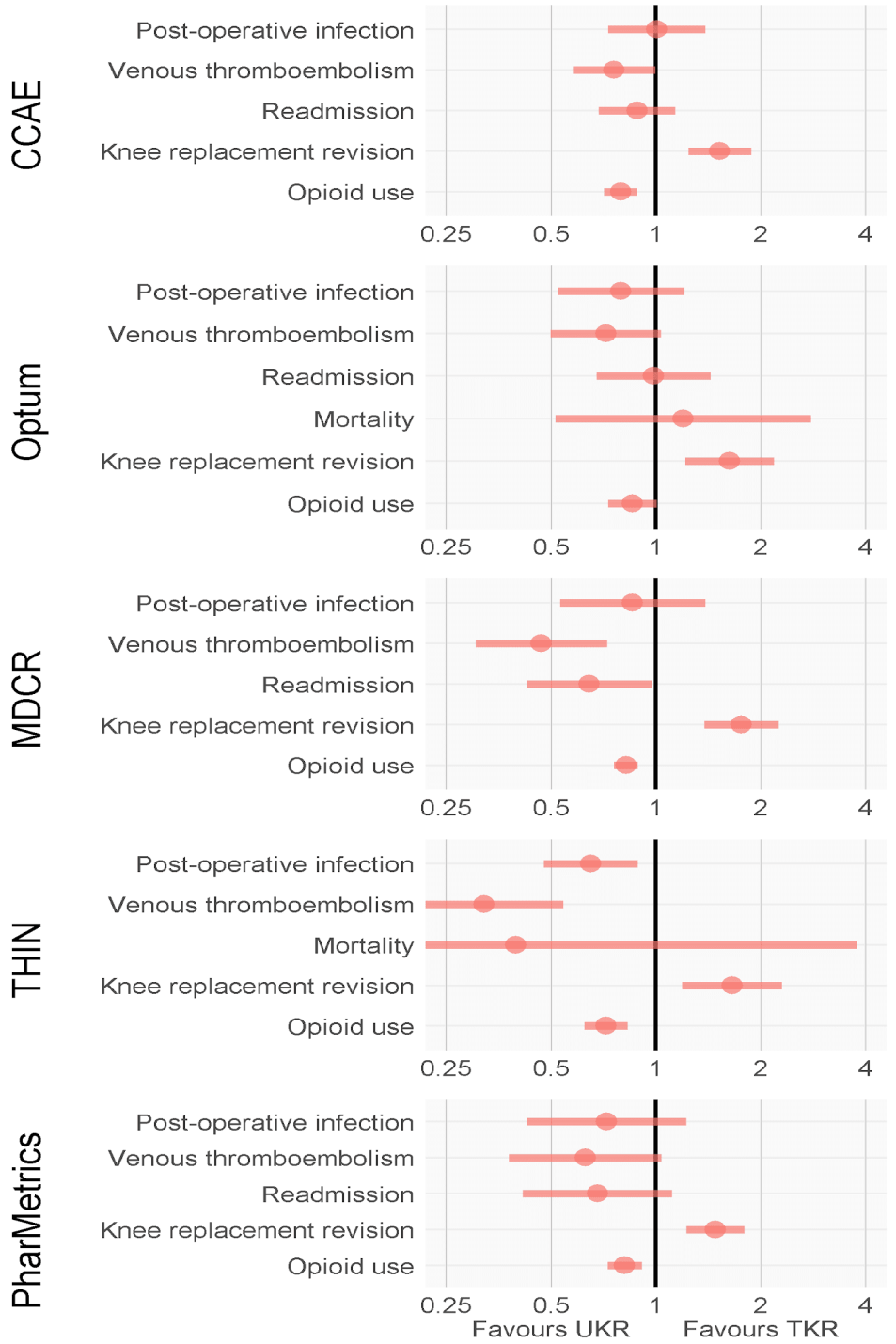
- Patient-level prediction

  http://data.ohdsi.org/oxfordMortalityExternalValidation/

OUR WEEK vs 20y of research
OX Study-a-thon vs BMJ Syst Rev

- VTE
  - RR 0.49 [0.20 to 1.17] (20 y)
  - vs HR 0.62 [0.36-0.96] (1 week)

- Long-term revision
  - RR 1.68 [1.07 to 2.64] (20y)
  - vs HR 1.51 to 2.16 (1 week)

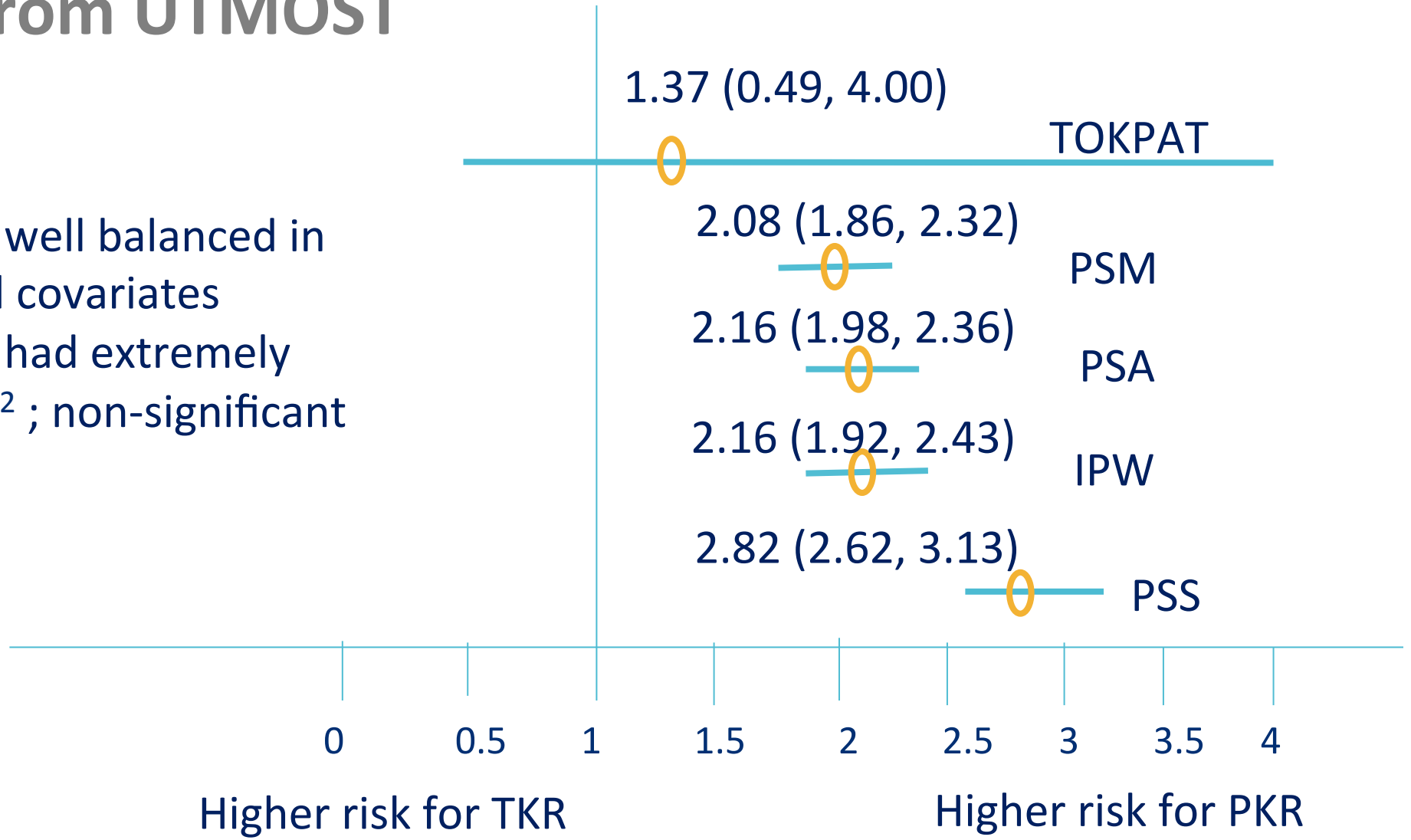


OUR WEEK vs a £3m trial [D Beard et al. Lancet 2019]

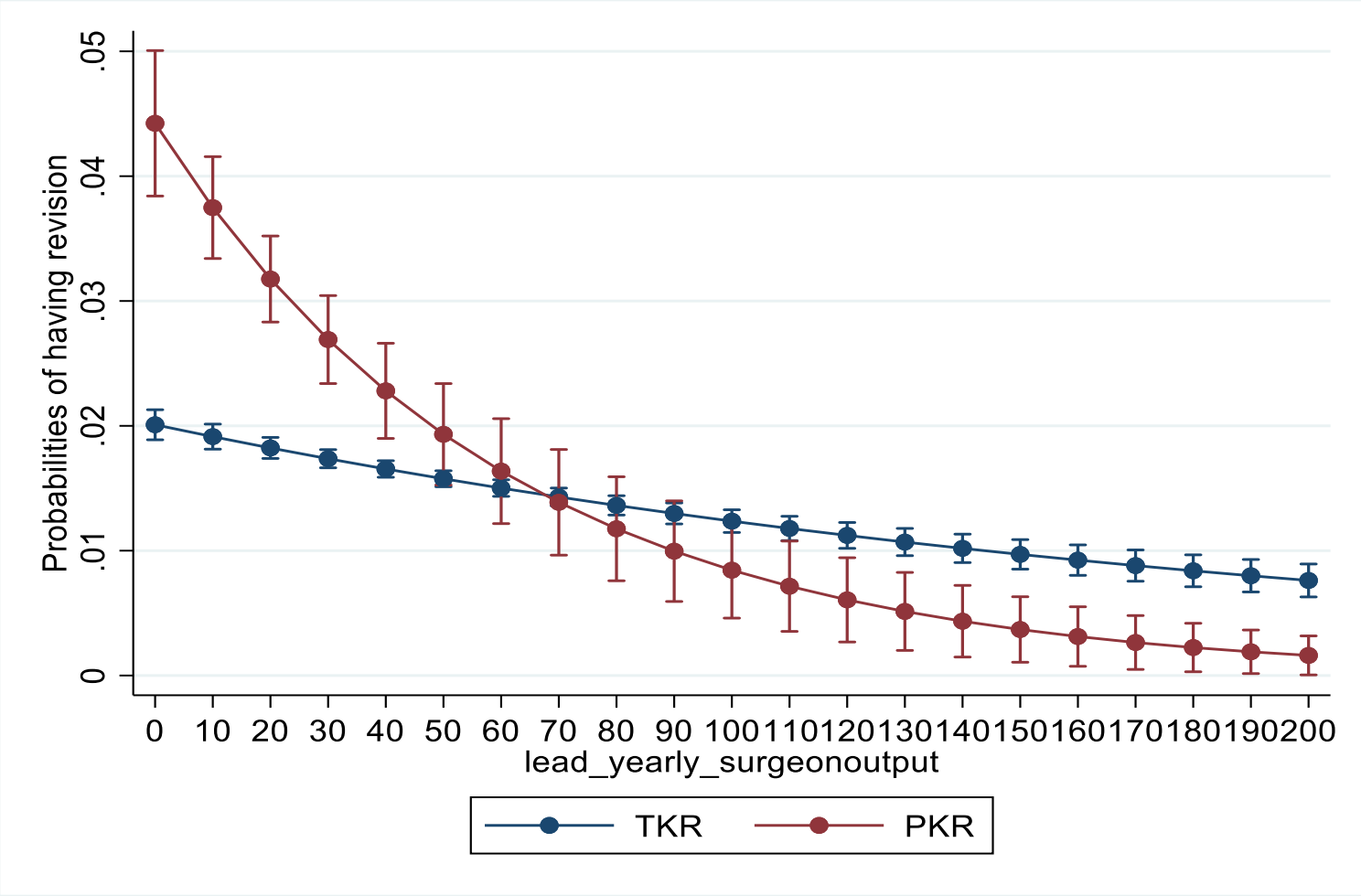
- Small improvement in pain/function with UKR in TOPKAT vs Small reduction in opioid/s use in Study-a-thon
- No power for safety in TOPKAT vs findings compatible w 20y of data in Study-a-thon
- … Yet revision not significantly increased!! [vs all previous papers]
  - WAS IT ALL A WASTE???!!

Revision risk: confused vs confounding Insights from UTMOST

- All methods well balanced in patient-level covariates
- All methods had extremely small τ^2 & I^2 ; non-significant p-values

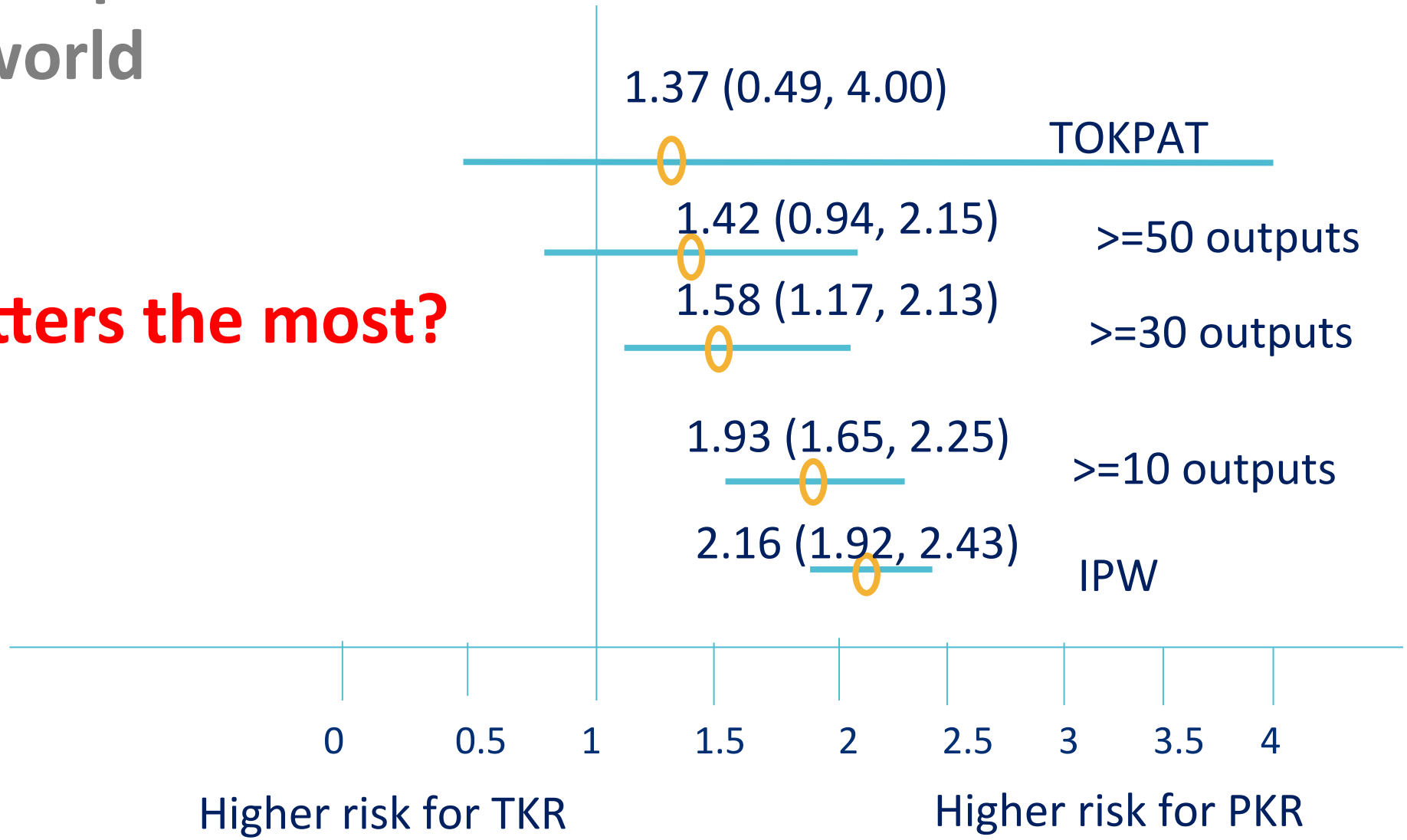


Surgeons' experience (1): effect modifiers



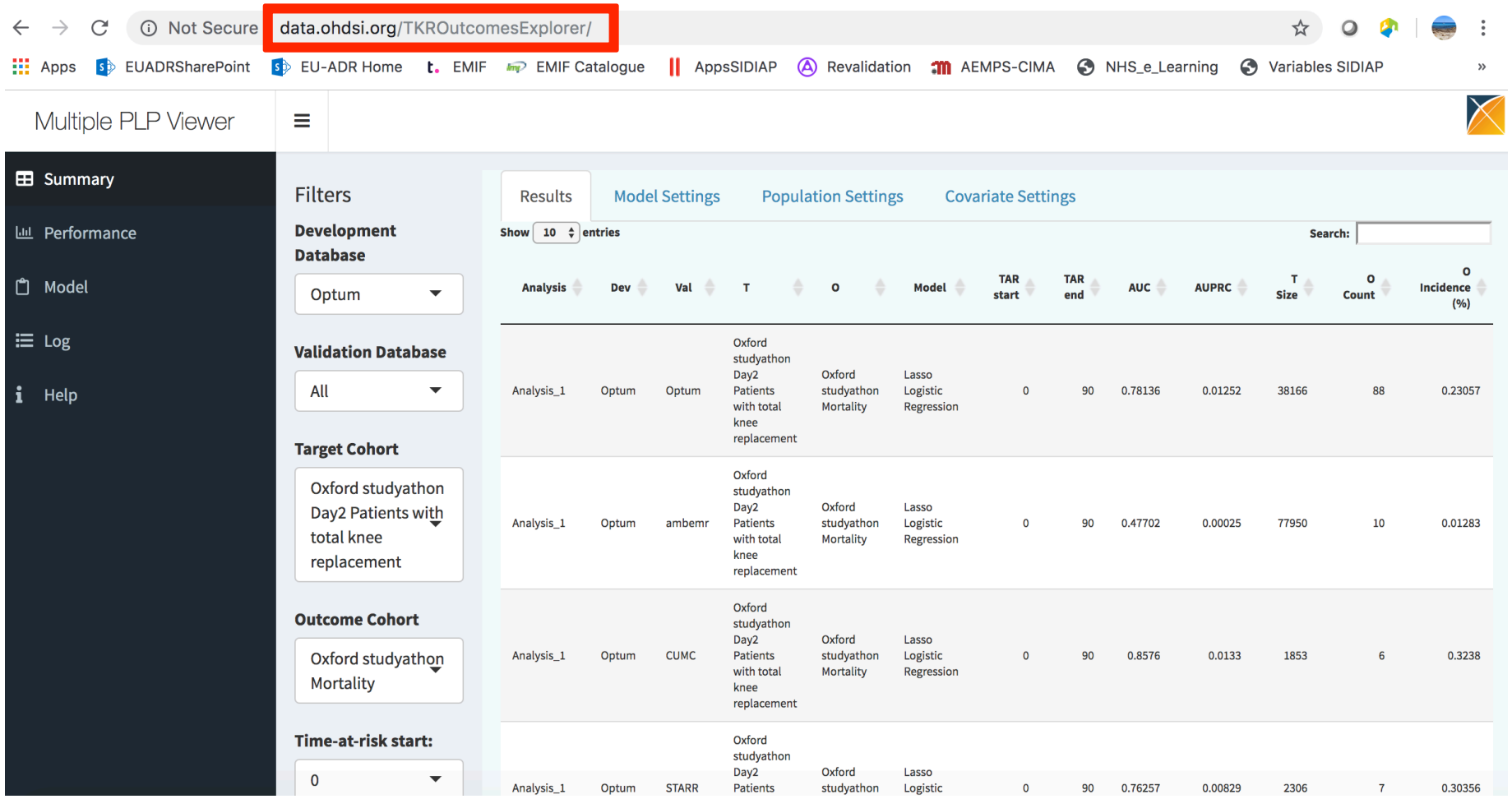
Surgeons' experience in trials vs The real world

What matters the most?



Prediction…

Predicting post-op mortality



Analysis	Dev	Val	T	O	Model	TAR start	TAR end	AUC	AUPRC	T Size	O Count	O Incidence (%)
Analysis_1	Optum	Optum	Oxford studyathon Day2 Patients with total knee replacement	Oxford studyathon Mortality	Lasso Logistic Regression	0	90	0.78136	0.01252	38166	88	0.23057
Analysis_1	Optum	ambemr	Oxford studyathon Day2 Patients with total knee replacement	Oxford studyathon Mortality	Lasso Logistic Regression	0	90	0.47702	0.00025	77950	10	0.01283
Analysis_1	Optum	CUMC	Oxford studyathon Day2 Patients with total knee replacement	Oxford studyathon Mortality	Lasso Logistic Regression	0	90	0.8576	0.0133	1853	6	0.3238
Analysis_1	Optum	STARR	Oxford studyathon Day2 Patients	Oxford studyathon	Lasso Logistic	0	90	0.76257	0.00829	2306	7	0.30356

3.Prediction…

Predicting post-op mortality

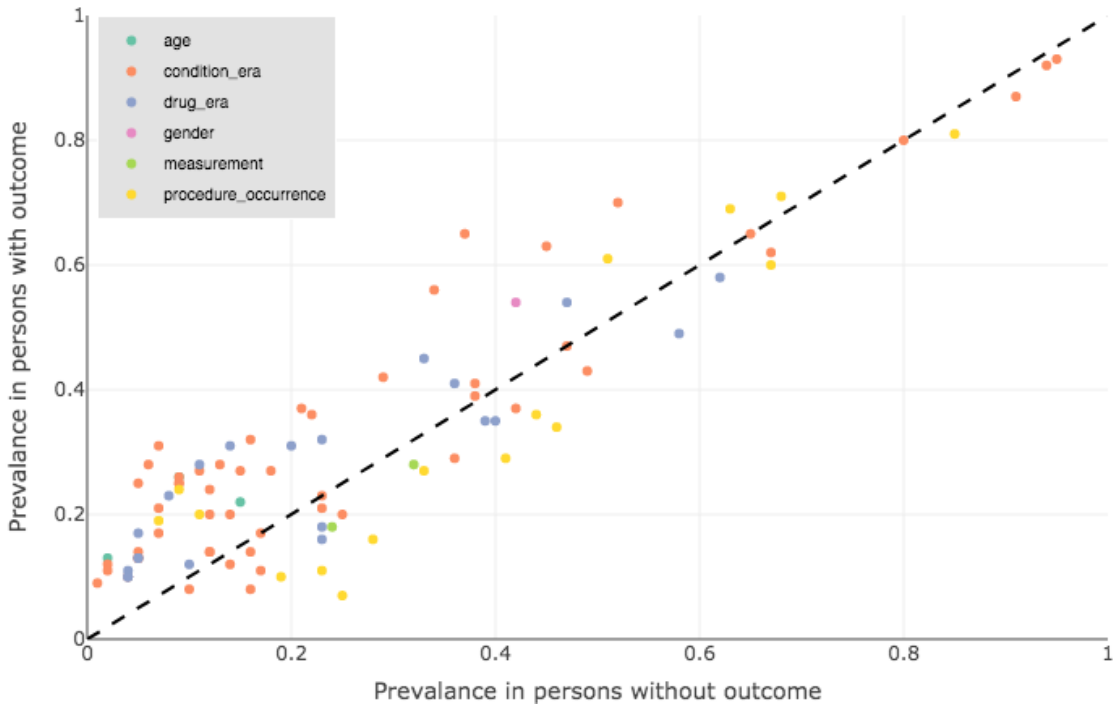
THE MODEL

Model Table

Download Model

Show 10 entries Search:

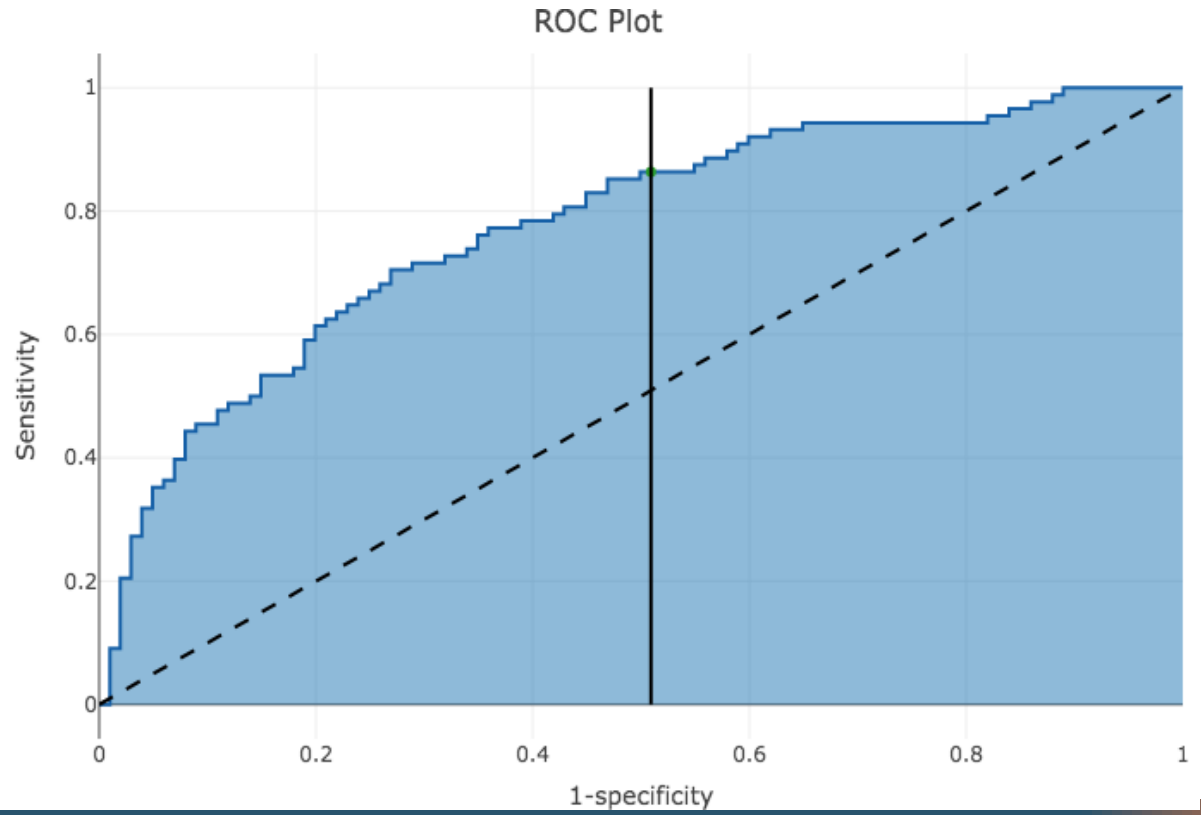
	Covariate Name	Value	Outcome Mean	Non-outcome Mean
1	index month: 1	0	0.1	0.1
2	Charlson index - Romano adaptation	0	3.81	2.16
3	Diabetes Comorbidity Severity Index (DCSI)	0	3.71	1.96
4	CHADS2	0	2.54	1.57
5	CHADS2VASc	0	4.18	2.94
6	visit_occurrence concept count during day -1095 through -1 concept_count relative to index	0	71.99	50.13
7	visit_occurrence concept count during day -365 through -1 concept_count relative to index	0	32.46	24.26
8	index month: 2	0	0.1	0.08
9	index month: 3	0	0.1	0.09
10	index month: 4	0	0.08	0.08



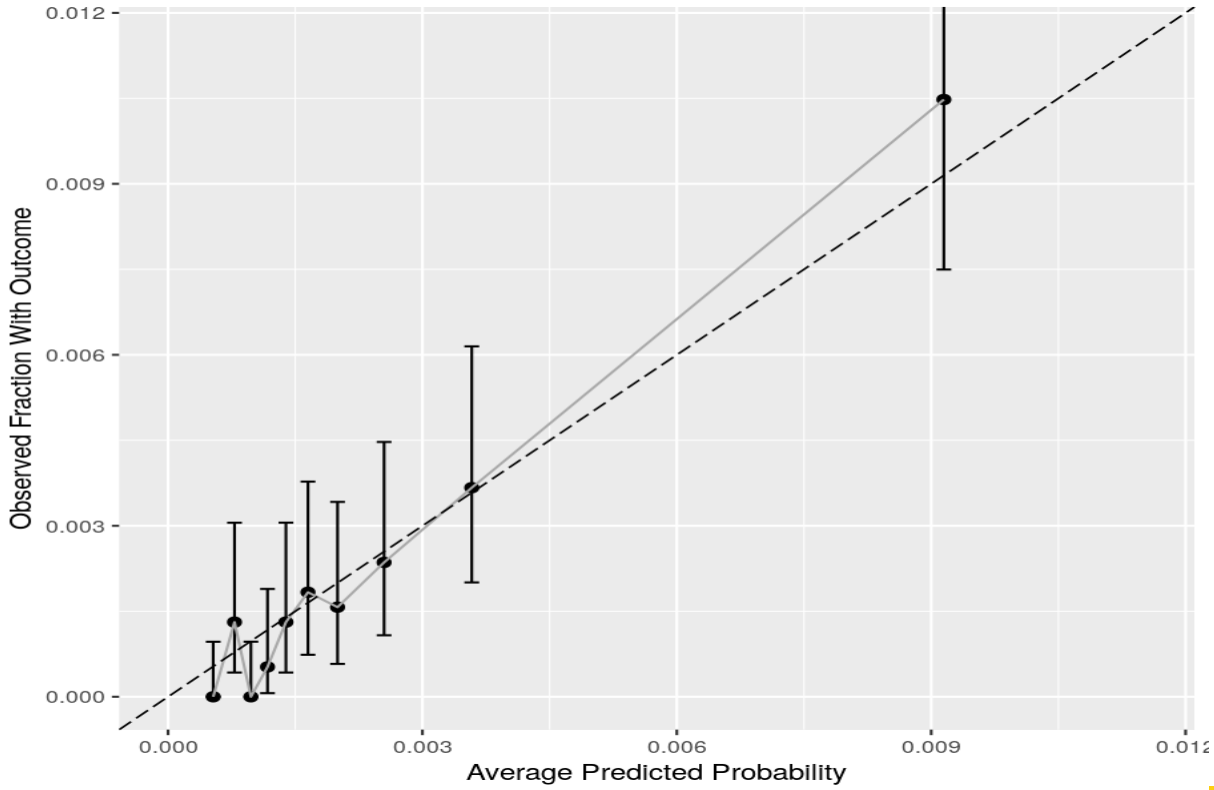
3.Prediction…

Predicting post-op mortality

DISCRIMINATION



CALIBRATION



AND WHAT DID I LEARN (by Friday too!!)

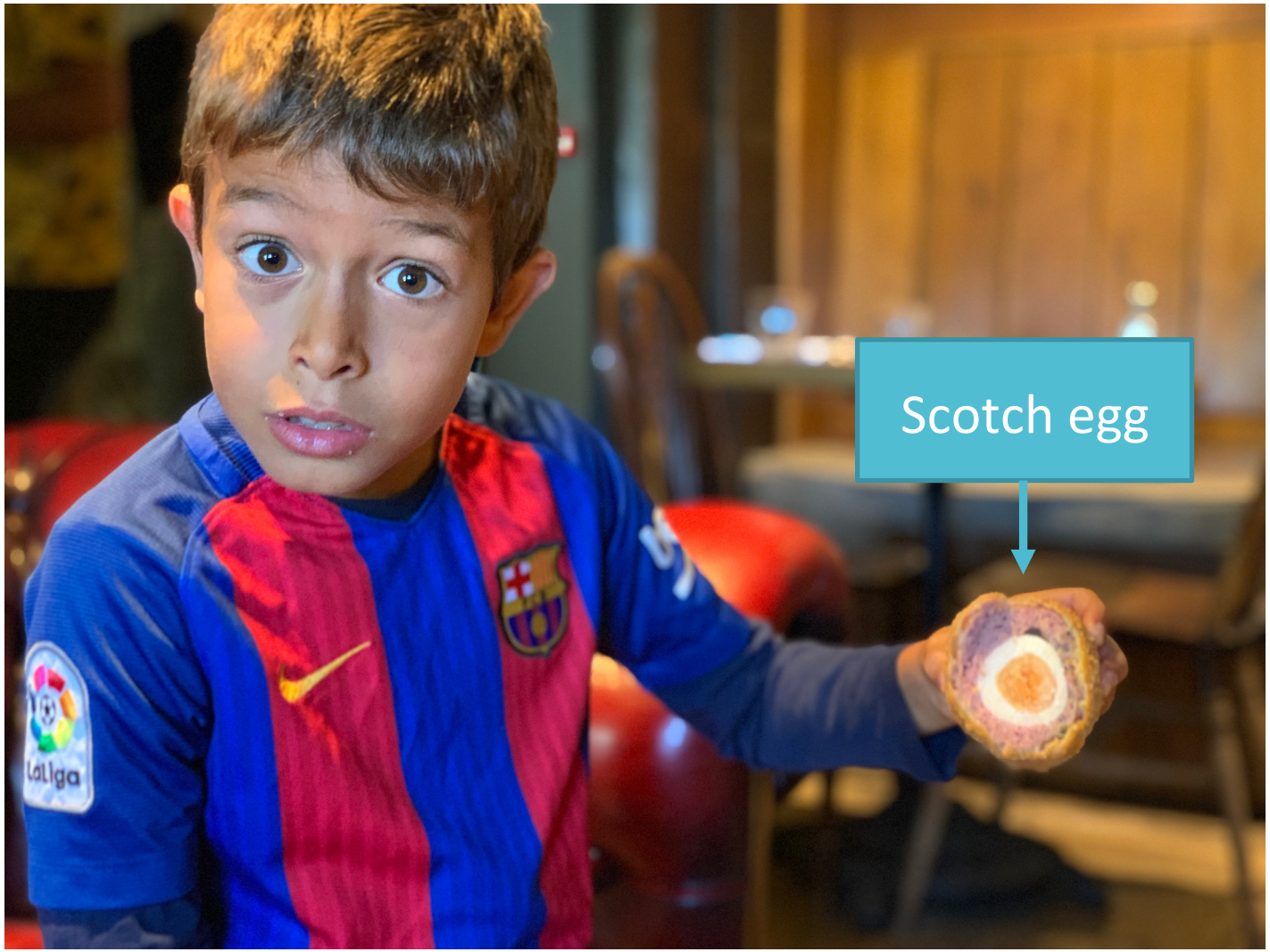
The Oxford Study-Athon

"Why had we not joined the journey earlier?"

Finished in the 1600s

Finished in 1430

Tradition?



Or laziness?

Or maybe we're not as good as some think..

BBC Home News More

NEWS

Family & Education

Oxford top of global university rankings

By Sean Coughlan
BBC News family and education correspondent

11 September 2019

Oxford University has been ranked first in an international league table for the fourth year in a row.

The annual **Times Higher Education world**

Or maybe we're not as good as some think..

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Evening Standard.
WEBSITE OF THE YEAR

News › Politics

Students at Boris Johnson's former Oxford college launch petition to have him banned from campus

SEAN MORRISON | 2 days ago |

Like Click to follow The Evening Standard

The petition calls on Balliol College to publicly condemn the Prime Minister for suspending Parliament (

It’s always hard to start a journey …

But once you find a good boat …

"As you set out for Ithaka

hope your road is a long one,

full of adventure, full of discovery…"

Ithaka, by G Cavafis

An Exciting Journey Ahead

The uptake of the OMOP-CDM and success of OHDSI enables the EHDEN project to build the European eco-system that brings reliable evidence quicker to our patients.

Expanding the Data Network, Community, and the support system with SMEs, will drive the sustainability of the eco-system.

The EHDEN project will continue the collaboration with OHDSI and will invest in further development of the CDM, Vocabularies, ETL tools, analytical tools, DQ tools.

EHDEN
EUROPEAN HEALTH DATA & EVIDENCE NETWORK

OHDSI
OBSERVATIONAL HEALTH DATA SCIENCES AND INFORMATICS

NEED MORE INFORMATION?

All this work would not have been possible without the contribution of many collaborators in EHDEN and OHDSI

Thanks for this great adventure!

EHDEN
EUROPEAN HEALTH DATA & EVIDENCE NETWORK

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