



Scientific poster presentations



The creative revolution - *my* top tips

Lucy Bull

NIHR Doctoral Research Fellow

University of Manchester, UK

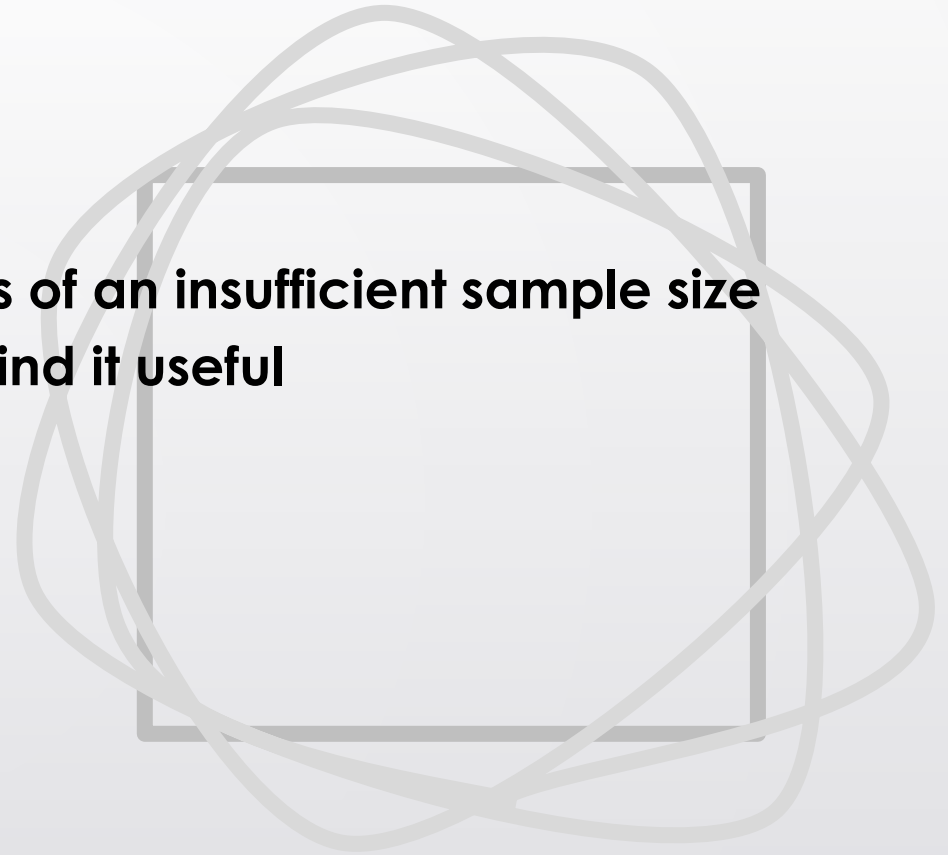
lucy.bull@manchester.ac.uk

@lucyy31



Disclosure

My experience of creating scientific posters is of an insufficient sample size to claim any expertise (n=3), but I hope you find it useful



My third scientific poster (post- creative revolution)

- An improved poster, but not a perfect one
- More use of images
- Varied the layout
- Key finding highlighted and can be viewed from a distance
- Something a bit different, that got people talking
- Cross breed: Infographic and better poster
- Poster prizes at YSM and RSS 2019

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MANCHESTER PS31
The University of Manchester

Harnessing repeated measurements of predictor variables: a review of existing methods for clinical risk prediction

Lucy M. Bull^[1,2], Mark Lunt^[1], Glen Martin^[3], Kimme Hyrich^[1,4], Jamie C. Sergeant^[1,2]

[1] Arthritis Research UK Centre for Epidemiology, Centre for Musculoskeletal Research, Manchester Academic Health Science Centre, University of Manchester, Manchester, UK.
[2] Centre for Biostatistics, Manchester Academic Health Science Centre, University of Manchester, Manchester, UK.
[3] Division of Informatics, Imaging and Data Science, Faculty of Biology, Medicine and Health, University of Manchester, Manchester Academic Health Science Centre, Manchester, UK.
[4] National Institute for Health Research Manchester Biomedical Research Centre, Manchester University NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, UK.

✉ Lucy.bull@manchester.ac.uk @Lucy31

MOTIVATIONS

- Clinical prediction models (CPMs) can predict the risk of health outcomes, such as disease onset or progression, for individual patients.
- Current CPMs are limited to harnessing cross-sectional (or baseline) patient information which reflects a snapshot in time of a patient's medical profile.
- The increasing availability of electronic health records (EHRs) provide opportunity to incorporate longitudinal information and improve the clinical usefulness of CPMs.
- Our aim was to systematically review the literature to understand and summarise available methods previously employed to harness repeated measurements of predictor variables for individual risk prediction.

METHODS

What we were looking for:

- ✓ Journal articles discussing the development of a multivariable CPM for patient-level prediction, and repeated measurements of at least one predictor recorded.
- ✓ Methods and applied papers.

What we were not looking for:

- ✗ Methods which either recorded or identified health states and treatment pathways using longitudinal medical data.
- ✗ Methods which were specific to harnessing functional data.

FINDINGS

There are **three ways** in which **repeated observations** can improve **predictions in healthcare**, and seven distinct **methodological frameworks** to work with.

- 1. To improve model specification and allow for updated risk predictions over time.**
 - Time-dependent covariate modelling
 - ✓ Updated predictors over follow-up
 - ✗ Not only for small prediction windows
 - Two-stage
 - ✓ Handles irregularly spaced events
 - ✓ Simple to apply
 - ✗ Not covered by separating-outcome processes
 - Joint modelling
 - ✓ Addresses limitations of two-stage model
 - ✓ Predicts outcomes
 - ✓ Complex to implement
 - ✗ Only uses the best predictor
- 2. To infer/predict a true value of a predictor at a pre-specified time.**
 - Generalised Estimating Equations
 - ✓ Within & between subject correlation
 - ✓ Repeated events
 - ✗ Ignores underlying trajectory
 - Landmark Analysis
 - ✓ Limited predictors over follow-up
 - ✓ Few missing data
 - ✗ Requires regularly spaced observations
 - Machine Learning
 - ✓ Few assumptions
 - ✓ Multiple longitudinal predictors
 - ✓ Large sample size required
 - ✗ Often "black box"
 - Bayesian Classification
 - ✓ Handles irregularly spaced measurements
 - ✓ Optimal predictions
 - ✓ Complex when multivariate
- 3. To account for the effects of how a predictor changes over time.**

• 237 relevant journal articles informed the above findings.
• Identified frameworks and the methods within them can vary by the aims addressed, assumptions made, their complexity and their computational burden.
• Most methods require subject-level repeated measurements at the time of prediction.
• Some methods only require a patient's most recent observation at the time of prediction.

CONCLUDING DISCUSSION

- The seven identified frameworks offer a wide range of ways in which longitudinal information can be incorporated to enhance CPMs.
- The choice of method should depend on the style of data upon which the CPM will be developed and used with in practice.
- Method choice could depend on: regularity of follow-up measurements, sample size, covariate variability, number and type of longitudinal predictors and the validity of any assumptions made for a specific clinical application.
- Available methods are limited for: incorporating informative processes, handling irregularly-spaced missing data, harnessing high-dimensional datasets.

This poster reports independent research arising from a Doctoral Research Fellowship, Lucy Bull, DRF-2018-11-072-052 supported by the National Institute for Health Research. The views expressed in this publication are those of the author(s) and not necessarily those of the NIHR, the National Institute for Health Research, Health Education England or the Department of Health. All icons in this poster have been provided by The Noun Project.

(My second one is at the end of the slides, if you're interested)


The creative revolution 2019

- Better Poster movement initiated by Mike Morrison <https://www.youtube.com/watch?v=1RwJbhkCA58>
- Motivated by the fact very few people were actually enjoying poster sessions (presenters and attendees)
- Less is more, focus on key messages
- Importance of plain English
- Provide access to a more detailed version if needed
- Interpretations of this movement can be viewed on Twitter using the #betterposter hashtag





Key takeaways from the #betterposter movement *for me*

- 1. There's no "standard" scientific poster format anymore**
 - 2. To think more about the takeaway messages**
 - 3. The more information my poster contains the less accessible it becomes**
 - 4. I do not need to prove my intelligence, I need to think more about the audience**
 - 5. Other people like images too, they are much easier to digest**
 - 6. Everyone else was finding poster sessions stressful too**
- 

Harnessing repeated measurements of predictor variables: a review of existing methods for clinical risk prediction

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Lucy.bull@manchester.ac.uk



@Lucy31

MOTIVATIONS



Technology



EHRs



Data Availability



Predictive Accuracy

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- Current CPMs are limited to harnessing cross-sectional (or baseline) patient information which reflects a snapshot in time of a patient's medical profile.
- The increasing availability of electronic health records (EHRs) provide opportunity to incorporate longitudinal information and improve the clinical usefulness of CPMs.
- Our aim was to systematically review the literature to understand and summarise available methods previously employed to harness repeated measurements of predictor variables for individual risk prediction.

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What we were *not* looking for:

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- ❖ Methods which were specific to harnessing *functional* data.

Title still a good size and readable from a far

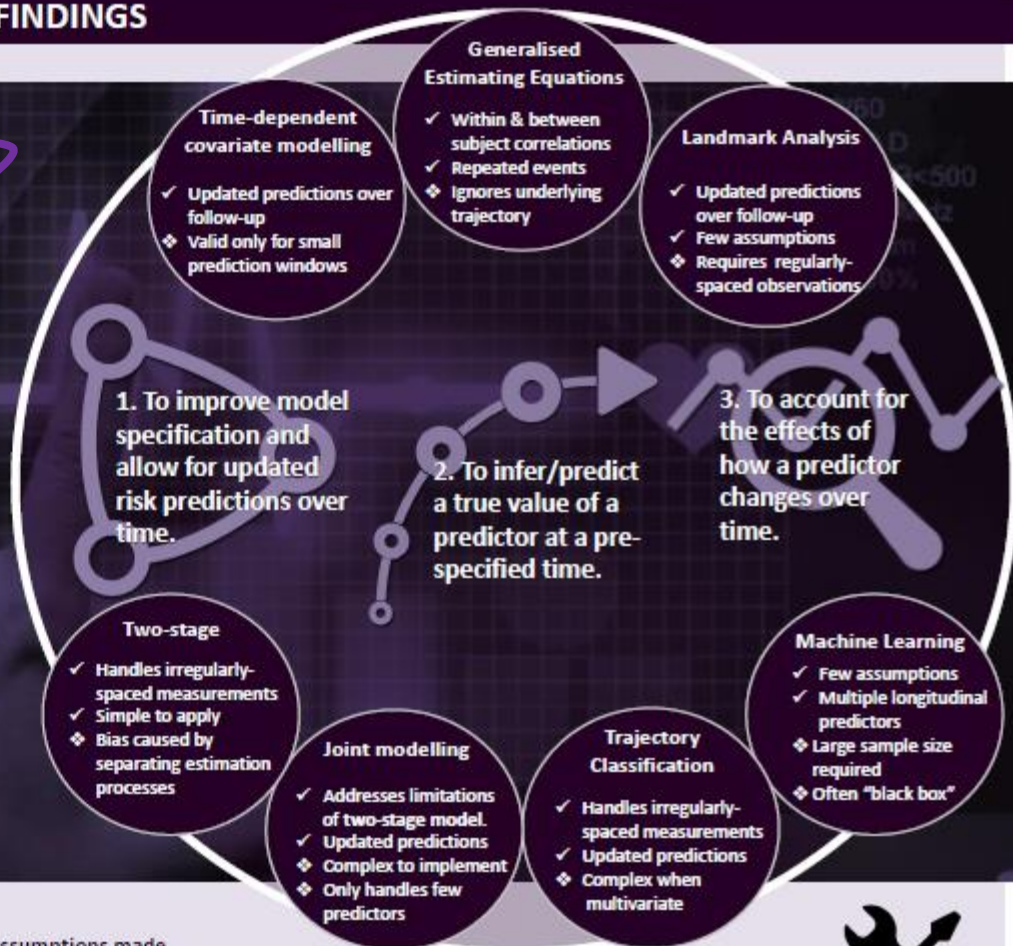
Don't forget the basics:
Your contact details

Drawing people in with key words

I like using images as backgrounds

FINDINGS

There are **three ways** in which repeated observations can improve predictions in healthcare, and seven distinct methodological frameworks to work with.



Icons and changing the presented layout of results

Tables are boring

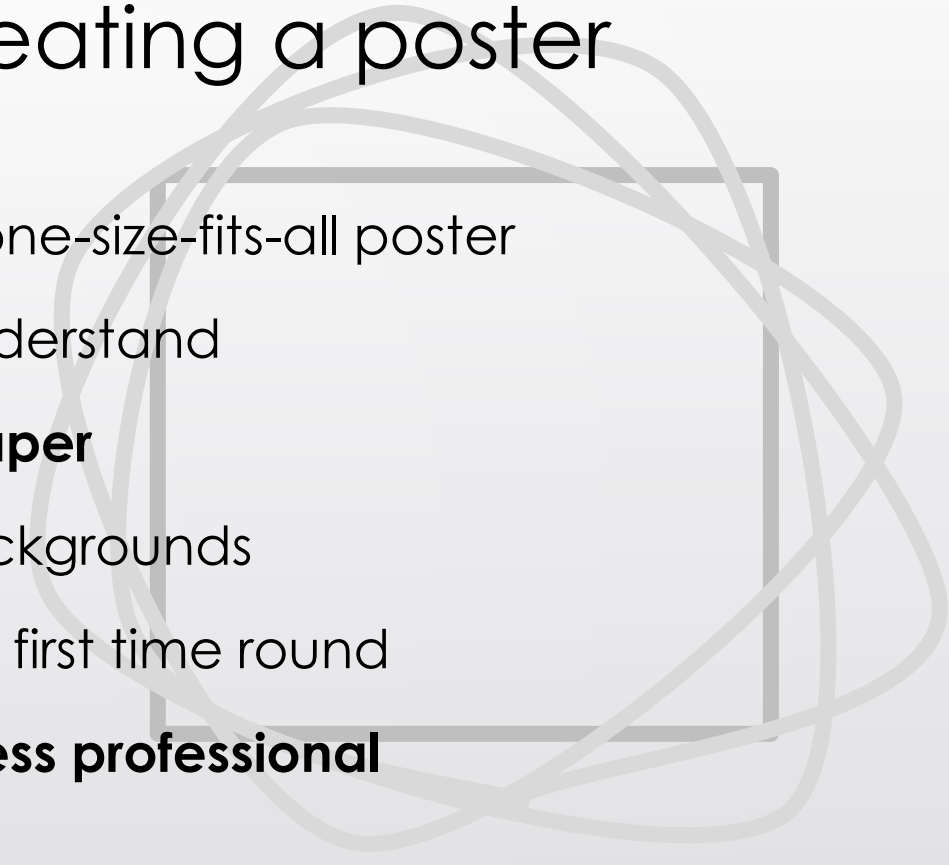
Key finding in straight-forward language

- 217 relevant journal articles informed the above findings.
- Identified frameworks and the methods within them can vary by the aims addressed, assumptions made, their complexity and their computational burden.
- Most methods require subject-level repeated measurements at the time of prediction.
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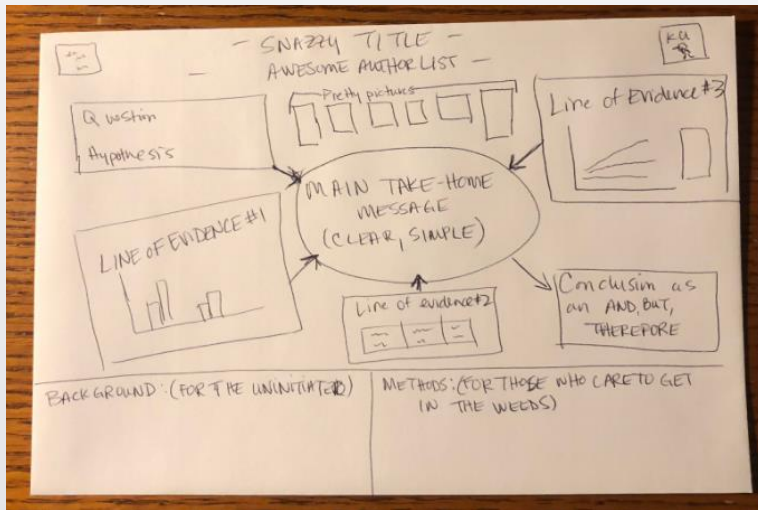




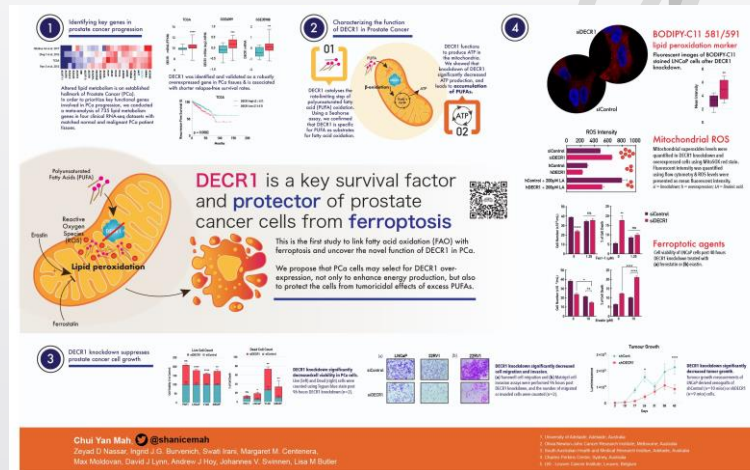
My top tips/reminders for creating a poster

1. **Do not be afraid to mix it up**, there is no one-size-fits-all poster
 2. **Make it really simple** for attendees to understand
 3. **Do not just create a large print of your paper**
 4. **Use more images** and icons, even as backgrounds
 5. **Make small steps**, nothing is ever perfect first time round
 6. **Being creative does not make you any less professional**
 7. **Gain feedback from peers**
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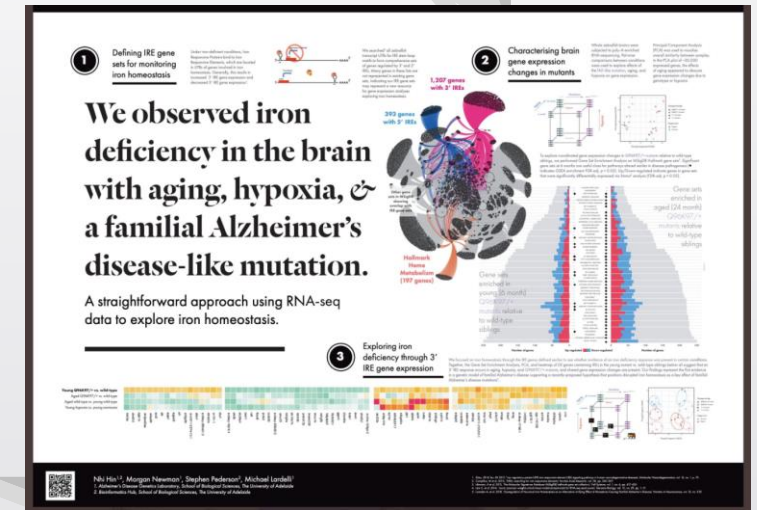
First step: Get inspired by the #betterposter Twitter



Dr. Amy Burgin
@burginam



Shanice Mah
@shanicemah



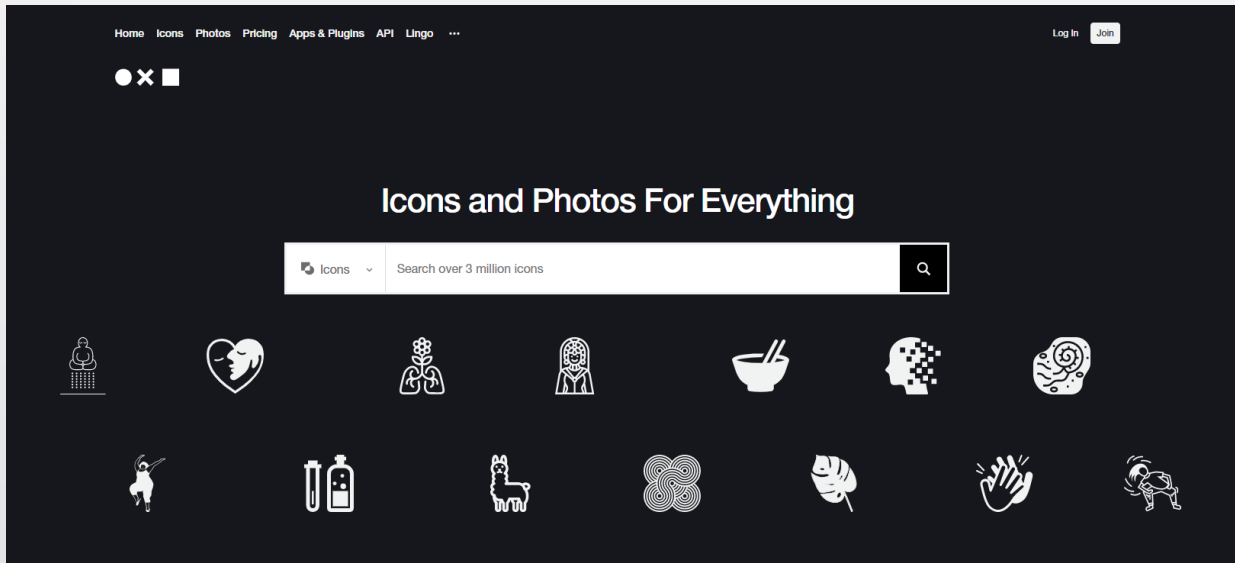
Nhi Hin, @NhiHin

Your peers are your inspiration, not your competition

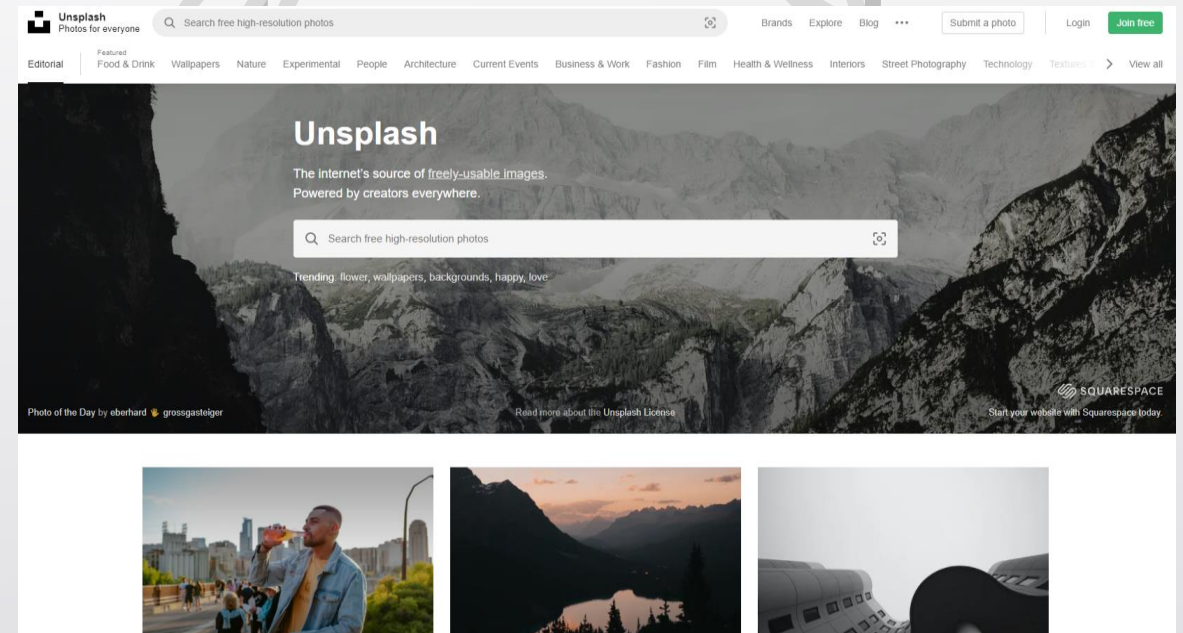
! Reminder that funders like their logos in specific places, so double check that before you get your heart set on a particular layout

Available/free resources

You do not need any fancy software



The noun project
<https://thenounproject.com/>



Unsplash
<https://unsplash.com/>

! Ensure you acknowledge the creatives behind any icon/photograph you use in your poster

Share far and wide!

Twitter is a portal to much larger academic audiences

I didn't want to do this at first, but I am so glad I did! Video summaries can attract more attention at the conference and online to discuss your work.

But, what to say?!

No more than a couple of minutes to explain who you are, what project the work was contributing to, what the objectives were and what you found.



Thank you for listening

Any questions?

Lucy Bull
NIHR Doctoral Research Fellow
lucy.bull@manchester.ac.uk
[@lucyy31](https://twitter.com/lucyy31)

MANCHESTER
The University of Manchester

Statistical Issues in the Development of Prognostic Models for Musculoskeletal Medicine

Lucy M. Bull^{1,2}, Mark Lunf³, Jamie C. Sergeant^{1,2,4}

NHS
National Institute for Health Research

BACKGROUND

AIM

METHODS AND DATA

VARIABLE SELECTION

HANDLING COLLINEARITY

	Response with AIC (AIC)	Response with AIC (AIC)
Model 1	1000	1000
Model 2	1000	1000
Model 3	1000	1000
Model 4	1000	1000
Model 5	1000	1000
Model 6	1000	1000
Model 7	1000	1000
Model 8	1000	1000
Model 9	1000	1000
Model 10	1000	1000
Model 11	1000	1000
Model 12	1000	1000
Model 13	1000	1000
Model 14	1000	1000
Model 15	1000	1000
Model 16	1000	1000
Model 17	1000	1000
Model 18	1000	1000
Model 19	1000	1000
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Model 21	1000	1000
Model 22	1000	1000
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Model 36	1000	1000
Model 37	1000	1000
Model 38	1000	1000
Model 39	1000	1000
Model 40	1000	1000
Model 41	1000	1000
Model 42	1000	1000
Model 43	1000	1000
Model 44	1000	1000
Model 45	1000	1000
Model 46	1000	1000
Model 47	1000	1000
Model 48	1000	1000
Model 49	1000	1000
Model 50	1000	1000

OVERALL

OPPORTUNITY

CFMR | **Arthritis Research UK** | **centre**

NIHR National Institute for Health Research

Harnessing repeated measurements of predictor variables: a review of existing methods for clinical risk prediction

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MOTIVATIONS

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There are three ways in which repeated observations can improve predictions in healthcare, and seven distinct methodological frameworks to work with.

CONCLUDING DISCUSSION

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"But what does this mean for my future, doctor?"

A project that will enable doctors to follow your journey and have a better idea about your future.

Lucy M. Bull^{1,2}, Mark Lunf³, Glen Martin^{4,5}, Kimme Hyrich^{1,3}, Jamie C. Sergeant^{1,2,4}

WHAT'S IMPORTANT?

WHAT'S THE PROBLEM?

A POSSIBLE REASON

WHAT DO I WANT TO DO?

HOW AM I GOING TO DO IT?

WHAT TYPE OF INFORMATION WILL BE USED?

Do you not need an appointment to see a doctor?

Arthritis Research UK | **NHS** | **National Institute for Health Research**

My second research poster for reference

Objective: to create a lay poster of my research

Not too sure how this was perceived but I enjoyed making it 😊

