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**Conference or Workshop Item:**

Booth, Alison Registration of experimental studies and of systematic reviews. In: 2nd International Symposium on Systematic Reviews in Laboratory Animal Science, 07-08 Mar 2013, Playfair Library, Old College, University of Edinburgh. (Unpublished)

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**NHS**  
National Institute for  
Health Research

# Registration of experimental studies and systematic reviews

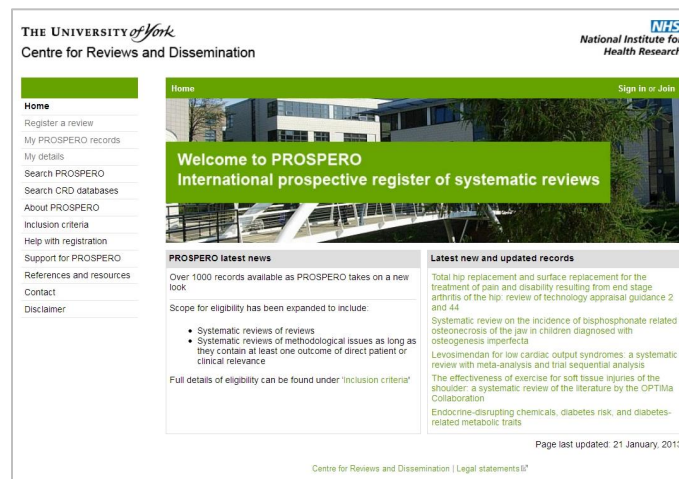
Alison Booth



THE UNIVERSITY *of York*

# Overview of presentation

- Principles and practice of registration
- Barriers and facilitators to registration
- Development and evaluation of utility of PROSPERO
- The future

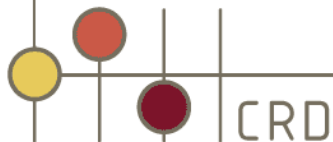


The screenshot shows the homepage of the PROSPERO website. At the top, it features the logos for 'THE UNIVERSITY of York' and 'National Institute for Health Research'. The main navigation menu on the left includes links for Home, Register a review, My PROSPERO records, My details, Search PROSPERO, Search CRD databases, About PROSPERO, Inclusion criteria, Help with registration, Support for PROSPERO, References and resources, Contact, and Disclaimer. The main content area has a green header with 'Welcome to PROSPERO International prospective register of systematic reviews'. Below this, there are two columns of 'PROSPERO latest news' and 'Latest new and updated records'. The 'PROSPERO latest news' section mentions over 1000 records available and lists inclusion criteria such as 'Systematic reviews of reviews' and 'Systematic reviews of methodological issues as long as they contain at least one outcome of direct patient or clinical relevance'. The 'Latest new and updated records' section lists several recent reviews, including one on hip replacement, one on bisphosphonate-related osteonecrosis, one on Levosimendan for low cardiac output syndromes, one on exercise for soft tissue injuries of the shoulder, and one on endocrine-disrupting chemicals. At the bottom, it states 'Page last updated: 21 January, 2013' and 'Centre for Reviews and Dissemination | Legal statements'.

# Principles of registration

- Availability of evidence to inform health care decisions
- Avoidance of publication bias and selective reporting bias
- Requirement of The Declaration of Helsinki
- Avoid unnecessary duplication
- Identify gaps in research
- Facilitate recruitment
- Promoting collaboration
- Early identification of potential problems

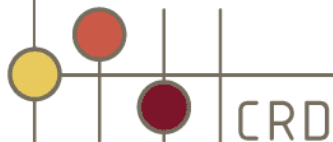
*WHO ICTRP: [www.who.int/ictrp/en/](http://www.who.int/ictrp/en/)*



# Practice of registration

- Accessible to the public at no charge
- Accept registrations from anyone (unduplicated, eligible and complete)
- Managed by a not-for-profit organisation
- Validate entries (within scope and complete)
- Electronically searchable
- Provide a unique identification number for each record
- Require provision of a minimum data set
- Permanent entries

*ICMJE criteria for clinical trial registers: [www.icmje.org/update\\_june07.html](http://www.icmje.org/update_june07.html)*



# Publication bias and selective reporting of outcomes

- In animal studies

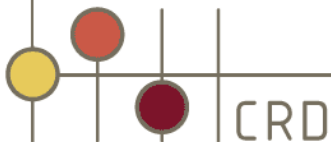
- Sena ES, van der Worp HB, Bath PM, et al: **Publication bias in reports of animal stroke studies leads to major overstatement of efficacy.** PLoS Biol. 2010 Mar 30;8(3):e1000344.
- Kilkenny C, Parsons N, Kadyszewski E, et al. (2009) **Survey of the Quality of Experimental Design, Statistical Analysis and Reporting of Research Using Animals.** PLoS ONE 4(11): e7824.

- In clinical trials

- Song F, Parekh S, Hooper L, et al: **Dissemination and publication of research findings: an updated review of related biases.** Health Technol Assess 2010, **14**:1-193.
- Smyth RM, Kirkham JJ, Jacoby A, et al. **Frequency and reasons for outcome reporting bias in clinical trials: interviews with trialists.** BMJ. 2011 Jan 6;342:c7153.

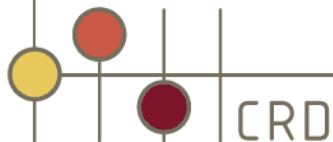
- In systematic reviews

- Tricco AC, Pham B, Brehaut J, et al. **An international survey indicated that unpublished systematic reviews exist.** Journal of clinical epidemiology 2009: 62(6):617-623.e5.
- Kirkham JJ, Altman DG, Williamson PR (2010) **Bias Due to Changes in Specified Outcomes during the Systematic Review Process.** PLoS ONE 5(3): e9810.



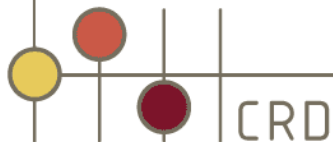
# How registration can help

- Records key planned features of the research
  - randomisation/inclusion criteria
  - primary and secondary outcomes and measures
- Allows comparison of published results with what was planned in the corresponding registration record
  - readers can judge whether any discrepancies are likely to have introduced bias
- Registration should allow amendments and maintain audit trail (not unreasonable to make changes, but need to know why)



# Avoiding unintended duplication

- Research can be invasive/time consuming and costly
- Often duplicate or very similar studies are undertaken
- Unintended duplication is economically wasteful
- Registration should allow those planning research to check whether there are any studies already in the 'pipeline' that address their topic of interest
- They can then decide whether or not to proceed



# Practical barriers to registration

- Availability of a registry
- Process for process sake
  - no legal or ethical imperative: ? value to registrant
- Safeguarding privacy
  - focus/topic of investigation
  - researchers carrying out the investigation
- Timing
  - too soon – lots of amendments
  - too late – fails to fulfil purpose of registration
- Costs
  - time, effort and money




# Benefits of registration

- Researchers
- Commissioners and funders
- Guideline developers
- Journal editors and peer reviewers
- Methodologists
- The public

# Prospective registration of systematic review protocols

- Importance increasingly recognised
- PRISMA 2009 advocated registration
- No open access facility to formally register systematic review protocols
  - Cochrane and Campbell Collaboration protocol registration limited to their own organisations

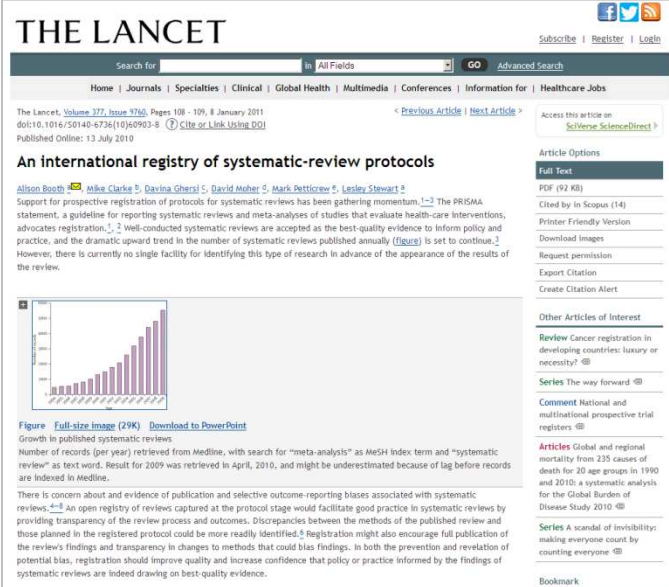
 PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
<b>TITLE</b>			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria; participants; and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known.	
		(outcomes, and study design (if 2009))	
<b>METHODS</b>			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered).	
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$ ) for each meta-analysis.	

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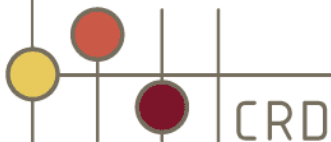
# Development of PROSPERO

- CRD initiated development of PROSPERO in 2010
- International Advisory Group
- Minimum dataset agreed by international consultation
  - 22 required fields
  - 18 optional fields



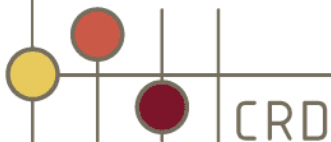
The screenshot shows the Lancet website interface. At the top, it says 'THE LANCET' with social media icons for Facebook, Twitter, and LinkedIn. Below that is a search bar and navigation links like 'Home | Journals | Specialties | Clinical | Global Health | Multimedia | Conferences | Information for | Healthcare Jobs'. The main article title is 'An international registry of systematic-review protocols' by Allison Booth, Mike Clarke, Davina Ghersi, David Moher, Mark Petticrew, and Lesley Stewart. The article discusses the PRISMA statement and the need for a registry of systematic review protocols. A bar chart shows the growth of published systematic reviews from 1990 to 2010. The caption for the chart is 'Figure Full-size image (29K) Download to PowerPoint'. The chart shows a steady increase in the number of published systematic reviews over time, starting from around 100 in 1990 and reaching over 1000 by 2010.

Lancet 2011;377(9760):108-109



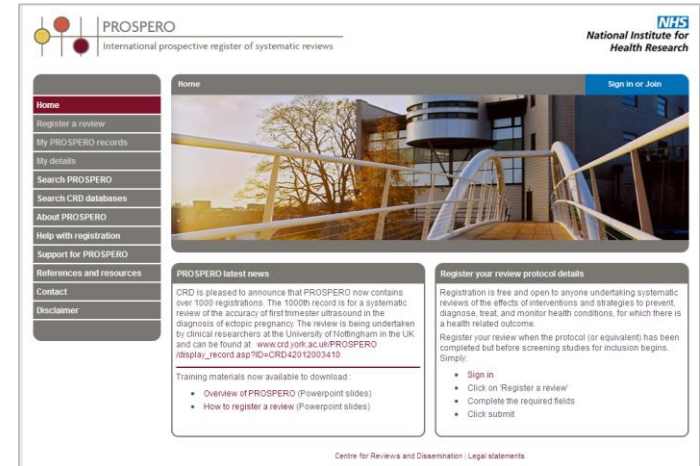
# Inclusion/exclusion and timing

- Ongoing systematic reviews that have a health related outcome in the broadest sense
  - Systematic reviews of reviews
  - Reviews of methodological issues with an outcome that can be used in health care practice
  - Scoping reviews – excluded as are not systematic reviews
  - Reviews of animal studies – excluded as outcomes not of direct relevance in health care practice
- Registered before screening against eligibility criteria commences (currently accepted as long as they have not progressed beyond the completion of data extraction)



# PROSPERO launched February 2011

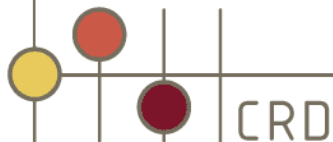
- Web based
- Free to register, free to search
- Users create and **update** their own records
- Record content is responsibility of review author
- Administrators check for “sense” **not** peer review
- An audit trail of amendments is maintained
- Registration record indexed by the PROSPERO team
- As many administration tasks as possible are automated
- Minimum data set



# One year evaluation of utility

- Based on 232 responses from users (response rate 22%)
  - 80% found registration fields relevant to their review
  - 99% found joining and navigation was easy/very easy
  - 96% found turn round time was good/excellent
  - 80% found supporting materials helpful/very helpful
- 99% rated their overall experience of registering with PROSPERO as good or excellent
- 79% completed the registration form in 60 minutes or less
- Conclusion: registration of systematic review protocols is feasible and not overly burdensome for those registering their reviews

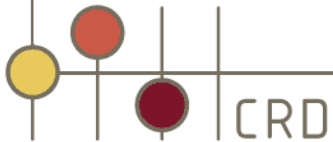
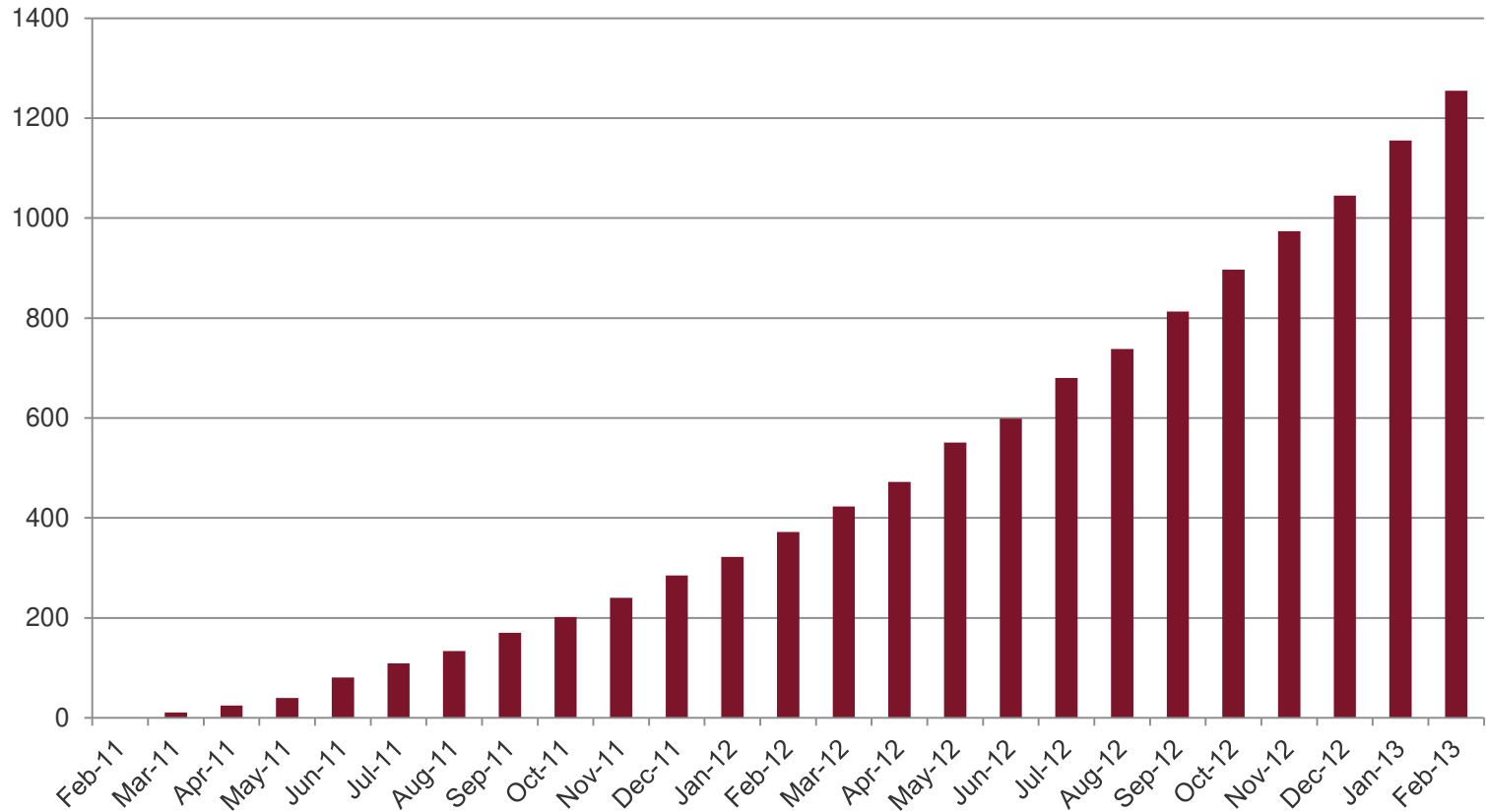
*Booth et al. Systematic Reviews 2013;2:4*



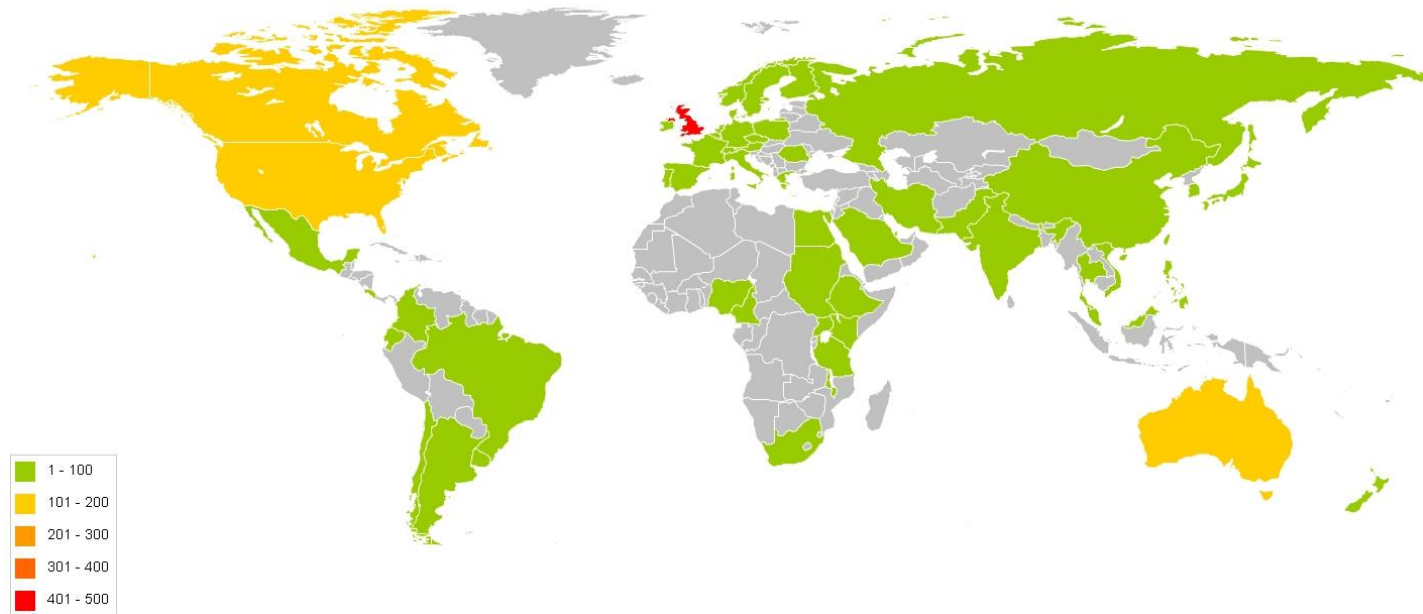
# Criticisms of the dataset

- *'Form bias towards reviews that involve statistical data analysis rather than narrative or qualitative reviews'*
- *'Some leaders assert that systematic reviews are exploratory in nature and should not have pre-determined primary outcomes'*
- *Legitimate reasons why data extraction, risk of bias (quality) assessment and data analysis all started but not completed*

# Cumulative totals for new registrations



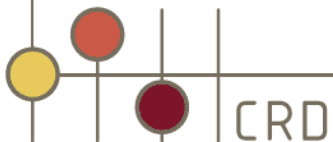
# Countries where registered reviews are being conducted



March 2013: PROSPERO contains details of 1260 reviews being carried out in 57 different countries.

# The future

- Improve functionality of form and search interface
- Expand the scope to include all systematic reviews for which there is a health related outcome in the broadest sense
- Continue to encourage registration and use of the database
- Work on a programme of methodological research
  
- Potentially help support development of satellites (*X-3 or Miranda?*)
  
- With the right support and flexible pragmatic approach - setting up a register is possible



- Home
- Register a review
- My PROSPERO records
- My details
- Search PROSPERO
- Search CRD databases
- About PROSPERO
- Inclusion criteria
- Help with registration
- Support for PROSPERO
- References and resources
- Contact
- Disclaimer

Home

Sign in or Join



#### PROSPERO latest news

Over 1000 records available as PROSPERO takes on a new look

Scope for eligibility has been expanded to include:

- Systematic reviews of reviews
- Systematic reviews of methodological issues as long as they contain at least one outcome of direct patient or clinical relevance

Full details of eligibility can be found under '[inclusion criteria](#)'

#### Latest new and updated records

Total hip replacement and surface replacement for the treatment of pain and disability resulting from end stage arthritis of the hip: review of technology appraisal guidance 2 and 44

Systematic review on the incidence of bisphosphonate related osteonecrosis of the jaw in children diagnosed with osteogenesis imperfecta

Levosimendan for low cardiac output syndromes: a systematic review with meta-analysis and trial sequential analysis

The effectiveness of exercise for soft tissue injuries of the shoulder: a systematic review of the literature by the OPTIMA Collaboration

Endocrine-disrupting chemicals, diabetes risk, and diabetes-related metabolic traits

Page last updated: 21 January, 2013

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[www.crd.york.ac.uk/PROSPERO](http://www.crd.york.ac.uk/PROSPERO)

