Enabling technologies for Living Systematic Reviews

State of the Science

Ian Shemilt, EPPI-Centre, University College London, UK
Synthesise Evidence
Plan and conduct systematic reviews and statistical meta-analyses

Produce Evidence
Plan, conduct and curate primary research (clinical trials and other studies)

Basic Research
e.g. pharmacogenomics, drug development

Evaluate and Improve Practice
Recording practice & population-based data
EHR, Registries, Quality Indicators, Shared Decisions

Disseminate Evidence
to Clinicians
Tools to analyse data, write and publish trustworthy guidelines

Disseminate Evidence
to Patients
Decision Aids for the clinical encounter

Implement Evidence
Personalised Decision Support Systems in the EHR linked to patient specific data

Interoperable
Study Data & Meta-data

Ubiquitous
Standardised
APIs

Standardised
Domain Ontologies

DATA

DATA

DATA

DATA
Through a combination of human and machine effort the aim is to identify and classify ALL trials using this system.

Identifying studies for LSRs* will then be a simple process of specifying the relevant PICO alert

* For RCTs
Demo – PICOFinder

https://uat-data.cochrane.org/pico-finder
Automation tools for LSR workflows

Study Identification
- Electronic search development
- Selecting studies (title-abstract & full-text screening)
  - Active learning (prospective)
  - ML classifiers (e.g. RCT classifier)
- Mapping research activity

Data Extraction
- Risk of bias assessment
- Other study characteristics (e.g. PICO)
- Statistical outcome data

Synthesis and Sense-making
- Automated text generation (e.g. RevMAN HAL)
- Automated meta-analysis?
- Dynamic updating of iSoF tables?

Increasing interest and evaluation activity
Demo –
RCT Classifier
EPPI Reviewer

https://eppi.ioe.ac.uk/cms/er4/
Automation tools in LSR workflows

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Increasing interest and evaluation activity
Data extraction

- RobotReviewer can identify phrases relating to study PICO characteristics and risk of bias
- ExaCT extracts trial characteristics (e.g., eligibility criteria)
- Systematic review found that no unified framework yet exists
- More evaluative work is needed on larger datasets
- Further challenges include extraction of data from tables and graphs
Demo – RobotReviewer

https://robot-reviewer.vortext.systems/
Automation tools in LSR workflows

**Study Identification**
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Increasing interest and evaluation activity
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State of the Science

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Demo – RCT Classifier EPPI Reviewer

https://eppi.ioe.ac.uk/cms/er4/
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‘Statin’ and ‘RCT’ [filter]
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DB - Embase
DP - Ovid Technologies
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PY - 2012
SP - 178
ST - Coenzyme Q10, an anti-oxidant of value to reduce oxidative stress; also useful to reduce statin-induced myalgia
T2 - Cardiovascular Journal of Africa
TI - Coenzyme Q10, an anti-oxidant of value to reduce oxidative stress; also useful to reduce statin-induced myalgia
VI - 23
ID - 3582
ER -

TY - JOUR
AB - Although statins have been shown to prevent contrast-induced acute kidney injury in patients with acute coronary syndromes, the benefit of statins is not known for patients at high risk for nephropathy who undergo elective coronary angiography. Two hundred twenty consecutive statin-naïve patients with chronic kidney disease (estimated glomerular filtration rate <60 ml/min/1.73 m² and <25%) who underwent elective coronary or peripheral angiography were randomly assigned to receive rosuvastatin (40 mg on admission, followed by 20 mg/day; n = 110) or no statin treatment (control group, n = 110). Contrast-induced acute kidney injury was defined by an absolute increase in serum creatinine of >0.5 mg/dl or a relative increase of >25% measured 48 or 72 hours after the procedure. Contrast-induced acute kidney injury occurred in 15 patients (7.2%), 9 (8.5%) in the control group and 6 (5.4%) in the rosuvastatin group (p = 0.44). The incidences of adverse cardiovascular and renal events (death, dialysis, myocardial infarction, stroke, or persistent renal damage) were similar between the two groups at follow-up. In conclusion, rosuvastatin did not reduce the risk for contrast-induced acute kidney injury or other clinically relevant outcomes in at-risk patients who underwent coronary and peripheral vascular angiography. Copyright © 2015 Elsevier Inc.
AD - (Abaci, Arat Ozkan, Kocaş, Cetinkal, Sukru Karaca, Baydar, Gurnem) Department of Cardiology, Istanbul University Cardiology Institute, Istanbul, Turkey (Kaya) Department of Biochemistry, Istanbul University Cardiology Institute, Istanbul, Turkey
AN - 602076836
AU - Abaci, 0.
AU - Arat Ozkan, 0.
AU - Kocaş, C.
AU - Cetinkal, G.
AU - Sukru Karaca, 0.
AU - Baydar, 0.
AU - Kaya, A.
AU - Gurnem, T.
DA - 01 Apr
DB - Embase
DP - Ovid Technologies
Import to EPPI Reviewer
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<td>Aalbers J</td>
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<tr>
<td>Abaci O, Arat O</td>
<td>Impact of Rosuvastatin on Contrast-Induced Acute Kidney Injury in Patients at High Risk for Nephropathy</td>
<td>2015</td>
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<td>Abadie R, Weyn</td>
<td>Clinician’s use of the Statin Choice decision aid in patients with diabetes: A videographic study nested in a random patient comparison</td>
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<td>Abbas A, Milles</td>
<td>Rosuvastatin and atorvastatin: Comparative effects on glucose metabolism in non-diabetic patients with dyslipidemia</td>
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<td>Abbas S, Moh</td>
<td>Simvastatin versus atorvastatin for improving mild to moderate depression in post-coronary artery bypass grafts</td>
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<td>Abd T, Jacobs</td>
<td>Statin-induced myopathy: A review and update</td>
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<td>Abdullah L, Luis</td>
<td>High serum Abeta and vascular risk factors in first-degree relatives of Alzheimer’s disease patients</td>
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<td>Statins: Practical considerations - A review</td>
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<td>A trial of Pitavastatin versus Rosuvastatin for Dyslipidemia in chronic kidney disease</td>
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<td>Aberg J, Roser</td>
<td>Pharmacokinetic interaction between nevirapin and pravastatin in HIV-seronegative volunteers: ACTG Study A51</td>
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<td>Aberg J, Sponi</td>
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<td>Abernethy A, Paria</td>
<td>A strategy to advance the evidence base in palliative medicine: Formation of a palliative care research cooperative</td>
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<td>Abernethy A, Paria</td>
<td>Managing comorbidities in oncology: A multisite randomized controlled trial of continuing versus discontinuing statins</td>
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