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Open-source models – why, when and how?

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Overview

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2. What are the challenges to open-source modelling?
   - Poll: What is your biggest barrier to publishing open-source models?
3. Why are open-source models so important?
4. When should we aim to publish open-source models?
5. How do we increase publication of open-source models?

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What does ‘open source’ mean?

‘Open source’ definition: open-source software is computer software that is released under a licence in which the copyright holder grants users the rights to use, study, change and distribute the software and its source code to anyone and for any purpose.[a]

‘Public domain’ definition: materials that are freely available and not restricted by copyright or licence agreements. [a]

Therefore: **Open-source models ≠ public domain models**

- R is open-source software that operates under a licence stating that anyone can download and create or modify code
- R models can be open source if they have a licence, otherwise they can be publicly available models
- Excel models can be made available in the public domain, but these are not ‘open source’

‘Open source’ has become a term for publicly available materials designed to encourage open collaboration.

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[a] https://opensource.org/ 3

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What are the challenges to open source?

We can all appreciate the benefits of others publishing their models as open source, but there are challenges too:

- Commercial sensitivity
- Confidential data
- Maintenance of open-source models
- Time and complexity in preparing models for open-source publication that can be understood, re-used and adapted by others. The following factors need to be considered here:
  - Complexity of model
  - Purpose of open-source model
  - Intended audience

Re-usability is more efficient over time, but often means more resources are required in the short term.

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POLL: What is your biggest barrier to publishing open-source models?

1. None – many or all of my models are published as open source
2. Most of the models I develop include commercial or client confidential information
3. Time required to prepare material and documentation for open-source publication
4. Time required to maintain material post-publication
5. Other (please state in the chat)

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Why are open-source models so important?

- Because of widespread and unbiased peer review, they are often the most technically correct and representative models that exist in HEOR
- They facilitate transparency and reproducibility of methods
- They generate open discussion on the validity of methods used to critique and reference research.
- In the long term, open-source models can save time during model conceptualization and building:
  - Validated models for examples and expertise
  - Access to functions that have been reviewed by the community
  - Foundation of methodology for disease indications
  - Potential to reuse or adapt existing validated models

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When should we aim to publish open-source models?

- Where the model code, structure or functions are likely to be re-used or adapted
- When developing new methods, functionality or structure
- When validating existing methods or functions
- Where the key message or findings are not commercially sensitive or confidential

In all cases, the model should be well explained and documented to facilitate reusability (accessibility ≠ transparency)

- The overall concept, structure and strategy should be documented independently from the source code
- Individual functions should be well commented and explained
- If displaying non-simulated data, referencing and justifying the inputs and their use should be thoroughly documented

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How do we increase publication of open-source models?

Open-source modelling can be achieved in many ways:

If part of a project is not suitable for open source, this does not mean that none of the project materials can be used for open source.

- What part of the project is commercially sensitive or confidential? Can simulated data be used?
- Ask clients or project stakeholders what can be made open source (e.g. methods, structure, functions, etc.)

Building time into projects to document models can create efficiencies in future projects, as this allows others to re-use these models.

- Technical reporting is often standard in projects, so this reporting can be adapted to use as open-source documentation

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How do we increase publication of open-source models?

Open-source modelling can be achieved in many ways:

Building time into projects to document models can create efficiencies in future projects, as this allows others to re-use these models.

- Release functions with examples in a code repository or sharing site over time to build up a library of open-source model resources

Understand the purpose of publication for open-source models and build upon them accordingly.

- Response to feedback from open-source models is at the discretion of the original publisher. This is not a problem if the materials are reproducible and there is a discussion forum available for the community to build upon and re-use proof-of-concept materials appropriately

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Thank you

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