



Introduction

Systematic review methods are rigorous and transparent approaches used to answer research questions. These methods have been adapted to multiple review types, including scoping reviews and systematic evidence maps.

Literature flow diagrams are critical reporting elements used to transparently display the results of the reference selection process. While beneficial, traditional static literature flow diagrams have several disadvantages for both authors and readers. Several tools have emerged to aid in literature screening and interactive data visualization in the past decade. However, these tools have been underutilized in the creation of literature flow diagrams, and resulting diagrams rely on manual development.

Methods

We outline a generalized approach for developing interactive study flow diagrams linked to the underlying study selection results with the following steps:

- Plan study flow diagram
- Collect and manage raw data
- Export and transform data
- Visualize the data
- Review and refine through iteration

To illustrate the method, we have updated a static literature flow diagram from a previous NTP Scoping Review using Tableau. Underlying data were exported from DistillerSR® and transformed using Power Query in Microsoft Excel.

Results

The resulting figure, or **I-REFF** (Interactive REference Flow) diagram includes the same information as the static visual, however, the I-REFF can also link to the review methods and allows users to track or identify individual references considered at each step in the review through filtering or searching. This greatly enhances experience for all users.

Interactive Reference Flow (I-REFF) Diagrams: A New Approach to Increase Efficiency and Transparency in Systematic Review Reporting

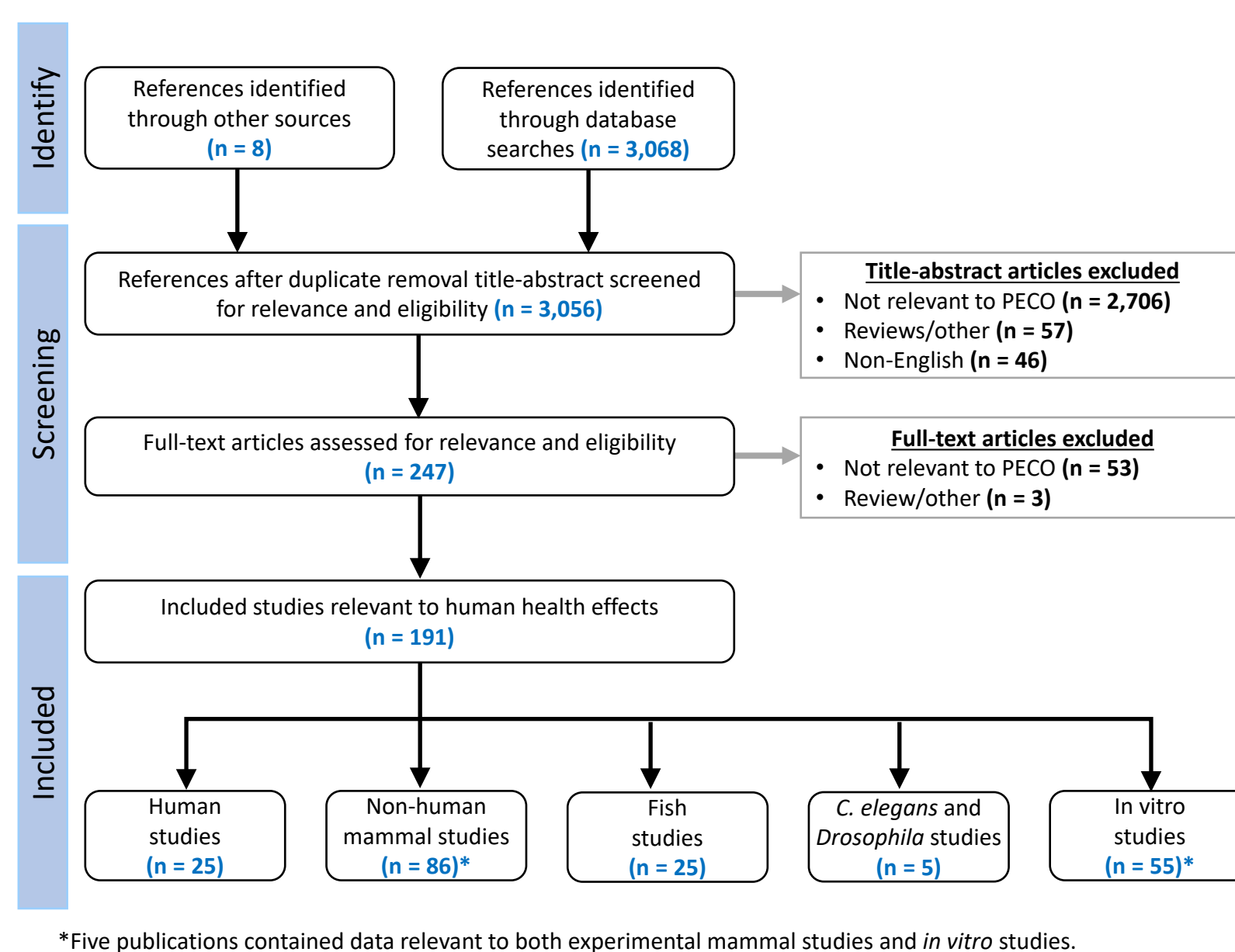
Kristen Magnuson¹, Courtney Lemeris¹, Grace Cooney¹, Christopher Sibrizzi¹, Andrew A. Rooney², Kelly Shipkowski², Kyla Taylor², Vickie Walker². ¹ICF International Inc., Fairfax, VA; ²NIEHS/NTP, Research Triangle Park, NC.

Comparison of traditional literature flow diagrams and I-REFF diagrams

Traditional literature flow diagrams are static figures that are manually generated and provide limited summary-level information about the reference selection process of systematic reviews.

I-REFF diagrams are interactive literature flow diagrams that support automation and enhance transparency in the reference selection process of systematic reviews by providing access to citation information.

Static Diagram



Disadvantages of Static Literature Flow Diagrams

For Authors

- Manually generated
- Labor-intensive to develop
- Requires repeated quality assurance steps at updates
- Time-intensive to maintain
- More prone to errors

For Readers

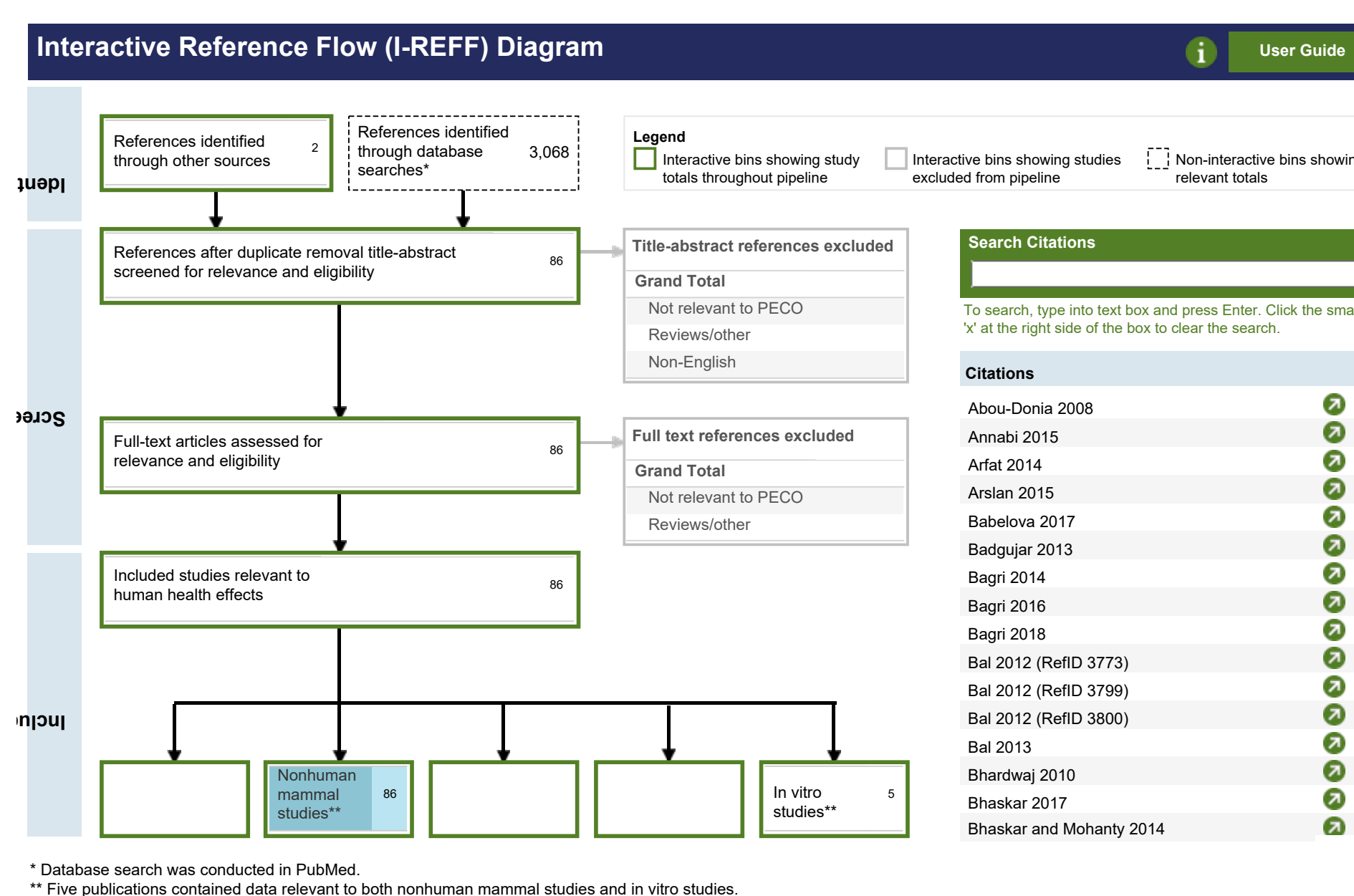
- Limited information
- Summary-level details only
- Difficult to identify fate of individual references

Get in touch with us:

Vickie Walker | Vickie.Walker@nih.gov;

Courtney Lemeris | Courtney.Lemeris@icf.com

I-REFF Diagram



Advantages of I-REFF Diagrams

For Authors

- Supports full and partial automation
- Minimal effort to update and maintain
- Reduces potential for errors and aids in quality assurance
- Can include much more detailed information in a readable format
- Paves the way for further automation in collaboration with screening platform developers

For Readers

- Information rich and improved transparency
 - More information provided, notably comprehensive reference lists
 - More efficient to review, with direct access to pre-specified protocol
 - Ability to track individual studies included or excluded at each stage
 - Greater opportunity to examine, replicate, and expand upon reviews, strengthening the merits of systematic review methods
- Enhanced user experience and interactivity
 - Supports new ways to explore systematic review results
 - Can include search and filter functions

