

Tailoring Your Knowledge Translation Strategies for Your Intended Users

KTDRR's 2023 Virtual KT Conference

November 6, 8, and 9

Center on
**KNOWLEDGE TRANSLATION FOR
DISABILITY & REHABILITATION RESEARCH**

Sharing Research Findings With Target Audiences

What Does the Literature Tell Us?

Alison Hoens

Clinical Professor & Knowledge Broker, UBC
Affiliate Knowledge Broker, ARC

Taylor Irvine

Knowledge Translation Research Assistant (2021–22)
University of British Columbia

Acknowledgements

Funders:

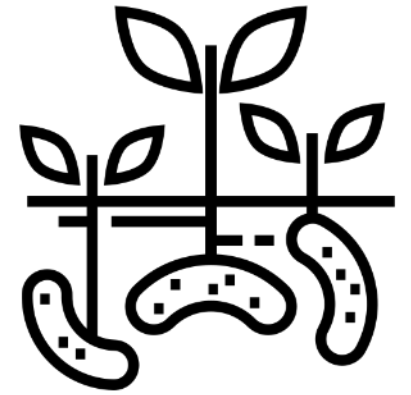
Genome BC

Genome Canada

Michael Smith Health Research BC

Objective for Our Time Together

To share the impetus, process, findings and recommended consideration from a literature review exploring information formats and data visualizations for a variety of audiences



Created by Creative Mania
from the Noun Project

Impetus

Pharmacogenomics for Depression

A project exploring the use of genetic testing for drug therapy in people living with depression

What is the question being addressed by the project?

"What is the effectiveness and cost-effectiveness of introducing pharmacogenomic testing in BC, as a routine component of clinical practice, in the care of people with depression?"

<https://spph.ubc.ca/pgx4depression/>

Interviews



What people think

We are interviewing patients, health care providers (e.g. doctors, psychiatrists, genetic counsellors, pharmacists), health care decision makers, manufacturers etc. for their thoughts about the benefits and concerns of pharmacogenomic testing for treatment of depression.

Review of literature



What is known

We are examining existing research to identify how effective pharmacogenomic testing is for the treatment of depression, as well as the benefits and concerns related to its use.

Analysis of data



What the data shows

We are examining the data collected from the health care system to understand the current picture of depression in British Columbia.

Simulation Model



Putting it all together

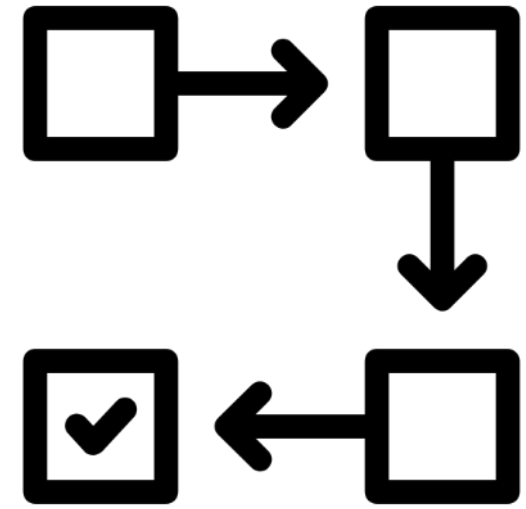
The information from the interviews, evidence from the literature, and the analysis of the data from the health care system, will be put into a unique computer simulation model that will help us 'see' how pharmacogenomic testing will impact patients and the health care system.

Impetus

Knowledge producers and funders wishing to share findings with their audiences can be **uncertain as to which format** (e.g. written summary, infographic, video) and **which data visualization(s)** (e.g. bar chart, line chart, pie chart, table) may be most appropriate to accurately and effectively convey the desired message(s).

(Buljan et al., 2018)

Process

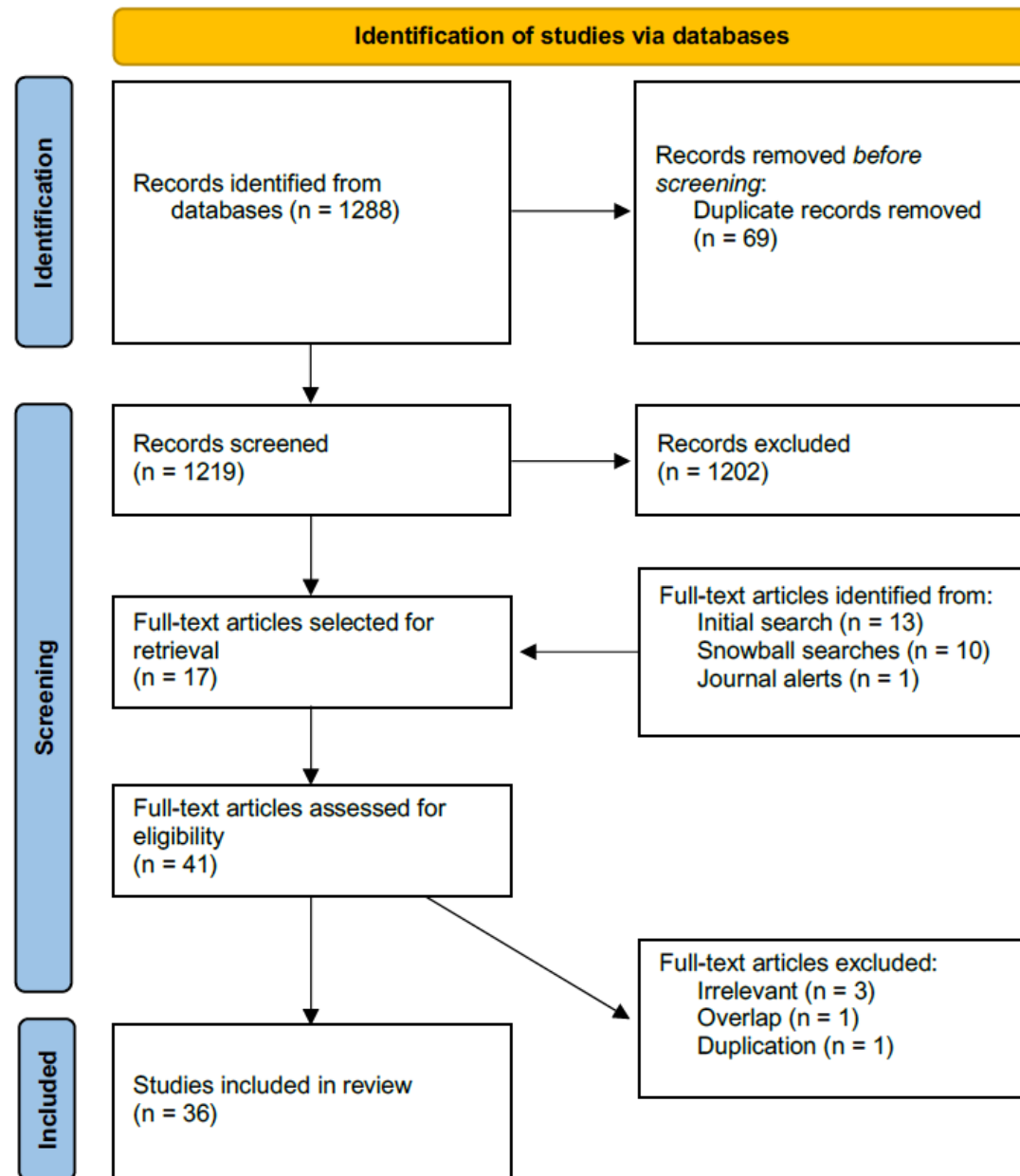


Created by Adrien Coquet
from the Noun Project

Additional File 1 Search Strategy

Databases	Terms	Year	Language	Objective
Initial Search				
PubMed, Google Scholar	KEYWORDS “data visualization comparison”; “data visualization effectiveness”; “data visualization task study”; “research dissemination”; “effectiveness”; “knowledge translation”; “information format”; “infographic effectiveness”; “video effectiveness”; “policy brief effectiveness”; “information format comparison”; “stakeholder preferences”; “lay people preferences”; “information”.	2011 to 2021	N/A	Obtain preliminary literature to inform the development of an enhanced search strategy for recent evidence using multiple databases and keywords.
Enhanced Search				
PubMed, Medline, Embase, Cochrane Library, PsycINFO, IEEE Xplore, UBC Library Database.	KEYWORDS “infographic*”; “video”; “policy brief”; “research summary”; “lay summary”; “ <u>evaluat*</u> ”; “assess*”; “knowledge translation”; “effective*”; “useful*”; “knowledge*”; “data visualization*”; “data visualisation*”; “bar chart”; “pie chart”; “donut chart”; “radar chart”; “mosaic plot”; “heat map”; “eye tracking”; “task*”; “knowledge mobilization”; “knowledge dissemination”; “end of grant knowledge translation”; “knowledge product”; “knowledge tool”; “research dissemination”.	2011 to 2021	English	Obtain primary, secondary, or tertiary literature on evaluations of information formats and data visualizations, and knowledge translation or research dissemination.

27 keywords



Additional file 3 Table comparing characteristics of included studies for information formats

		Type of data				Audience							Information Format							Method								
Study	Year	Quantitative	Qualitative	Mixed method	Review	Researchers	Public health professionals	Clinicians	Pharmacists	Lay people	Policymakers	Other	None	Infographic	Video	Policy Brief	Research summary	Summary of findings table	Plain language summary	Other	RCT	Interviews	Focus group	Pre-test/post-test	Survey	Review	T-test	Comparison
Heerman et al.	2021	X								X				X	X				X						X			X
Kunze et al.	2021	X										X		X						X							X	X
Olfert et al.	2019			X		X		X						X								X			X			
Huang et al.	2018	X										X		X						X	X						X	X
Buljan et al.	2018	X						X		X				X					X	X	X				X			X
Crick and Hartling	2015	X				X	X	X						X						X					X			X

Additional file 5 Table comparing characteristics of included studies for data visualizations

Study	Year	Type of data					Data visualization											Method				
		Quantitative	Qualitative	Mixed method	Review	Methodology	Bar chart	Stacked bar chart	Pie chart	Clock chart	Donut chart	Line chart	Scatter chart	Table	Network analysis	Pictographs/icon arrays	Radial chart	Sparkplug	Eye-tracking	Task-study	Survey	Interviews
van Weert et al.	2021	X					X		X	X			X		X		X		X	X		X
Saket et al.	2019	X					X		X		X	X	X						X	X		X
Indratmo et al.	2018	X					X	X											X	X		X
Skau et al.	2015	X					X												X	X		X
Haroz et al.	2015	X					X								X				X	X		X



Findings

Analysis of Information Formats

Analysis: Comprehension, Preference, Satisfaction

Methodologies

- questionnaires (online, paper, and phone; single occasion or pre/post)
- Interviews
- focus groups
- both interview & questionnaire

Using

- Likert scale questions
- open-ended questions
- knowledge scores
- change in knowledge scores
- whether there was a subsequent new course of action

Evaluation of Data Visualizations

What was evaluated?

- **Response accuracy**
 - the number of errors participants made when completing tasks using a data visualization
- **Response time**
 - the time to complete the tasks

How were they evaluated?

- **Eye tracking**
- **Relative judgement questions**
 - comparing values within the data visualizations (e.g., is value A greater or less than value B?)
- **Absolute judgement questions**
 - estimating the values within a data visualization (e.g., what is the value of A?)
- **Information recall questions**
 - recalling values within a data visualization

Caution ...

Interpretation across studies requires caution because of:

- the array of information formats;
- the variety of audiences who were participants; and
- considerable variation in methods, outcomes and outcome measures



Preferred Format Doesn't Guarantee Understanding

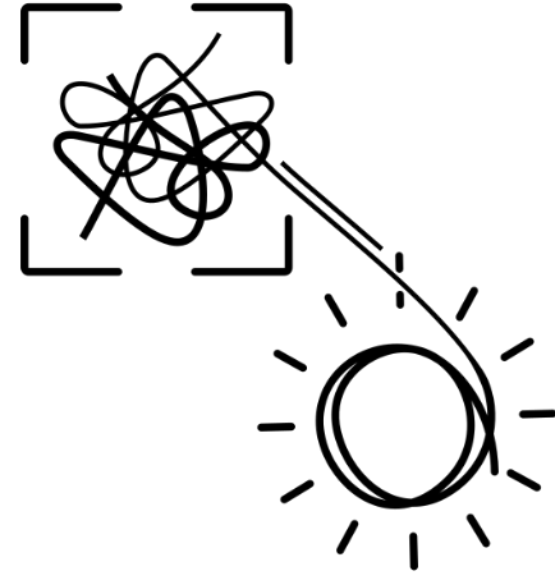
1. Although infographics were preferred over written formats, they did not facilitate better comprehension (Garcia-Retamero & Cokely, 2017).
2. Participant preference for data visualization was associated with user accuracy and speed in completing tasks, but perceived accuracy did not always match task accuracy (Saket et al., 2019).

Thus, need to be **cautious about making statements about comprehensibility both within and across information formats.**

Don't be tempted to select a format based solely on audience preference.

Format Alone Doesn't Guarantee Understanding

All lay summaries are not equally comprehensible simply because they are lay summaries.



Don't Forget Numerical & Graphical Literacy

Comprehensibility is associated with numerical and graph literacy (Garcia-Retamero & Cokely, 2017).

- **Numerical literacy (numeracy):** the ability to understand and use simple numerical concepts in life
- **Graph literacy:** the ability to understand information that is presented graphically (extract and make inferences)

~ **One-third** of people experience challenges in numeracy and data visualizations (Galesic et al., 2011).

Thus, **despite the evidence that data visualizations can improve comprehension of quantitative information, they are not likely to be helpful for all readers.**

Visual displays may be more helpful for people with low numeracy, whereas numbers may be better for people who have poor graph literacy (Gudi et al., 2021; Gaissmaier et al., 2012).

Thus, **provide a combination of text and data visualizations.**

Take-aways

Considerations for Information Formats

For lay audiences

- Written formats may benefit from including narrative.
- Video formats may benefit from augmentation with animation and narration.

For healthcare professionals

- Scientifically based written materials may benefit from being supported by infographics and plain language summaries.

For policymakers and their staff

- Briefs may benefit from both data-focussed and story-focussed content.

For researchers

- Critical appraisals may be particularly valued.

Considerations for Information Formats (cont'd)

Bar charts: for visualizing a *comparison between several data points or to show data clusters*.

Pie charts: for visualizing *proportions and include numerical values/tick marks* for improving accuracy. Avoid for correlations and for tasks that require relative judgements.

Line charts: for visualizing *trends or correlations* when readers need to precisely identify the value of a specific data point.

Scatter plots: for visualizing *anomalies*.

Icon arrays: person-like where possible, for visualizing *treatment reduction risk or risk of side effects and include baseline risk, numerators and denominators*.

Tables: for when readers need to retrieve or add numerical values. Avoid for correlation tasks.

References

Buljan, I., Malički, M., Wager, E., Puljak, L., Hren, D., Kellie, F., et al. (2018). No difference in knowledge obtained from infographic or plain language summary of a Cochrane systematic review: three randomized controlled trials. *Journal of Clinical Epidemiology* 97, 86–94. doi: 10.1016/j.jclinepi.2017.12.003.

Galesic, M., and Garcia-Retamero, R. (2011). Graph Literacy: A Cross-Cultural Comparison. *Med Decis Making* 31, 444–457. doi: 10.1177/0272989X10373805.

Gaissmaier, W., Wegwarth, O., Skopec, D., Müller, A.-S., Broschinski, S., and Politi, M. C. (2012). Numbers can be worth a thousand pictures: Individual differences in understanding graphical and numerical representations of health-related information. *Health Psychology* 31, 286–296. doi: 10.1037/a0024850.

Garcia-Retamero, R., and Cokely, E. T. (2017). Designing Visual Aids That Promote Risk Literacy: A Systematic Review of Health Research and Evidence-Based Design Heuristics. *Hum Factors* 59, 582–627. doi: 10.1177/0018720817690634.

Gudi, S. K., Tiwari, K. K., and Panjwani, K. (2021). Plain-language summaries: An essential component to promote knowledge translation. *Int J Clin Pract* 75. doi: 10.1111/ijcp.14140.

Saket, B., Endert, A., and Demiralp, C. (2019). Task-Based Effectiveness of Basic Visualizations. *IEEE Trans. Visual. Comput. Graphics* 25, 2505–2512. doi: 10.1109/TVCG.2018.2829750.



Q&A

 www.ktdrr.org

 ktdrr@air.org

 800.266.1832

Center on
**KNOWLEDGE TRANSLATION FOR
DISABILITY & REHABILITATION RESEARCH**