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# Discovering the Preferences of Physicians with Regards to Rank-ordered Medical Documents

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**Dympna O' Sullivan, Szymon Wilk, Wojtek Michalowski, Roman Słowiński, Roland Thomas, Ken Farion**

***MET Research Group,***

Aston University, Birmingham, UK

Poznan University of Technology, Poznan, Poland

University of Ottawa, Ottawa, Canada

Carleton University, Ottawa, Canada

Children's Hospital of Eastern Ontario, Ottawa, Canada



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# Outline

- Problem statement
  - Research issue
  - Related work
  - GRIP method
  - Experimental design and results
  - Conclusions
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# Use of Evidence at the Point of care

- **Practice of evidence-based medicine also involves consulting medical documents retrieved from Scopus, PubMed, Cochrane Library, etc.**
    - **Retrieved documents are normally presented as a list, but we don't know how:**
      - MD perceives a list when top document is not relevant
      - MD differentiates between positions on the list
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# Research Issue

*What are the preferences of an individual MD with regards to the order and relevance (correctness) of presented medical documents?*

Example:      correct list:            [a,b,c]  
                  retrieved lists:        [a,k,c] and [c,a,b]

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## Related Work

- How user evaluates list-based presentation (depth-first vs breadth first)
  - How many items on a list is too many
  - How to evaluate precision and recall of the retrieval algorithms
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# GRIP Method

- Constructs marginal value functions and derives from them additive value function;
  - Relies on pairwise comparisons of reference alternatives;
  - Identifies inconsistent comparisons and removes them;
  - In this research – focus on the marginal value functions as they provide insight about MDs' preferential valuations
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# Experimental Design: Coding

- ❑ Three evaluation criteria, each representing MD's preference with regards to a relevance of a document on a given position on a list.
  - ❑ List composed of 3 documents coded as:
    - Y = right document on a right position
    - N = right document on a wrong position
    - X = wrong document
    - [N,X,Y]: 1<sup>st</sup> position = incorrectly placed relevant document; 2<sup>nd</sup> position = irrelevant document; 3<sup>rd</sup> position = correctly placed relevant document
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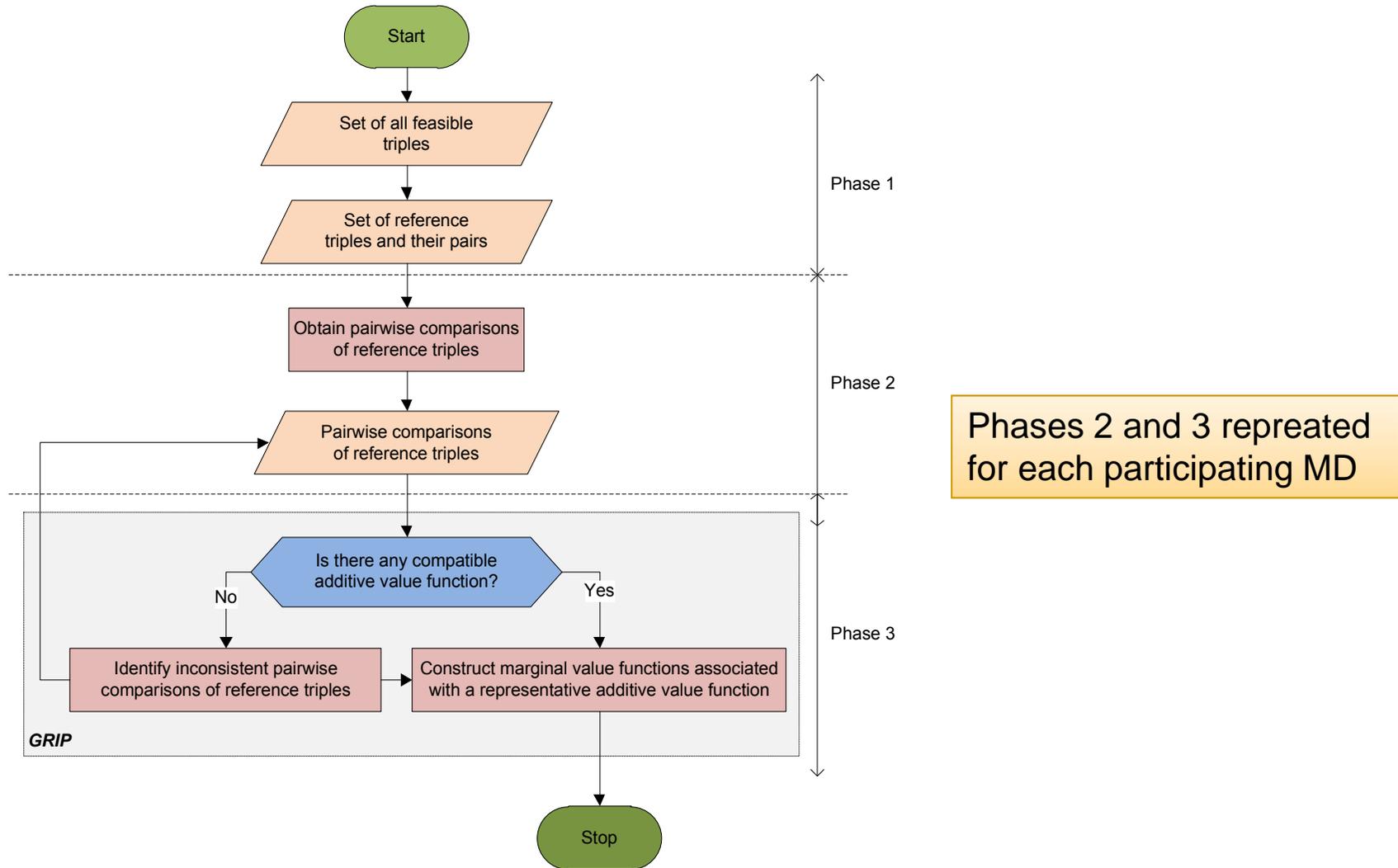
# Experimental Design: Data

T1	T2	P1	P2_3	P4	P5_6
NNN	YYX	↘	↘	↘	↘
NNX	YXY	↘	↘	↘	↘
NXN	XYY	↘	↘	↘	↘
NXX	XYX	↘	↘	↘	↘
XNX	XXY	↘	↘	↘	↘
XNN	YXX	↘	↘	↘	↘
NNN	YXY	↘	↘	↘	↘
NNX	XYY	↘	↘	↘	↘
XNN	XYX	↘	↘	↘	↘
NXX	XXY	↘	↘	↘	↘

From 24 feasible triples, 10 reference triples selected for comparison

6 MDs participated in the evaluation, with MD #2 and #3 and #5 and #6 (P2\_3 and P5\_6 respectively) giving the same answers

# Experimental Design: Phases



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# Results

- Because the domains of marginal value functions, are discrete, these functions are not continuous (become a set of the breakpoints for each)

Position 1					Position 2					Position 3				
	P1	P2_3	P4	P5_6		P1	P2_3	P4	P5_6		P1	P2_3	P4	P5_6
N	0.31	0.31	0.1	0.26	N	0.19	0.31	0.2	0.26	N	0.19	0.19	0.1	0.11
Y	0.42	0.42	0.4	0.53	Y	0.35	0.35	0.4	0.32	Y	0.23	0.23	0.2	0.16

- Insights:
    - It is very important to present most relevant document correctly on position 1;
    - It is important that a relevant document is placed on position 3 (but does not need to be truly the the least important from all the three).
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# Conclusions

- MDs pay considerable attention to the 1<sup>st</sup> position on a rank-ordered list;
  - Importance of what and how is presented diminishes when moving to the lower positions on a list, implying that the lists should be relatively short.
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