

St. Michael's

Inspired Care.
Inspiring Science.

Design of Physician Printed Educational Materials: Making Good Ideas Stick

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Study Objective

To determine whether physician-oriented Print Educational Materials (PEMs) are created in accordance with design principles described in multi-disciplinary literature

Why Do We Care?

Challenger Space Shuttle O-Ring Memo (Martin, 2012)

**“The result would be a catastrophe
of the highest order – loss of
human life”**

MORTON THIOKOL INC. COMPANY PRIVATE
Wasatch Division

Interoffice Memo

31 July 1985
2870:FY86:073

TO: R. K. Lund
Vice President, Engineering

CC: B. C. Brinton, A. J. McDonald, L. H. Sayer, J. R. Kapp

FROM: R. M. Boisjoly
Applied Mechanics - Ext. 3525

SUBJECT: SRM O-Ring Erosion/Potential Failure Criticality

This letter is written to insure that management is fully aware of the seriousness of the current O-Ring erosion problem in the SRM joints from an engineering standpoint.

The mistakenly accepted position on the joint problem was to fly without fear of failure and to run a series of design evaluations which would ultimately lead to a solution or at least a significant reduction of the erosion problem. This position is now drastically changed as a result of the SRM 16A nozzle joint erosion which eroded a secondary O-Ring with the primary O-Ring never sealing.

If the same scenario should occur in a field joint (and it could), then it is a jump ball as to the success or failure of the joint because the secondary O-Ring cannot respond to the clevis loading rare and may not be capable of pressurization. The result would be a catastrophe of the highest order - loss of human life.

An unofficial team (a memo defining the team and its purpose was never published) with leader was formed on 19 July 1985 and was tasked with solving the problem for both the short and long term. This unofficial team is essentially nonexistent at this time. In my opinion, the team must be officially given the responsibility and the authority to execute the work that needs to be done on a non-interference basis (full time assignment until completed).

Why Do We Care?

- Physicians are experiencing information overload
- Transfer of clinical knowledge into practice is slow and haphazard (Graham, 2006)
- Interventions to change physician behaviour have mixed results (Graham, 2006)

What are PEMs?

- Printed educational materials
 - Published or printed clinical care recommendations, including guidelines or other evidence (Grimshaw, 2003)
- Potential effect modifiers (Giguere, 2012)

Source

Channel of
Dissemination

Message

Format
(Visual
Aspect)

Methods

1. Examined the Evidence



2. Created a Checklist



3. Identified a Sample of PEMs



4. Evaluated PEMs using
Checklist

Methods: The Evidence

- Realist review on guideline implementability
- Medicine, psychology, human factors/design, and business literatures
- Mapped onto knowledge synthesis, considered judgment, feasibility, message, and format domains

1

2

3

4

Methods: The Evidence

- Process of reading PEMs (Kang, 2005):

Perception



Cognition



Assessment

1

2

3

4

Methods: The Evidence

Perception

Visualization: Data is easier to process, can increase feeling of credibility (Lehtonen, 1988)

Vividness: Increases use of data in decision making (Lurie, 2007)

Cognition

Evaluability: Easy to compare data results in increased acquisition and information processing (Lurie, 2007)

1

2

3

4

Methods: The Evidence

Assessment

Design elements can affect how true a statement is perceived to be (Johnson, 2007; Alter, 2009)

- Conceptual fluency (semantic priming)
- Visual clarity
- Phonological simplicity

1

2

3

4

Methods: The Checklist

Citations from realist review were operationalized into checklist items:

“The modal response for the maximum text length of a guideline to which physicians would refer was two pages.”
(Wolff, 1998)



Is the document 2 pages or shorter?

1

2

3

4

Methods: The Checklist

Some items were too technical:

- Difficult to test/appraise by non-experts

“For contrast, there should be both a significant hue and luminance difference” (Ware, 2004)

1

2

3

4

Methods: The Checklist

The concepts lead to 6 checklist categories:

1. General Layout & Structure
2. Content
3. Text
4. Colour
5. Tables
6. Figures

1

2

3

4

Methods: The Sample

Cochrane Review (Giguere et al. 2012)



45 studies



13 PEMs

1

2

3

4

Methods: The Evaluation Process

Checklist piloted by 4 researchers



PEMs evaluated independently, in duplicate

1

2

3

4

Results: PEM Types

- 6 brief guides for clinical education
- 5 peer reviewed journal articles
- 1 bulletin
- 1 algorithm

Results: Design Features

General Layout and Structure

Design Feature	# of PEMs
Table of Contents	1
Definition of Terms	1
Use of Sections	6
Use of Headings	11

Results: Design Features

Content

Design Feature	# of PEMs
Introduction	10
Summary	4
Recommendations	10

Presentation and Use of Text

Design Feature	# of PEMs
Use of Highlighting	6
Use of Bullet Points	6

Results: Design Features

Colour, Tables & Figures

Design Feature	# of PEMs
Colour	9
Tables	9
Images	5
Graphs	4
Algorithms or Flowcharts	5

Results: How Did They Do?

“Needs Work”

- Summaries
- Recommendations
- Images

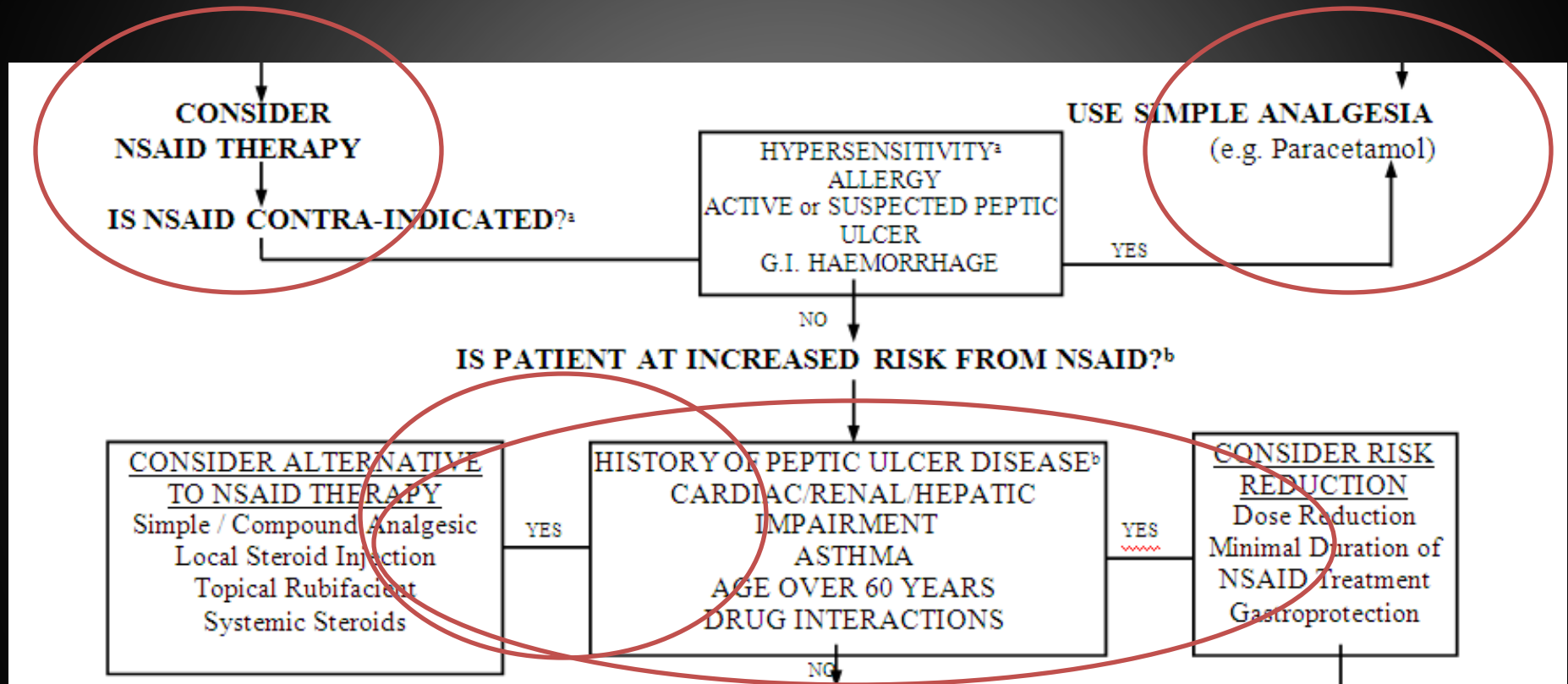
“Good Start”

- General layout and structure
- Tables
- Algorithms

“Looks Good”

- Introductions
- Use of colour
- Graphs

Example: Algorithm



What Did We Learn?

- Results show that PEM developers DO put effort into the design of their materials
 - Some design elements are known and used well
 - Still need guidance and information on certain design elements

Limitations

- The Checklist:

Still a work in
progress



Based on extensive
evidence

- The Sample

Sample of
PEMs



All PEMs evaluated
using rigorous
study design

Next Steps

1

Shorten and
improve
checklist

2

Pilot for PEM
appraisal

3

Create
version for
PEM
developers

Conclusion

- Limited use of design and formatting means critical messages may be lost



- Design principles can differentiate key recommendations
- Improve the transfer of knowledge to health provider
 - Ultimately improve patient care

Thank You

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APPLICATIONS DES CONNAISSANCES CANADA

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