Rule Breaking

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Session contents

• Overview of rule build and design principles.
• Developing an interaction rule
• Issues with rules
• Sample governance processes
• WARNING:
  – Largely Cerner based but transferable.
  – Deliberately contains gobbledygook.
How it starts

• The clinical team

“Can we have an interaction rule for statins and stuff?”
How it starts

• The Informatics team

“Yeah no problem!”
How it ends

MAJOR Atorvastatin and Ciclosporin Interaction

There is a significant interaction between Atorvastatin and CicloSPORIN.

Concurrent use increases plasma levels of Atorvastatin, which can lead to myopathy / rhabdomyolysis, which can be fatal. For more information click [Here](#).

When prescribed with CicloSPORIN the maximum dose of Atorvastatin is 10 mg daily.

This alert will cancel this order a lower dose of Atorvastatin can be ordered below.

Add Order For:

- **Atorvastatin → DOSE: 10 mg, oral, NOCTE**
It is all very simple!

<table>
<thead>
<tr>
<th>Cerner Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evoke</td>
<td>The high level trigger</td>
</tr>
<tr>
<td>Logic</td>
<td>The fine details</td>
</tr>
<tr>
<td>Action</td>
<td>The response</td>
</tr>
</tbody>
</table>
Until it becomes complex

• All about the details . . .
  – What specifically does the rule require?
  – What should the rule do?
  – When should it do it?
  – Who for?

• How will the rule be maintained?

• Is there a better way to do it?
Breaking Rules - When

• Evoke actions:
  – OpenChart
  – Add to scratchpad
    • Order? resume? cancel
  – Sign order
  – Clinical event

• Details:
  – Which applications?
  – Who?

Revision of ePx

<table>
<thead>
<tr>
<th>Log on to system.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access patient’s record</td>
</tr>
<tr>
<td>Search for drug(s) or set(s) or plan(s)</td>
</tr>
<tr>
<td>Select from above</td>
</tr>
<tr>
<td>Select order details.</td>
</tr>
<tr>
<td>Review</td>
</tr>
<tr>
<td>Sign</td>
</tr>
<tr>
<td>Review</td>
</tr>
<tr>
<td>Exit patient’s record</td>
</tr>
</tbody>
</table>
Rule Breaking - Why

- Logic section:
  - Incoming order, results
    - Type, dose, route, value, status
  - Previous order, result(s)
    - When, how long ago, this admission?
  - Demographics
    - Gender, age, location
  - Evaluation \((\text{weekday} (\text{curdate}) = 0 \text{ or } \text{weekday} (\text{curdate}) = 6) \text{ or } (\text{curtime} < 0800 \text{ or } \text{curtime} > 1900)\)
  - Calculation
Rule breaking - What

• Actions:
  – Pop-up – instant vs delayed, block, inform,
  – Messages – who to? Data governance
  – Maintain orders e.g. referral
  – Maintain results
  – Secondary rule
  – Action groups
Design principles

• Manageable chunks
• Many simple rules vs Fewer Complex rules
• Develop in de-bug mode.
• Build in small pieces and test as you go.
• Develop template rules with consistent:
  – Nomenclature
  – inclusion / exclusion processes
  – Build sequence
# The same interaction 3 ways

(Statin + Ciclosporin)

<table>
<thead>
<tr>
<th>Rule 1. Simple pop-up rule</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evoke:</strong></td>
</tr>
<tr>
<td>Add to scratch pad or sign order</td>
</tr>
<tr>
<td>Incoming order is a statin.</td>
</tr>
<tr>
<td>Not ordered by pharmacy</td>
</tr>
<tr>
<td><strong>Logic:</strong></td>
</tr>
<tr>
<td>Incoming order is a statin</td>
</tr>
<tr>
<td>Active orders exist for Ciclosporin.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
</tr>
<tr>
<td>Single pop-up message</td>
</tr>
<tr>
<td>Default to cancel order?</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>Needs a co-rule for incoming Ciclosporin.</td>
</tr>
<tr>
<td>Same action for all statins</td>
</tr>
</tbody>
</table>
## Rule 2. Variable pop-up rule

| **Evoke:** | Add to scratchpad or Sign order  
Incoming order is a statin or ciclosporin.  
Not ordered by pharmacy |
|---|---|
| **Logic:** | Incoming order is either:  
1) Rosuvastatin, Pravastatin, Simvastatin  
2) Atorvastatin dose >10mg  
3) Ciclosporin  
Active orders exist for either:  
4) Rosuvastatin, Pravastatin, Simvastatin  
5) Atorvastatin dose >10mg  
6) Ciclosporin. |
| **Action Group(s):** | Four different pop-up messages if  
1 and 6, 3 and 4 = Cancel statin  
2 and 6, 3 and 5 = cancel and prompt 10mg atorvastatin |
| **Comments:** | Handles atorvastatin  
Requires paediatric version allowing pravastatin.  
Signorder option allows rule on resume |
<table>
<thead>
<tr>
<th>Rule 3: Referral to pharmacy, no pop-up for prescriber</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evoke:</strong></td>
</tr>
<tr>
<td>Sign order.</td>
</tr>
<tr>
<td>Incoming order is a statin or ciclosporin.</td>
</tr>
<tr>
<td>Not ordered by pharmacy</td>
</tr>
<tr>
<td><strong>Logic:</strong></td>
</tr>
<tr>
<td>Incoming order is:</td>
</tr>
<tr>
<td>(Rosuvastatin, Pravastatin, Simvastatin, Atorvastatin</td>
</tr>
<tr>
<td>And an active order exists for Ciclosporin.)</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>(Ciclosporin</td>
</tr>
<tr>
<td>And an active order exists for Rosuvastatin, Pravastatin, Simvastatin, Atorvastatin)</td>
</tr>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>Generates Pharmacy referral and task for Statin / Ciclosporin review.</td>
</tr>
<tr>
<td>Creates a specific pharmacy priority score.</td>
</tr>
<tr>
<td>Recalculates overall priority score</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>Requires co-rule to readjust priority score when task is completed.</td>
</tr>
</tbody>
</table>
Design Complexities

• Multiple systems.
• Synchronous vs Asynchronous.
• Substitution values.
• Numeric maths vs decimal point maths.
• Scope of EPR deployment.
• Do you really want to put an absolute block on something?
Maintenance Complexities

• Over-lapping rules.

• Changes in:
  – User positions.
  – Templates.
  – Hyperlinks.
  – Drug catalogue.

• Experience tends to “Orange Juice.”
Current NUTH Governance

• All Requests reviewed by Med safety Working group (MSWG)
• Pro-forma to define the rule contents.
• Estimate of build time.
• Build / test in path to production
• Log development time
• Advise audit and review process.
Development time estimate NUTH

• Based on pharmacy prioritisation work.
• And assuming:
  – 3 domain path to live
  – change control.
  – Testing.
  – Fully defined
• Simple order or clinical event rule 3 days
• Clinical event and order rule e.g. TDM 6 days
• Interaction 9 days
Have you got the resources to do this?