Simplifying Medication Scheduling
Can We Confuse Patients Less?

Alastair J.J. Wood MD
Taking Medicines Requires Knowing

- What to take
- How many pills to take
- When to take them
Successful Drug Therapy Requires

- **Physician**
  - Correct choice of drug
  - Correct choice of dosage
  - Correctly writing Rx

- **Pharmacist**
  - Correctly understanding Rx
  - Correctly transcribing Rx to bottle
  - Correctly transmitting information to patient
Successful Drug Therapy Requires

- **Patient**
  - Access to medicines
  - Correct use of medicines
    - Correct understanding of instructions
    - Correct implementation of instructions
    - Integration of multiple medicines into schedule
    - Actually taking medicine(s)
Correctly Taking Medication

 Much much harder than it looks!

 When do I take them?
 How much do I take?
 How many tablets?
 Which medicines do I take when?
Variability in Label Instructions
“Take 1 pill a day”

- **Prescriber**
  - Inter—different prescribers write it 44 ways!
  - Intra—same prescriber multiple ways!

- **Pharmacist**
  - Inter—different pharmacists transcribe same sig differently
  - Intra—same pharmacists transcribe it differently at different times
Prescription Clarity?
Transcription of Rx to Label?
# Transcription of Rx to Label Imperfect and Variable

<table>
<thead>
<tr>
<th>Prescription</th>
<th>Examples of Pharmacy ‘Sig’ Interpretations</th>
</tr>
</thead>
</table>
| Lipitor 10 mg tabs  
Take one tab QD  
Dispense #30  
Indication: for high cholesterol  
No refills | - "Take one tablet daily."
- "Take 1 tablet by mouth for high cholesterol."
- "Take one (1) tablet(s) by mouth once a day."
- "Take one tablet by mouth every day for high cholesterol."
|
| Fosamax 5 mg tabs  
Take one tab QD  
Dispense #30  
Indication: osteoporosis prevention  
Do not lie down for at least 30 minutes | - "Take 1 tablet by mouth daily."
- "Take one tablet by mouth every day for osteoporosis prevention. Do not lie down for at least 3 minutes after taking."
- "Take 1 tablet every day, 30 minutes before breakfast with a glass of water. Do not lie down."
- "Take one tablet every day."
|
| Bactrim DS tabs  
Take one tab BID  
Dispense #6  
Indication: UTI  
No refills | - "Take one tablet by mouth twice daily for UTI"
- "Take one tablet by mouth twice daily for urinary tract infection."
- "Take 1 tablet by mouth 2 times a day."
- "Take 1 tablet twice daily for 3 days."
|
| Ibuprofen 200 mg tabs  
Take 1-2 tabs TID PRN pain  
Dispense #30  
No refills | - "Take 1 to 2 tablets by mouth as needed for pain."
- "Take 1 to 2 tablets by mouth three times daily as needed for pain."
- "Take 1 to 2 tablets by mouth as needed for pain ** Not to exceed 4 times a day"
- "Take 1 to 2 tablets 3 times a day as needed for pain."
Container Label Variability
Varies by Pharmacy

- Most prominent
  - Pharmacy name
  - Pharmacy phone number
  - Refill number

- Less prominent/less clear
  - Patient instructions
Patient Understanding Imperfect

- 46% of patients misinterpret 1 or more Rx instructions on labels

Wolf MS, et al. Pat Ed Counsel 2007; 67: 293-300
Patient Understanding Imperfect

**Dosage Instruction**

Take one teaspoonful by mouth three times daily

**Interpretation**

Take three teaspoons daily

Take three tablespoons every day

Drink it three times a day

*Wolf MS, et al. Pat Ed Counsel 2007; 67: 293-300*
<table>
<thead>
<tr>
<th>Dosage Instruction</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take one tablet by mouth twice daily for 7 days</td>
<td>Take two pills a day</td>
</tr>
<tr>
<td></td>
<td>Take it for 7 days</td>
</tr>
<tr>
<td></td>
<td>Take one every day for a week</td>
</tr>
<tr>
<td></td>
<td>I’d take a pill every day for a week</td>
</tr>
</tbody>
</table>

*Wolf MS, et al. Pat Ed Counsel 2007; 67: 293-300*
<table>
<thead>
<tr>
<th>Dosage Instruction</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take two tablets by mouth twice daily</td>
<td>Take it every 8 hours</td>
</tr>
<tr>
<td></td>
<td>Take it every day</td>
</tr>
<tr>
<td></td>
<td>Take one every 12 hours</td>
</tr>
</tbody>
</table>

*Wolf MS, et al. Pat Ed Counsel 2007; 67: 293-300*
Patient Understanding Imperfect

Dosage Instruction

Take one tablet in the morning and one at 5 pm

Interpretation

I would take it every day at 5 o’clock

Take it at 5 p.m.

Wolf MS, et al.  Pat Ed Counsel 2007; 67: 293-300

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Current Situation Unsatisfactory
Need For Radical Change

- Prescriptions unclear
- Transcription of Rx to label imperfect
- Patient understanding of label poor
- Variability excessive
- Complexity excessive
Patient’s Day

- 7am 3pm
- 8am 4pm
- 9am 5pm
- 10am 6pm
- 11am 7pm
- Noon 8pm
- 1pm 9pm
- 2pm 10pm

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<table>
<thead>
<tr>
<th>Time</th>
<th>Medicine Administration</th>
<th>Time</th>
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© Alastair J.J. Wood
### Patient’s Day

**TID Med & QID Med**

<table>
<thead>
<tr>
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<th>TID</th>
<th>QID</th>
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<tbody>
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© Alastair J.J. Wood
## Patient’s Day

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© Alastair J.J. Wood
# Patient’s Day

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**BID Med**

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<tbody>
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<td>11pm</td>
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</table>

8 episodes/day!!!
Proposal
Universal Medication Schedule UMS

- Breakfast time
- Lunch time
- Supper time
- Bed time
Proposal
Universal Medication Schedule UMS

As far as possible all medicines should be slotted into the **Universal Medication Schedule**

- Breakfast time
- Lunch time
- Supper time
- Bed time
Patient’s Day
TID Med

- Breakfast time
- Lunch time
- Supper time
- Bed time
### Patient’s Day

**TID Med & QID Med**

<table>
<thead>
<tr>
<th>Time</th>
<th>T</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Lunch</td>
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<td></td>
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<tr>
<td>Supper</td>
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<tr>
<td>Bed</td>
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</tbody>
</table>
Patient’s Day

TID Med & QID Med  BID Med

8 episodes/day reduced to 4/day

- Breakfast time: T Q B
- Lunch time: T Q
- Supper time: Q B
- Bed time: T Q
Proportion of Patients’ Rxs Covered

- Review of 346,844 oral prescriptions
  - Once a day 51%
  - Twice a day 19%
  - Three times a day 5%
  - Four times a day 2%
    TOTAL 77%
  As directed/As needed 15%
    TOTAL 92%
  - Five or more times a day 1%
  - Other 7%

Wolf, MS personal communication, October 2007
Patient Understanding of UMS

Randomized Trial (Comprehension Testing)
- 500 patients, 2 sites (Chicago, Shreveport)
- BID, TID, QD prescriptions tested
  - Enhanced text only
  - Standard label
  - UMS label
- UMS 5x better comprehension compared to standard label (p<0.001)

© Alastair J.J. Wood

Wolf, MS et al. personal communication, 2007
Patient Understanding of UMS Compared to Standard Label

5x better comprehension compared to standard label (p<0.001)

© Alastair J.J. Wood

Wolf, MS et al. personal communication, 2007
# Standard Dosing Times On Prescriptions

**Alastair Wood, MD**  
1234 Springfield Drive  
Nashville, TN 54321  
(302) 432-1234

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Schedule</th>
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<tbody>
<tr>
<td>1. ________________</td>
<td>2. ________________</td>
<td>3. ________________</td>
</tr>
<tr>
<td>Dose: ________________</td>
<td>Dose: ________________</td>
<td>Dose: ________________</td>
</tr>
<tr>
<td>Take for: ________________</td>
<td>Take for: ________________</td>
<td>Take for: ________________</td>
</tr>
</tbody>
</table>

**Schedule**

<table>
<thead>
<tr>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
<th>Bedtime</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

**Additional Instructions**

- Take with a meal
- Swallow whole
- Do not drink alcohol
- Limit your time in the sun
- Other ________________

© Alastair J.J. Wood
Glyburide 50mg  09/26/2007
This medicine is for Michael Wolf
To treat Diabetes
Prescribed by Ruth Parker, MD
Filled by Target Pharmacy
123 State Street
St. Paul, MN 12345
(312) 123-4567
You have 11 refills
Refer to Rx# 789-3452-1-0

<table>
<thead>
<tr>
<th></th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
<th>Bedtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take 2 tablets in the morning, and 2 tablets at bedtime</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• Take with a meal
• Swallow tablet whole
• Do not drink alcohol
Benefits

- Patients, physicians, pharmacists use the same schedule
- Variability in Rx reduced
- Variability in transcription of Rx reduced
- Patients understanding improved
- Patient adherence improved
- Therapeutic outcome improved
Benefits

- Universal Prescription pads
- Universal labels
- Universal medicine reminder boxes
- Uniform medication schedules in pivotal clinical trials for FDA approval
- Consistent format across all domains
- Reduction in errors/variability
Potential Objections
Drug concentration variability

- Concentrations actually vary enormously among individuals—Biological variability
- Product variability
- Brand/Generic Variability
  - FDA requirement for brand/generic equivalence
    - only requires that for peak and average concentrations (AUC) “90% CI between 80%-125% of branded product”
FDA Definition of Equivalence

- 90% confidence intervals for peak and average concentrations (AUC) must lie within 80%-125% of those of branded product.
Potential Objections
Drug concentration variability

- Within patient variability will be improved by Uniform Medication Schedule
  And that is what matters!

- Across patient variability is already greater than change produced by UMS

- No physician actually knows when meds taken
Uniform Medication Schedule

- Simplifies dosing schedule
- No loss of efficacy
- Improves patient understanding
- Improves patient adherence
- Reduces errors
- Reduces variability
- Improves outcome