Results and Impact of Electronic Prescribing (e-Rx) Use;
3rd teleconference in a series of four on the Medicare Modernization Act e-RX Pilot Evaluation

November 2, 2007

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Moderator:
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ePrescribing Pilot Findings

Ken Majkowski, Pharm D
Vice President, Clinical Affairs and Product Strategy

November 2, 2007
Background

• Overview of RxHub
  – Services
• RxHub Experience with Pilot Transactions
  – Metrics
• Pilot Findings and Correlation to RxHub Experience
RxHub Overview

- Founded in 2001 by the three largest PBMs. Resulted in a nationwide ePrescribing information exchange network
- Open to all ePrescribing stakeholders to ensure fastest route to widespread adoption and cost effective healthcare delivery
- Utilizes (and develops) industry transactional standards to securely communicate consenting patient information in real-time between ePrescribing stakeholders (ASC X12, HL7, and NCPDP)
- Provides clinical decision support information - patient eligibility, benefits, formulary, and medication history - for more than 160 million patients to physicians at the point-of-care (access to more than 200 million patients are under contract)
- Delivers real-time, informed electronic prescriptions to pharmacists in the retail and mail order settings
- RxHub does not alter clinician/patient relationships, or business relationships between payers, pharmacies, and technology vendors
- Cost Recovery Model
RxHub Success Factors

• Delivering Value – Payer Centric Model
  – Leverage assets to deliver value to all Stakeholders

• Unique Products & Services
  – **Master Patient Index (MPI)**
  – **PRN (Eligibility, Formulary & Benefits, Med History)**
  – **SIG (NewRx, Refill/Renewal, Change, Cancel, Fill Status)**
  – **MEDS (Med History for the acute care setting)**
  – Pharmacy Benefit Eligibility at the point of dispensing
  – RxHub Integration Services
RxHub Services

- **Person Index**: Provides real-time access to more than 180M members uniquely identified using demographic elements (over 200M under contract).
- **Patient Eligibility**: Provides real-time access to patient eligibility, benefit and coverage, and formularies for authorized clinicians at the point of care. Patient eligibility is also available to pharmacists at the point of dispensing.
- **Patient Medication History**: Provides real-time PBM drug history for all patient coverages and includes original prescription and refills. Data can be used to indicate patient compliance, therapeutic interventions, drug-drug and drug-allergy interactions, adverse drug reactions, and duplicate therapy. This information is available for outpatient, inpatient and emergency departments.
- **Patient Prescriptions**: Provides bi-directional electronic delivery of prescriptions between physicians and pharmacies of the patients choice (retail, mail order and Long Term Care).
RxHub Participant Activity YTD – October 2007

**Payers/PBM Partners**
- ACS
- Aetna
- Argus
- Care First
- Humana
- Independence Blue Cross
- Regence
- BCBS Florida
- BCBS Illinois
- BCBS Minnesota
- CAQH
- CVS Caremark
- PharmaCare
- EDS
- Express Scripts
- First Health
- MC-21
- Medco Health Solutions
- Presbyterian Health
- RESTAT
- SXC
  - Independent Health
  - MedMetrics
- WellPoint
- Hospital Distributors
- DB Motion
- DrFirst
- GE Healthcare
- Healthcare Systems
- InterMedHx
- Patient Keeper
- Quovadx
- Regenstrief Institute
- Siemens Healthcare
- Emergency Preparedness
  - * ICERx.org

**RxHub MPI**
RxHub National Patient Health Information Network™ provides access to more than 180M covered lives in the US

**RxHub PRN/SIG**
- Ambulatory
  - 115M Eligibility & Benefit Requests
  - 11M Medication History Profiles Delivered
- 999K New/Refill Prescriptions delivered to Retail/Mail

**Technology Application Partners**
- Achieve Healthcare
- Allscripts
- Touchworks
- eRX Now
- HealthMatics
- Athena Health
- Axolotl
- Bond Medical
- Catalis Health
- Cerner
- Chart Connect
- Community Computer
- DAW Systems
- DrFirst
- eClinical Works
- eHealth Solutions
- ElectroMed
- Emdeon
- EPIC
- ePocrates
- First Point
- Gold Standard
- H2H Solutions
- Health Vision
- InstantRx
- iScribe
- MA Share
- Caregroup
- McKesson
- RelayHealth
- Practice Partner
- MDOffices
- Medical Info Sys
- MedicWare
- MedKeeper
- MedPlus
- Medport
- Misys
- NewCrop
- NextGen
- OA Systems
- Phytel
- Prematics
- Pulse Systems
- Regenstrief INPC
- RxNT
- SafeMed
- SAGE
- ScriptRx
- Sequel Systems
- SSIMED
- STI Computer
- Synamed
- Virtual Medical Network
- Waiting Room Solutions
- Zix Corporation
- Zynchos
- Network Pharmacies
- Caremark Mail Order
- eRX Network
- Express Scripts Mail Services
- Medco Mail Order
- PharmaCare
- RNA

**RxHub MDS**
- Acute Care
  - 2.5M Medication History profiles delivered

**Network Pharmacies**
- Caremark Mail Order
- eRX Network
- Express Scripts Mail Services
- Medco Mail Order
- PharmaCare
- RNA

**Emergency Preparedness**
- * ICERx.org

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RxHub Quarterly Script Volume (000's)
ePrescribing Pilot Participants

**Long Term Care e-Rx Standards Pilot Study - Minneapolis**
- Participants: Achieve Healthcare Technologies, Benedictine Health System (BHS), Preferred Choice Pharmacy (PCP), RNA Health Information Systems, RxHub, BCBS Minnesota, Prime Therapeutics, MediMedia

**New Jersey E-Prescribing Action Coalition**
- Participants: Horizon Blue Cross Blue Shield of NJ, Caremark Rx, iScribe, Allscripts (TouchWorks), RxHub, SureScripts, UMDNJ, Point of Care Partners, RAND Health

**Ohio KePRO**
- Participants: UPCP + Ohio KePRO, InstantDx (OnCallData™), NDCHealth (PERSÉ), RxHub, SureScripts, QualChoice, Aetna, MGMA Center for Research, Univ. of Minnesota Division of HSR, Wellpoint/Anthem, Aetna, Medical Mutual of Ohio, Wolters Kluwer Health, Partners Health Care, RAND Corporation

**The ePrescribing Gateway - Massachusetts**
- Participants: Brigham & Woman’s Hospital, Partners Healthcare, Beth Israel Deaconess Medical Center MSHARE, CSC Consulting, BCBS Massachusetts, Express Scripts, SureScripts

**SureScripts – Florida, Massachusetts, Nevada, New Jersey, Tennessee**
- Participants: Brown Medical School, Allscripts, MedPlus, DrFirst, Gold Standard, ZixCorp, Ahold, Albertsons, Brooks, CVS, Duane Reed, RiteAid, Walgreens, Walmart, Kerr Drugs, Longs Drugs, Midwestern University, Chain Pharmacy Advisory Council, Independent Pharmacy Advisory Council

[INHS INLAND NORTHWEST HEALTH SERVICES]

[Agency for Healthcare Research and Quality]

[AHRC INLAND NORTHWEST HEALTH SERVICES]
Outcomes to Discuss

• Formulary versus Generic Prescribing
• Medication History Utilization
• Inappropriate Prescribing/Adverse Drug Events
Standards

• Initial Standards
  – Formulary and Benefit
  – Medication History
  – Fill Status
  – Prior Authorization
  – Structured & Codified SIG
  – RxNorm

• Foundation Standards
  – Eligibility
  – SCRIPT
  – Telecom
Formulary & Benefits Findings

• Analysis shows that this standard is technically able to convey the information needed to support this function for use in Part D

• Implementation issues
  – Matching patients to health plans
  – As more Health Plans participate, Eligibility information will be more readily available
RxHub Master Person Index Coverage – October 2007

RxHub National Patient Health Information Network™

Range of Covered Lives Accessible through RxHub

- 80 – 100%
- 60 – 79%
- 40 – 59%
- 20 – 39%
- Less than 20%

Note: Does not include lives under contract
ePrescribing Case Studies

• The ePrescribing experience of Henry Ford Health System exceeded their expectations.
  – More than 2,100,000 prescriptions have been sent electronically to date with the following impact:
    • Over 80,000 were changed due to formulary messages
    • Over 200,000 were changed due to interaction warnings
    • Over 15,000 were changed due to drug allergy warning
    • The generic usage rate improved from 56.7% to 70.5%

• AETNA ePrescribing experience with Zix in New Jersey
  – 5 to 7 % increase in generic prescribing
Medication History Findings

- Analysis shows that this standard is technically able to convey the information needed to support this function for use in Part D
- Standard is relatively mature, widely adopted
- Useful for preventing medication errors and for understanding medication management compliance
- No one source provides a comprehensive listing of medications
- Underutilized by physicians
  - Believe the information is not complete enough to provide real value
  - Unaware information was available
- Need to reconcile data from multiple sources
Summary - Med History Focus

Group Findings

• Medication history is underused in practice today, even by physicians who prescribe electronically. Most physicians were unaware that external med history was or could be available to them.
• Physicians recognize that med history does or can provide them with very useful information and, as such, could contribute to efficiency and quality.
• In general, physicians want basic med history lists (drug prescribed) with ability to drill down for additional information.
• Physicians would like to have the capability to tailor functions for particular types of patients or drugs.
• No consensus on ideal workflow for using med history.
• Physicians need to be led in adoption of med history—they are not asking for it but appreciate its value once they see it.
• Physicians think that pharmacy claims history have a 6 to 12 week latency like medical claims.
Long Term Care Findings

• Analysis shows that ePrescribing can be supported, with some technical accommodations to the standards, in long-term care facilities for Part D implementation
• Exempted from testing interoperability with foundation standards
• Did not test medication history
• Provided 43% patient coverage using patient eligibility – much higher than anticipated
• No changes to Formulary and Benefit standard – works as designed
• Modifications needed to SCRIPT 8.1 foundation standard to support LTC
Outcomes

• **Formulary versus Generic Prescribing** – the role of ePrescribing in the use of on-formulary medication and generics is still very preliminary, with prescribers uncertain about the accuracy and completeness of formulary information

• **Medication History Utilization** – providers may have been unaware of the availability of this function and comments ranged from a perception of medication history as inaccurate, to those who viewed it as a good supplement to patient self-reporting

• **Inappropriate Prescribing/Adverse Drug Events** – data may demonstrate a potential decrease in medication errors, with many respondents indicating they overrode drug-drug interactions at least sometimes

• **Callbacks** – anecdotes indicate that especially in long-term care, callbacks were dramatically reduced but in another pilot site’s survey, no significant differences were noted
Conclusion

• Electronic prescribing is still in its infancy
• Pilot sites demonstrated potential for effective standards-based implementation of three of the initial standards
• Additional work to be done on remaining three for Part D recommendation
• Implementation issues still remain
  – Should be addressed through industry stakeholder input into the established process leading up to the issuance of final ePrescribing standards
Conclusion

• Pilot project impacted by…
  – Limited amount of time granted to recruit grantees/contractor and conduct pilot site activities
  – Small size of the pilot sites which may or may not represent a statistically significant sample
  – Ability of the grantees/contractor to recruit the right set of participants to make the outcomes meaningful
• Majority of practices consist in size of one or two physicians
  – Adoption of ePrescribing may be slower
  – Requirements for support will be higher than physicians in larger offices
• Large physician offices more likely to deploy ePrescribing along with other HIT systems
• Continue to work with industry, standards setting organizations and other interested stakeholders to fully adopt and implement electronic prescribing in order to reap its many potential benefits
Thank You

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Studies of E-Prescribing Adoption and Use in the New Jersey E-Prescribing Action Coalition

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VA Greater Los Angeles Healthcare System

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Point of Care Partners
Medicare Modernization Act

- Established prescription drug benefit
  - Concerns raised about costs and safety
- E-prescribing goal: “Deliver information to the point of care that enables more informed decisions about appropriate and cost effective medications.”
- Part D plans required to accept electronic Rx
  - 2006: Pilot testing of “initial” eRx standards
  - 2007: HHS reports to Congress, e-prescribing NPRM
  - 2008: E-prescribing final rule of additional standards
  - 2009: Final standards effective no later than one year after promulgation of final rule
Conceptual Model

- Structure of the standard enables
- Information display / capture at prescriber enables
- Changes in work processes produce
- Changes in drug use:
  - Appropriateness
  - Costs
  - Patient adherence
- Other effects:
  - Labor and other costs
  - Health service use
  - Patient satisfaction
New Jersey E-prescribing Action Coalition

- Horizon BCBSNJ “E-Prescribe” program
  - Targeted enrollment of 1000 MDs
  - Paid for installation, training; honorarium for use
    - Caremark - *iScribe*
    - Allscripts - *TouchWorks*
    - InstantDx - *OnCallData*

- RxHub
- SureScripts
- Point of Care Partners
- UMDNJ
- RAND
Methods: Adoption and Use Analysis

• Adoption (as of July 1, 2006)
  – E-prescribing primary care physicians who activated January – December, 2005
    • Characterize based on assigned patient panel
    • 6 full months of post-activation records
    • iScribe users only; Allscripts, InstantDx installation didn’t begin until 2006
  – Comparison: Primary care physicians who hadn’t enrolled in e-prescribing as of July 1, 2006

• E-prescribing usage ratio
  \[
  \text{Count of e-prescriptions MD wrote in period} \quad \div \quad \text{Count of Rx claims from MD in period}
  \]
Enrollment and Activation

4661 MDs offered eRx

706 MDs enrolled

155 MDs hadn’t activated by 1/1/2006

551 MDs activated eRx by 1/1/2006

268 MDs with no primary care patients as of 1/1/2006

283 PCPs in e-Prescribing cohort

3966 MDs did not enroll

2091 with no primary care patients as of 1/1/2006

1875 PCPs in control cohort
Factors Associated with Participation

<table>
<thead>
<tr>
<th>PCP Characteristics</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-5 physicians</td>
<td>1.9</td>
<td>1.4 – 2.5</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>6-10 physicians</td>
<td>1.6</td>
<td>1.0 – 2.5</td>
<td>0.04</td>
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<tr>
<td>&gt;10 physicians</td>
<td>1.2</td>
<td>0.3 – 4.1</td>
<td>0.78</td>
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<tr>
<td>HBCBSNJ Rx Claim Volume</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 1750/yr)</td>
<td>0.7</td>
<td>0.5 – 1.0</td>
<td>0.05</td>
</tr>
<tr>
<td>High (&gt;3500/yr)</td>
<td>1.1</td>
<td>0.8 – 1.5</td>
<td>0.45</td>
</tr>
<tr>
<td>Patient Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;10% of patients from predominantly black neighborhoods</td>
<td>0.7</td>
<td>0.4 – 1.0</td>
<td>0.03</td>
</tr>
</tbody>
</table>
E-Prescribing Usage

- 283 e-prescribers’ usage ratios for 2006
Factors Associated with eRx Use

• Average 2006 usage ratio: 0.24

<table>
<thead>
<tr>
<th>Practice Size</th>
<th>Coeff</th>
<th>(95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 – 5 physicians</td>
<td>-0.01</td>
<td>-0.09 – 0.07</td>
<td>.74</td>
</tr>
<tr>
<td>6 – 10 physicians</td>
<td>-0.14</td>
<td>0.04 – 0.24</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>11+ physicians</td>
<td>-0.15</td>
<td>0.01 – 0.29</td>
<td>.03</td>
</tr>
</tbody>
</table>

– Not significant (excluded from model):
  • MD specialty, Rx claim volume;
  • Patient panel mean age, gender, income, neighborhood race-ethnicity
Methods: Qualitative Case Study

• Purposive sample of 12 practices scheduled to install iScribe or Allscripts

• Site visits before and 3 months after eRx
  – Observation of physical environment, organizational culture, prescription workflow.
  – In-depth interviews of physicians, office managers, and office staff involved in prescription workflow.

• Qualitative Analysis
  – Transcripts coded using ATLAS.ti.
  – Identified themes using a template organizing style.
Case Study Results

• Of 12 practices where baseline site visits completed
  – 2 cancelled installation
  – 2 successfully installed but quit using eRx
  – 8 installed and still using eRx
    • Of these, only staff were still using at 2
Unsuccessful site

- 6-physician family medicine office, 11 non-MD staff

MD champion:

- “We went online Friday, I tried on Saturday, it worked. I tried at 9 am Monday, it didn’t work. We contact them and they called us 2 weeks later on Monday. So, the momentum was gone.”

- “I write the name and 6 prescriptions on one (sheet). And I can actually do that quicker. So I realized that it wasn’t gonna be a time improvement. I was torn, but then I thought, you know, I just can’t devote the time to become the expert I have to be to make it work flawlessly.”
Successful site

MD user:

“It’s made me a lot (quicker). After the uh, growing pains of getting used to how it worked (and the) initial bugs, and especially after (preferences) were in there … I didn’t have to put in the amount-the dosing, ‘cause it saves those configurations for you

“the one or two days lately when, for whatever reason, I couldn’t use it, I really felt how much (paper) was slowing me down…

“I think it’s increased patient satisfaction. You know, patients really like it. They think it’s very cool. Once in a while, the prescription doesn’t go through, but they don’t get angry or upset ‘cause I think they understand that, in the past, they always had to go to the pharmacy twice-to drop it off, and then to go get it.
Shifts in Work

- Solo OB/Gyn, 3 staff; physician only user

- **RN**: “His handwriting is atrocious and (I) was inundated with calls from the pharmacy about it before… (E-prescribing) has cut down on calls about handwriting.”

- **MD**: “(I’m now) doing more of what the nurse used to do with regard to prescriptions.”
  - Now approves and sends renewals using the PDA himself, vs. approving a telephone message and handing it back to the nurse to call in
Methods: Prescriber Survey

• Sample
  – 395 physicians who enrolled for eRx & had working email address
    • 236 iScribe or Allscripts users
    • 159 waiting list
  
• Data collection
  – Lead letter, email invite, telephone reminder
  – Online survey instrument
## Overall Experiences with E-prescribing

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The e-prescribing system is easy to use</td>
<td>3%</td>
<td>9%</td>
<td>6%</td>
<td>58%</td>
<td>24%</td>
</tr>
<tr>
<td>I use e-prescribing for most of my prescriptions</td>
<td>6%</td>
<td>15%</td>
<td>16%</td>
<td>26%</td>
<td>38%</td>
</tr>
<tr>
<td>E-prescribing has made work easier for my staff</td>
<td>5%</td>
<td>13%</td>
<td>33%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>E-prescribing has made my work easier</td>
<td>6%</td>
<td>16%</td>
<td>24%</td>
<td>32%</td>
<td>23%</td>
</tr>
<tr>
<td>Using e-prescribing improves the quality of care I can deliver</td>
<td>5%</td>
<td>14%</td>
<td>2%</td>
<td>38%</td>
<td>24%</td>
</tr>
<tr>
<td>Using the e-prescribing increases my productivity</td>
<td>7%</td>
<td>24%</td>
<td>28%</td>
<td>22%</td>
<td>19%</td>
</tr>
<tr>
<td>The system does not require a lot of mental effort</td>
<td>3%</td>
<td>13%</td>
<td>23%</td>
<td>45%</td>
<td>16%</td>
</tr>
</tbody>
</table>
Conclusions

• E-prescribing holds promise
  – Perception of increased safety and efficiency
    • Despite technical problems, poor functioning of standards
  – May save staff time more than prescriber time

• E-prescribing was substantially under-used
  – Yet a minority of e-prescribers achieved high use
  – Major predictors of high use not identified

• Future priorities
  – Identify workflow & training strategies to promote use
  – Improve technical functioning
Maximizing the Effectiveness of E-Prescribing Between Physicians and Community Pharmacies: Implementation

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Terri Warholak, PhD

November 2, 2007
OVERVIEW

OBJECTIVES OF THE PROJECT

**Testing** of interoperability of the standards; certification processes and pilot testing.

**Evaluation** of the implementation of the standards from multiple perspectives using mixed-method approach.

BREADTH: geography, e-prescribing technologies, practice settings, perspectives

- 6 states, 6 vendors, ~275 docs in ~88 practices, 276 retail pharmacy stores, ~1100 patients
Evaluation Strategies:

• **Mixed-method approach**
  – Qualitative methods:
    • Focus groups
    • Performance analyses (on-site observation) – physician practice only

  – Quantitative
    • Survey
      – Providers (physicians and other prescribers, pharmacists and pharmacy techs)
      – Patients
    • Documentation of interventions (pharmacy)
Patient Perspectives
Variation in patient preference for e-prescribing

Physician Software Vendor

OVERALL

A

B

C

D

E

F

0% 20% 40% 60% 80% 100%

Strongly prefer paper
Mildly prefer paper
Mildly prefer e-rx
Strongly prefer e-rx
Physician comments on patient preference

• “They love it. Even when we hated it in the beginning … the patients loved it. They were--they go there, it's ready for them. As opposed to going there… waiting in line, dropping off the thing and, okay, come back in forty minutes.”

• “Oh yeah they like it... There's – ‘Oh, that's cool; my doc is high tech.’ … So it's usually a positive thing unless they've had (a bad) experience -I've had patients where I go to pull out the PDA, and they go, ‘Oh no, not that thing; that didn't work last time.””

• “And then it doesn’t happen, and the patient gets pissed off… It happened to me--was it--Saturday night. I sent it from home and then continued to get calls from an irate patient every hour that it's not going through. And I knew I did it.”

• “So then that makes it difficult because then the patients don't want us to do it, you know, to prescribe electronically.”
Patients knowledge about e-prescribing

Does patient know practice uses e-prescribing?

Has patient ever had an e-prescription?

[Bar charts showing the distribution of responses for different groups (A to F) and overall.]

AHRQ | Agency for Healthcare Research and Quality
Physician comments on consistency of e-rx use

• “I think it is a big statement that we have changed our practice styles so much that it is now rare for me to write a prescription by hand.”

• “If I see a patient, it's still easier for me to sit there with my prescription pad because I don't have a computer in my exam room…. If someone … calls in and says I need a prescription … I'll have the nurse… enter it into the system… and I can just sign off on that.”

• “I can't do all (e-prescriptions) -- I see six patients an hour, and I cannot do all my patients on that. I have to do some written scripts, or I'll be really backed up.”

• “When they say they need potassium, I just pick up the phone and call rather than get on the [product name], log on [product name]… It's faster for me usually just to call.

• “Once in a while a patient will call me with a problem, and I'll just right off the bat I'll just call the pharmacy and call in a prescription for them.”
Patient expectations of prescription readiness

0% 20% 40% 60% 80% 100%

Immediate  Within a few hours  More than a few hours  By mail

OVERALL
A
B
C
D
E
F

Physician Software Vendor
Patient satisfaction with e-prescribing as dispensed at pharmacy

- Dissatisfied: 3%
- Somewhat dissatisfied: 14%
- Moderately satisfied: 29%
- Very satisfied: 54%
Clinician perspectives
How use of e-prescribing software has affected job compared to other methods

**Clinicians**
- Somewhat/ Much Worse: 17%
- Much Better: 35%
- Somewhat Better: 42%
- No Change: 6%

**Non-Clinicians**
- Somewhat/ Much Worse: 16%
- Much Better: 40%
- Somewhat Better: 39%
- No Change: 5%

[Graph showing survey results]
Perceptions on how e-prescribing has impacted quality and safety

![Bar chart showing perceptions of impact on patient safety and quality of care. The chart indicates a significant increase in perceptions of somewhat/much better for both patient safety and quality of care, with a corresponding decrease in perceptions of somewhat/much worse.](chart.png)
E-prescribing compared to other methods in terms of communication w/ pharmacies

- Much Better: 31%
- Somewhat Better: 43%
- No Change: 17%
- Somewhat/ Much Worse: 9%

Legend:
- Somewhat/ Much Worse
- No Change
- Somewhat Better
- Much Better
Pharmacy relationship

• “Well I think it's been good in the aspect that my scripts can be read by the pharmacy. I think they're thrilled with it.“

• “(Access to formulary and benefit information) saves us a lot of callbacks. Example, if the brand name is not covered at all but the generic is, you just automatically write the generic.”

• “Less time on the phone with the pharmacist… yeah, phone and time costs with the nurses in terms of they're not spending too much time on phones. They do it on a computer. It's just quicker.”
Pharmacy perspective
Pharmacist perceptions

How eRxs Compare: Pharmacists (n=446)

<table>
<thead>
<tr>
<th></th>
<th>Safety</th>
<th>Effectiveness</th>
<th>Efficiency</th>
<th>Pt Communication</th>
<th>MD Communication</th>
<th>Pt Relations</th>
<th>MD Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Much Better</strong></td>
<td>31.4%</td>
<td>23.1%</td>
<td>28.0%</td>
<td>11.7%</td>
<td>18.3%</td>
<td>11.0%</td>
<td>13.7%</td>
</tr>
<tr>
<td><strong>Somewhat Better</strong></td>
<td>41.5%</td>
<td>47.4%</td>
<td>47.0%</td>
<td>23.6%</td>
<td>30.2%</td>
<td>33.6%</td>
<td>27.7%</td>
</tr>
<tr>
<td><strong>No Change</strong></td>
<td>16.0%</td>
<td>20.9%</td>
<td>14.1%</td>
<td>52.3%</td>
<td>25.7%</td>
<td>43.5%</td>
<td>40.3%</td>
</tr>
<tr>
<td><strong>Somewhat Worse</strong></td>
<td>9.3%</td>
<td>7.7%</td>
<td>9.1%</td>
<td>10.4%</td>
<td>21.4%</td>
<td>10.4%</td>
<td>15.1%</td>
</tr>
<tr>
<td><strong>Much Worse</strong></td>
<td>1.8%</td>
<td>0.9%</td>
<td>1.8%</td>
<td>2.0%</td>
<td>4.3%</td>
<td>1.6%</td>
<td>3.2%</td>
</tr>
</tbody>
</table>
More work to be done…..

• Pharmacists intervene 3.8% of e-Rx
• The need for codified SIG clear

Warholak T, Rupp M. Medication Therapy Intervention Study.
Industry perspective: Codified SIG

Figure D2b. With respect to Structured and Codified Sig Formats, which approach is more likely to reduce the number of errors related to patient instructions that occurs in e-prescribing?

Clear perceptions of safety gains with 99/1 proposition
Industry perspective: Codified SIG

Figure D2c. With respect to Structured and Codified Sig Formats, which approach is more likely to reduce the number of calls between pharmacies and prescriber offices?

Favors 99/1 proposition to reduce callbacks
SUMMARY

• Just because a practice has e-Rx capabilities....
  – Not all clinicians within the practice e-rx
    • Training issues
    • Lack of understanding of benefits
  – Not all clinicians use e-rx with all patients
  – Not with all prescriptions
    • Regulations (scheduled drugs)
  – Not all functionalities of e-Rx
Summary

• Overall perspectives from patients, pharmacy, and clinicians optimistic

• More work needs to be done:
  – Less than optimal use of functionality
  – Reducing errors– Need codified SIG
  – Reducing use of multiple prescribing systems in practices

• Untapped potential?
  – Engaging:
    • Pharmacists – med history at point of dispensing?
    • Physicians – using med history in practice
    • Patients – e-rx tools to improve medication management
Bibliography


Goldman R, Dube C, Lapane KL. The status of electronic processing of refills (in preparation)

Lapane KL, Waring ME, Schneider KL, Quilliam BJ, Dube C. A mixed-method Study Of The Value Of Drug Alerts At Point Of E-Prescribing In Primary Care (in revision, JGIM)

Dube C, Lapane KL. Medication history at the point of prescribing: changing clinical practice (in preparation)


Rupp M, Warholak T. Pharmacy personnel attitudes towards e-prescribing. (in preparation)

Warholak T, Rupp M. Medication therapy interventions on e-prescriptions. (in preparation)

Lapane KL, Waring ME. Medicare Part D implementation: Lessons learned (in preparation)
Northeast Ohio CMS eRx Project

Workflow Findings

AHRQ eRx TeleConference, 11/2/ 07

Bob Elson, MD, MS  (bob.elson@eclipsys.com)
Chief Medical Officer, Eclipsys Corp.
MetroHealth Center for Healthcare Research and Policy

http://healthit.ahrq.gov/erxpilots
NEO eRx Project Participants

- UH Medical Practices + Ohio KePRO
- MGMA Center for Research
- Univ. of Minnesota Division of HSR
- InstantDx (OnCallData™)
- RxHub, SureScripts, NDC
- Aetna, Anthem, Medical Mutual of Ohio
- Partners Healthcare (Bates / Seger)

... and CMS, AHRQ, and the other pilots
NEO eRx: Workflow Overview

• eRx adoption and basic workflow
• Incumbent transaction volumes and workflow
  – Eligibility, Medication Hx, NEWRX
• Transaction interventions
  – Medication Hx, Fill Notification, Prior Auth
NEO eRX PROJECT TIMELINE 2006

Planning, Tool Development
Practice Recruitment, IRB

Health Plan Data Acquisition / Analysis

Med Hx (new)

Training

Prior Auth

Training

RxFILL

Training

Site Visits

270/271 SCRIPT
Formulary
Med Hx

Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec
UH Medical Practices (UHMP)

285 physicians, 73 practices, 42 communities
46 primary care; 27 specialty
1.25 million office visits / yr
Small Practice Adoption: Magic Mix

You can lead a horse to water...

- eRx offered $free$ to all UHMP practices
- Out-of-the-box integration w/ practice management system
- Minimal equipment requirements
- ASP delivery; robust remote training and support
- Each practice allowed to determine optimal workflow
- Malpractice subsidy if met threshold utilization criteria
Pre-Project eRx Adoption (All of UHMP)

AND make it drink (voluntarily) … !

Total e-Rx / mo, 1/05 -> 1/06
eRx (Study) and Control Practices

Study (eRx) group (n=25 practices, 130 physicians)
- Part of University Hospital Medical Practices (UHMP)
  - Community-based, primary care practices in Northeast Ohio
- Access to OnCallData™ e-prescribing software
- At least one doctor in the practice generated a minimum of 150 eRx in any month of 2006 prior to enrollment

Control group (n=22 practices, 77 physicians)
- Independent primary care practices in NEO
  - Not currently e-prescribing
- Convenience sample
  - Practices w/ Ohio KePRO relationship under 8th SOW
eRx and Control Practices

eRx and Control Groups:
• 25 UHMP practices with access to eRx (130 MDs)
• 22 non eRx practices (100 MDs)
• Loosely matched by size and specialty (separately)
## e-Prescribing @ 25 UHMP Practices

<table>
<thead>
<tr>
<th>Month</th>
<th>Total eRx</th>
<th>Study Group</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>32,153</td>
<td>21,095</td>
<td>65.6</td>
</tr>
<tr>
<td>February</td>
<td>31,723</td>
<td>21,304</td>
<td>67.2</td>
</tr>
<tr>
<td>March</td>
<td>40,079</td>
<td>26,549</td>
<td>66.2</td>
</tr>
<tr>
<td>April</td>
<td>35,680</td>
<td>23,406</td>
<td>65.6</td>
</tr>
<tr>
<td>May</td>
<td>42,646</td>
<td>27,497</td>
<td>64.5</td>
</tr>
<tr>
<td>June</td>
<td>40,451</td>
<td>26,588</td>
<td>65.7</td>
</tr>
<tr>
<td>July</td>
<td>37,795</td>
<td>24,349</td>
<td>64.4</td>
</tr>
<tr>
<td>August</td>
<td>43,560</td>
<td>27,977</td>
<td>64.2</td>
</tr>
<tr>
<td>September</td>
<td>42,228</td>
<td>27,660</td>
<td>65.5</td>
</tr>
<tr>
<td>October</td>
<td>47,998</td>
<td>31,402</td>
<td>65.4</td>
</tr>
<tr>
<td>November</td>
<td>46,440</td>
<td>30,343</td>
<td>65.3</td>
</tr>
<tr>
<td>December</td>
<td>44,674</td>
<td>29,131</td>
<td>65.2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>485,427</strong></td>
<td><strong>317,301</strong></td>
<td><strong>65.4</strong></td>
</tr>
</tbody>
</table>
eRx / prescriber / mo (10/06 by practice)

25 UHMP primary care practices
130 physicians

p = pediatric practice
# at top of each bar = number of physicians in that practice
Surrogate-Based e-Prescribing

- 48,013 eRx in October (all UHMP)
  - 16,715 entered directly by MD
    - 15,724 NewRx (~1000 Renew)
  - 97 / 219 e-prescribers did at least some data entry themselves
    - 122 did none
Renewal Workflow Findings

- eRx decreases dependence on phone / fax
  - Incoming Rx renewal requests from local pharmacies received by:
    |            | eRx | Control |
    |------------|-----|---------|
    | Phone      | 41% | 62%     |
    | Fax        | 25% | 36%     |
    | eRx        | 33% | 0%      |

- eRx practices still depend on paper for internal processing
  - For phoned-in requests, 81% communicated to MD by paper
    - Only 7% entered into OnCallData™ on the front end
  - For faxed requests, fax itself used for internal communication 91%
- 73% sent back to pharmacy via eRx
  - only 33% come in by eRx, but most entered into OCD on back end
  - 25% of authorizations called or faxed to pharmacy vs. 90% in control
Characterizing Rx-Related Phone Calls

PHONE TALLY SHEET

Date: __/__/____
Day of Week (circle): M T W Th F

Page ___ of ___

NOTE: PLEASE START A NEW FORM FOR EACH DAY

For each call, place an "X" in the appropriate box for each set of questions

Key:
- In = Incoming
- Out = Outgoing
- Live = Person on phone
- VM = Voice Mail Message
- PT = Patient
- Pharm = Pharmacy
- PBM = Pharm. Benefits Mgr.
- Form = Formulary (incl. generics)
- PA = Prior Authorization
- Clarify = Clarify Prescriptions
  (e.g. eligibility, other concern)
- Yes = Chart requested / pulled to handle call
- No = Chart not requested / pulled to handle call

<table>
<thead>
<tr>
<th>Call / Msg Type</th>
<th>Caller Type (Incoming Only)</th>
<th>Time on Phone</th>
<th>Source/Destination</th>
<th>Rx Issue</th>
<th>Chart Request? (Incoming Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In Out Live VM</td>
<td>&lt;2 min 2-5 min &gt;5 min</td>
<td>Pt Pharm PBM</td>
<td>New Renew Form PA Clarify</td>
<td>Yes No</td>
</tr>
<tr>
<td>2</td>
<td>In Out Live VM</td>
<td>&lt;2 min 2-5 min &gt;5 min</td>
<td>Pt Pharm PBM</td>
<td>New Renew Form PA Clarify</td>
<td>Yes No</td>
</tr>
</tbody>
</table>
eRx Impact on Call Types

• Inbound / outbound Ratio

• Relative % of outbound calls going to pharmacy
NEO eRx: Workflow Overview

• eRx adoption and basic workflow
• Incumbent transaction volumes and workflow
  – Eligibility, Medication Hx, NEWRX
• Transaction interventions
  – Medication Hx, Fill Notification, Prior Auth
Eligibility Checking Workflow

- Could be triggered manually, but...
- Usually automatic, on patient selection
- Formulary assignment behind the scenes (unless eligibility check failed, in which case formulary could be assigned manually)
- Users (and support team) uniformly unaware
- No dual-eligibility resolution workflow
Eligibility Checking Transaction

Foundation Standard: Eligibility (X12 270/271)
OnCallData™ sends name, dob, zip, gender to RxHub, gets formulary identifier in return (informs formulary selection for that prescribing session)

Jan → Dec ’06: 176K + responses / 300K checks (~59% hit rate)
## RxHub MPI Coverage in NEO (2006)

<table>
<thead>
<tr>
<th>MSANAME</th>
<th>STATE</th>
<th>Population</th>
<th>Total Lives</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canton-Massillon, OH MSA</td>
<td>OH</td>
<td>401,163</td>
<td>216,937</td>
<td>54.1%</td>
</tr>
<tr>
<td>Cincinnati-Hamilton, OH-KY-IN CMSA</td>
<td>OH</td>
<td>1,556,125</td>
<td>741,595</td>
<td>47.7%</td>
</tr>
<tr>
<td><strong>Cleveland-Akron, OH CMSA</strong></td>
<td>OH</td>
<td>2,947,194</td>
<td>1,851,263</td>
<td>62.8%</td>
</tr>
<tr>
<td>Columbus, OH MSA</td>
<td>OH</td>
<td>1,540,591</td>
<td>996,344</td>
<td>64.7%</td>
</tr>
<tr>
<td>Dayton-Springfield, OH MSA</td>
<td>OH</td>
<td>954,267</td>
<td>533,123</td>
<td>55.9%</td>
</tr>
<tr>
<td>Huntington-Ashland, WV-KY-OH MSA</td>
<td>OH</td>
<td>62,035</td>
<td>32,306</td>
<td>52.1%</td>
</tr>
<tr>
<td>Lima, OH MSA</td>
<td>OH</td>
<td>161,422</td>
<td>89,023</td>
<td>55.1%</td>
</tr>
<tr>
<td>Mansfield, OH MSA</td>
<td>OH</td>
<td>179,996</td>
<td>99,665</td>
<td>55.4%</td>
</tr>
<tr>
<td>Parkersburg-Marietta, WV-OH MSA</td>
<td>OH</td>
<td>64,513</td>
<td>32,709</td>
<td>50.7%</td>
</tr>
<tr>
<td>RURAL OHIO</td>
<td>OH</td>
<td>2,136,206</td>
<td>1,164,740</td>
<td>54.5%</td>
</tr>
<tr>
<td>Steubenville-Weirton, OH-WV MSA</td>
<td>OH</td>
<td>76,712</td>
<td>41,015</td>
<td>53.5%</td>
</tr>
<tr>
<td>Toledo, OH MSA</td>
<td>OH</td>
<td>614,641</td>
<td>432,023</td>
<td>70.3%</td>
</tr>
<tr>
<td>Wheeling, WV-OH MSA</td>
<td>OH</td>
<td>68,610</td>
<td>42,073</td>
<td>61.3%</td>
</tr>
<tr>
<td>Youngstown-Warren, OH MSA</td>
<td>OH</td>
<td>589,527</td>
<td>304,685</td>
<td>51.7%</td>
</tr>
<tr>
<td>OH Total</td>
<td></td>
<td>11,353,002</td>
<td>6,577,501</td>
<td>57.9%</td>
</tr>
</tbody>
</table>
# Eligibility Checking Transactions ‘06

<table>
<thead>
<tr>
<th></th>
<th>Eligibility Checks</th>
<th>Positive Responses</th>
<th>Percent Positive</th>
</tr>
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<tbody>
<tr>
<td>January</td>
<td>11,500</td>
<td>7,291</td>
<td>63.4</td>
</tr>
<tr>
<td>February</td>
<td>19,354</td>
<td>11,877</td>
<td>61.4</td>
</tr>
<tr>
<td>March</td>
<td>25,514</td>
<td>15,727</td>
<td>61.6</td>
</tr>
<tr>
<td>April</td>
<td>23,361</td>
<td>14,356</td>
<td>61.5</td>
</tr>
<tr>
<td>May</td>
<td>27,457</td>
<td>16,371</td>
<td>59.6</td>
</tr>
<tr>
<td>June</td>
<td>25,475</td>
<td>14,966</td>
<td>58.7</td>
</tr>
<tr>
<td>July</td>
<td>24,035</td>
<td>14,094</td>
<td>58.6</td>
</tr>
<tr>
<td>August</td>
<td>27,250</td>
<td>15,909</td>
<td>58.4</td>
</tr>
<tr>
<td>September</td>
<td>26,347</td>
<td>14,625</td>
<td>55.5</td>
</tr>
<tr>
<td>October</td>
<td>30,498</td>
<td>16,531</td>
<td>54.2</td>
</tr>
<tr>
<td>November</td>
<td>29,746</td>
<td>16,347</td>
<td>55.0</td>
</tr>
<tr>
<td>December</td>
<td>29,320</td>
<td>17,521</td>
<td>59.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>299,857</td>
<td>175,615</td>
<td>58.6</td>
</tr>
</tbody>
</table>
Medication History Transfer Workflow

- Automatically pre-fetched after positive eligibility check, but ...
- User action (manual trigger) required to view
- Patient consent implied via clinic registration (intervening consenting prompt upon manual trigger largely ignored)
- Users (and support team) unfamiliar with function itself, much less more complex data source and interpretation issues
- Lack of dual-eligibility resolution workflow is a setup for false positive patient matching
Medication History Transfer Workflow
Medication History Transaction

June → Sept '06: **46K med hx transfers (only 500 “views”)**

**Initial Standard: Medication History (SCRIPT 8.1)**
OnCallData™ requests med hx from RxHub, using info from prior eligibility check
(Shows interoperability between an Initial and a Foundation standard)
# Medication History Actual “Views”

<table>
<thead>
<tr>
<th>Year 2006</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication History Transfers from RxHub</td>
<td>12324</td>
<td>10447</td>
<td>13063</td>
<td>9962</td>
</tr>
<tr>
<td>Medication History Viewed</td>
<td>117</td>
<td>122</td>
<td>134</td>
<td>129</td>
</tr>
</tbody>
</table>
Prescription Routing Transactions

**Foundation Standard: NEWRX (SCRIPT 8.1)**
New prescriptions ($F_1$) from OnCallData™ to pharmacy
Renewal request ($F_2$) from pharmacy; response ($F_3$) to pharmacy

**Sept ’06:**
39K New; 3K Renew
CVS + RiteAid + Walgreen’s: 20 / 42K

* Mail order routing via RxHub not represented here
Prescription Routing Workflow

• Strong positive feelings by MAs
  – In spite of having to hand enter most new prescriptions and renewal authorizations before routing
• Large remaining opportunity for e-renewal requests
• Internal messaging for renewals mostly paper-based
• Persistent reliability problems related to pharmacy “receiving” electronically routed prescriptions
  – Primarily a retrieval / training problem at the pharmacy rather than true transaction failure, but didn’t always ameliorate with time
  – Perceived increase in inbound calls from pharmacy b/o this
NEO eRx: Workflow Overview

• eRx adoption and basic workflow
• Incumbent transaction volumes and workflow
  – Eligibility, Medication Hx, NEWRX
• Transaction interventions
  – Medication Hx, Fill Notification, Prior Auth
Medication History (SureScripts)

Initial Standard: Medication History (SCRIPT 8.1)
Pharmacy transfers prescription hx to SureScripts repository after dispensed
OnCallData™ requests med hx from SureScripts at encounter
(MPI but no eligibility check involved)
Medication History Test

Medication history (November test)

– Existing (RxHub) rx history transfers not being looked at by users
  • Typical month: available 13,000 times but viewed only 130 (1%); jumped to 4% in October

– October ’06: SureScripts (filled prescriptions from pharmacies) added to RxHub (claims paid by prescription benefit managers)

– Training intervention at nine UHMP practices
  • Print prescription history and place on paper chart at time of encounter during November

– Only one practice complied, and was eager to stop

– Mixed response from physicians, but continue to support importance of transferred prescription history (at least conceptually)

– Early problems with SureScripts patient matching; unable to fully evaluate
## Med History Transfers vs. Views

<table>
<thead>
<tr>
<th>Month</th>
<th>Medication History Transfers</th>
<th>Medication History Views</th>
<th>Percent Viewed</th>
<th>% Change from Prior Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>12,324</td>
<td>117</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>10,447</td>
<td>122</td>
<td>1.17</td>
<td>4.3</td>
</tr>
<tr>
<td>August</td>
<td>13,063</td>
<td>134</td>
<td>1.03</td>
<td>9.8</td>
</tr>
<tr>
<td>September</td>
<td>9,962</td>
<td>129</td>
<td>1.29</td>
<td>-3.7</td>
</tr>
<tr>
<td>October</td>
<td>12,464</td>
<td>488</td>
<td>3.92</td>
<td>278.3</td>
</tr>
<tr>
<td>November</td>
<td>11,807</td>
<td>579</td>
<td>4.90</td>
<td>18.6</td>
</tr>
<tr>
<td>December</td>
<td>13,295</td>
<td>184</td>
<td>1.38</td>
<td>-68.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>83,362</td>
<td>1,753</td>
<td>2.10</td>
<td></td>
</tr>
</tbody>
</table>
RXFILL / NoFILL

UHMP Practice

OnCallData™

Presumptive
NoFill Alert

RxFILL

SureScripts

Pharmacy

CVS, Walgreen’s, RiteAid, others

NanoPharmacy

CVS, Walgreen’s, RiteAid, others
RxFill / NoFILL Testing

• *Presumed* NoFill alert (no actual transaction)
• Go-live 10/23; aborted ~10/28 (NDCs missing)
  – Intense workflow (and legal) planning, training
• Go-live 10/31; aborted 11/29 (RxFILL mix-up)
  – Reared head w/ flood of false NoFill alerts
• Reactivated 12/1 – but not “salvageable” at that point
  – Most of 9 practices not paying much attention
• RxFill lacks interop w/ NewRx
  – No tracking number for closing the loop
ePrior Auth (X12 278 + 275)

Production test with Anthem 12/06
Prior Authorization Testing

• Prior Authorization test with Anthem; “unsolicited model”
  – Prescriber sees drug-specific questions when drug is picked
    • Celebrex, Mobic, Lyrica, Provigil, Viagra, Nexium, Crestor, Vytorin
  – Answer questions, submit and receive response via OnCallData™
    • PLUS parallel fax-based workflow
• All UHMP non-pediatric practices, no training!
• Live 12/10/06
• 30 transactions over 4 weeks
  – 17 prescribers, 13 practices (25/30 by surrogates)
• Mean turnaround time for authorizations: 87 min
  – Highly valued
• Main glitch: 12/30 were “repeats”
Summary: Adoption and Workflow

- eRx w/ advanced transactional capabilities can be rapidly adopted by small, community-based practices
  - PMS integration, no license fee + small incentive
  - Large (>2/3) dependence on surrogates
    - Implications for decision support and safety benefits unclear
    - Policy guidance? P4P?
  - Big impact on efficiency and communication channels, but…
    - Paper-based internal communication still predominates
    - Faxing is tough to beat re: overall resource requirements
    - Opportunity for additional efficiency with more pharmacy participation plus true e-messaging within the practices
  - Conventional wisdom challenged:
    - eRenewals drive adoption (?)
    - Surrogates provide bridge to MD adoption (?)
    - eRx is a stepping stone to a full EMR (?)
Summary: Standards

• Eligibility checking works remarkably well
  – But users universally unaware
  – No human assessment of dual-eligibles or possible false+ MPI matches
  – Disappointing impact on formulary/cost but difficult to interpret

• NEWRX workhorse – extremely important
  – Primary driver of surrogate adoption
  – Persistent transmission reliability issues
    • Most problems due to human factors @ pharmacy?

• Med Hx: Transaction is easy; workflow integration isn’t
• NoFill clinically risky w/o true transaction; need order ID
• Prior Auth: not fully tested; big hit for providers