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Automated Identification and Discarding of Low-Quality External Medication Information in an Electronic Health Record

S05: Applications for Quality and Efficiency Improvement Processes

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Disclosure

I have no relevant financial relationships with commercial interests to disclose.

Learning Objectives

After participating in this session the learner should be better able to:

- Distinguish sources of external medication information available in an electronic health record
- Understand how EHR-based rules can filter low-quality external medication information from clinician consideration, increasing the effective rate of external medication reconciliation with no additional clinician effort

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Goals of external medication reconciliation

Local EHR medication list reflects all medications patient is taking*

- Medication safety
  - Interactions
  - Side effects
  - Dose/fill errors
- Medication adherence
- Patient education
- Incentive programs — Meaningful Use Stage 3

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* "Taking" is not well defined

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The Medicaid MU3 requirement

Measure 3: For more than 80 percent of transitions or referrals received and patient encounters in which the EP [eligible professional] has never before encountered the patient, he/she performs a clinical information reconciliation. The EP must implement clinical information reconciliation for the following three clinical information sets:

(1) Medication. **Review of the patient's medication, including the name, dosage, frequency, and route of each medication**.

https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/MedicaidEP_2019_Obj7.pdf

Sources of external medication information

Medications from other EHRs

- Prescribed medications
- “Historical” medications

Dispenses (SureScripts)

- Claims history
- Fill history

Claims data (non-SureScripts)

Patient

- Medication discontinuation

Structural issues

- Free-text sig in fill (“TK 1 T PO QD”)
- Claim but no fill
- EHR generates but doesn’t parse discrete sig
- EHR free-text sig awkward, non-patient facing or absent
- Start/end dates wrong or missing

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The manual reconciliation process

External meds/dispenses

- – Rx: acetaminophen 325 mg tablet, 1/3/2015–
- – [No Rx]
  - + Dispense: 30 ACME PAIN RELIEF 400 MG tablets 4/23/2019
- – Historical: gabapentin 300 mg capsule
  Sig: Take by mouth.
- + Rx: lisinopril 20 mg tablet, 3/20/2019–
  Sig: Take 1 tablet by mouth daily.
  - Dispense: 30 lisinopril 20 mg tablets 3/21/2019
  - Dispense: 30 lisinopril 20 mg tablets 4/20/2019
- – [No Rx]
  - Dispense: 10 oxycodone 5 mg tablets 4/22/2019
- – [No Rx]
  - Dispense: 30 aspirin 81 mg EC tablets 4/24/2019
- – Historical: None
- ± Patient: No longer taking atorvastatin

Local EHR med list

- Rx: atorvastatin 40 mg tablet, 9/14/2018–
- ~~Rx: lisinopril 10 mg tablet, 8/12/2018–~~
- Rx: aspirin 81 mg tablet, 4/21/2019–
- Historical: ibuprofen 400 mg tablet
- Historical: lisinopril 20 mg tablet, 3/20/2019–

Challenges

Data encoding and quality

- Duplicate medications
- Discontinued medications
- Non-medications
- Use of standardized terminologies
- Free-text (or no) sigs

Data presentation

- Local and external lists
  - Atop one another
  - Side-by-side
  - Interleaved
- Sorting/grouping
  - Configurability
  - Discoverability
- Brand versus generic names

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Methods

Policies focus clinician reconciliation time on high-value data

1. Batch discard non-medications (coupons, “other”)
2. Batch discard old medications (>2 years)
3. Batch discard no longer valid controlled substance Rx (>90/180 days)
4. Batch discard “historical” medications
5. Pilot: interactive discard where newer matching medication order exists

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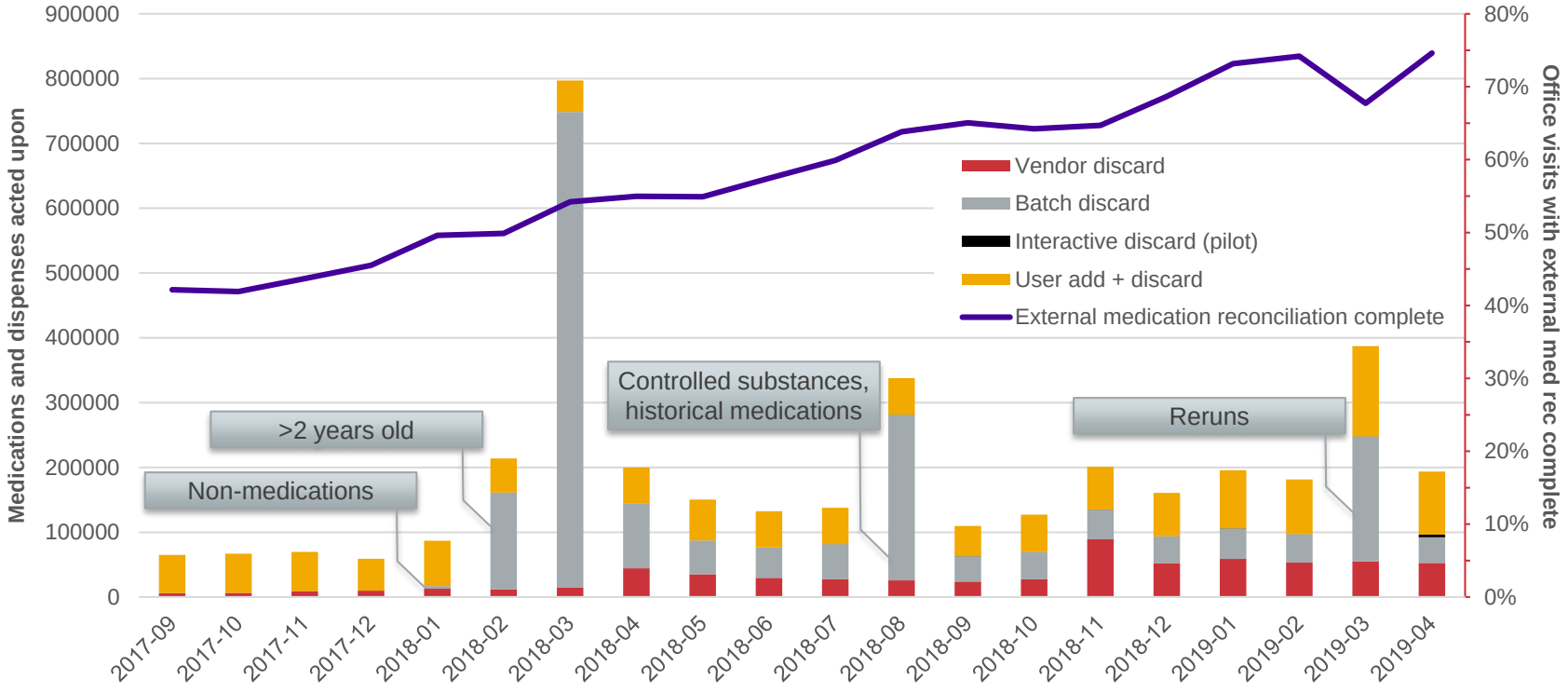
Results: actions and external med rec completion



Data through 4/26

Interactive discard pilot

There are outside medications which can be auto-discarded. Leave feedback if you see a problem.

	Sig	Start	Disp	Why
---Allopurinol---				
allopurinol (ZYLOPRIM) 100 mg tablet	Take 100 mg by mouth	05/25/18		2
---Atorvastatin Calcium---				
atorvastatin (LIPITOR) 80 mg tablet	Take 1 tablet by mouth daily	01/26/18		1
---MetFORMIN HCl---				
metformin (GLUCOPHAGE-XR) 500 mg 24 hr tablet	Take 500 mg by mouth	05/25/18		2

1=Historical (incomplete sig; from Epic organization)
2=more recent local order for same simple generic/strength

Auto-discard medications

Give feedback

Results: interactive discard pilot

1/7 – 4/4/2019: ~50 clinicians

Office visits where “auto-discard” alert	Acted upon	Not acted upon
External med reconciliation complete	95%	52%

“Auto-discard medications” selected in **11%** of visits

Feedback: **0**

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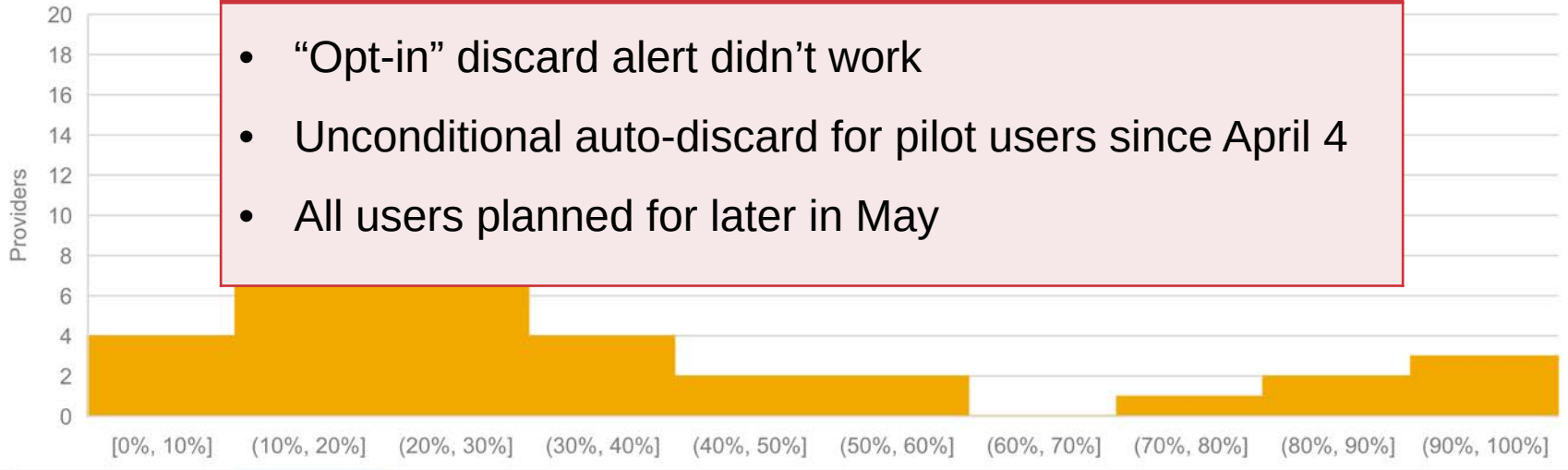
Attempts to improve alert engagement

- Second in-person presentation to pilot group
- Redesign other common alerts to make alert more visible

So…

- “Opt-in” discard alert didn’t work
- Unconditional auto-discard for pilot users since April 4
- All users planned for later in May



Results: fully automated interactive discard pilot

	1/7 – 4/4		4/4 – 4/26
Office visits where “auto-discard” alert	Acted upon	Not acted upon	Automated
External med reconciliation complete	63%		74%

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Results: which rules do the most?

Medication criteria	Batch	Interactive
Incomplete/historical	17%	16%
Old (> 2 years)	79%	17%
Old and controlled	3%	1%
Matches local med		65%

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Challenges with interactive auto-discard

- More difficult to test
- Locking and timing issues
  - Runs at time of visit, rather than overnight
  - Data may not be there yet
  - May not have access to discard
  - Run opportunistically; cheap if no new external medications or dispenses
- Reliant on EHR internals
  - Revisions required with one EHR update and one upgrade thus far
  - Auto-discard rules standardized in future (FHIR?)

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Conclusions and future directions

Auto-discard works

- Build and implement policy

Target wider range of workflows

- Rx renewal requests
- ED and inpatient encounters

E-prescribing is evolving

- Wider acceptance of CancelRx (now >50%) and RxChange*
- Structured & 1000 character sigs

Still, gaps remain

- Provenance of historical meds
- EHR medication data quality

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Practical Application of This Session

Help maximize the clinical relevance of your external medication information:

- Auto-query external sources at the appropriate time
- Automatically discard low-quality external medication information
- Evaluate the reconciliation user interface; make targeted improvements
- Educate and support your clinicians; offer opportunities for feedback
- Continuously monitor data volume and reconciliation performance
- Engage with vendors and HIE partners on data quality issues

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Thank you!

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