

# **SCREENING ELECTRONIC PRESCRIPTION RECORDS FOR DROPOUTS**

Thomas S. Rector, PhD

Sean Nugent, BA

Andrea Cutting, MA

Hannah Fairman, BA

Michele Spont, PhD

Siamak Noorbaloochi, PhD

Hanna Bloomfield, MD, MPH

Minneapolis VA Healthcare System

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# **PRIMARY QUESTION**

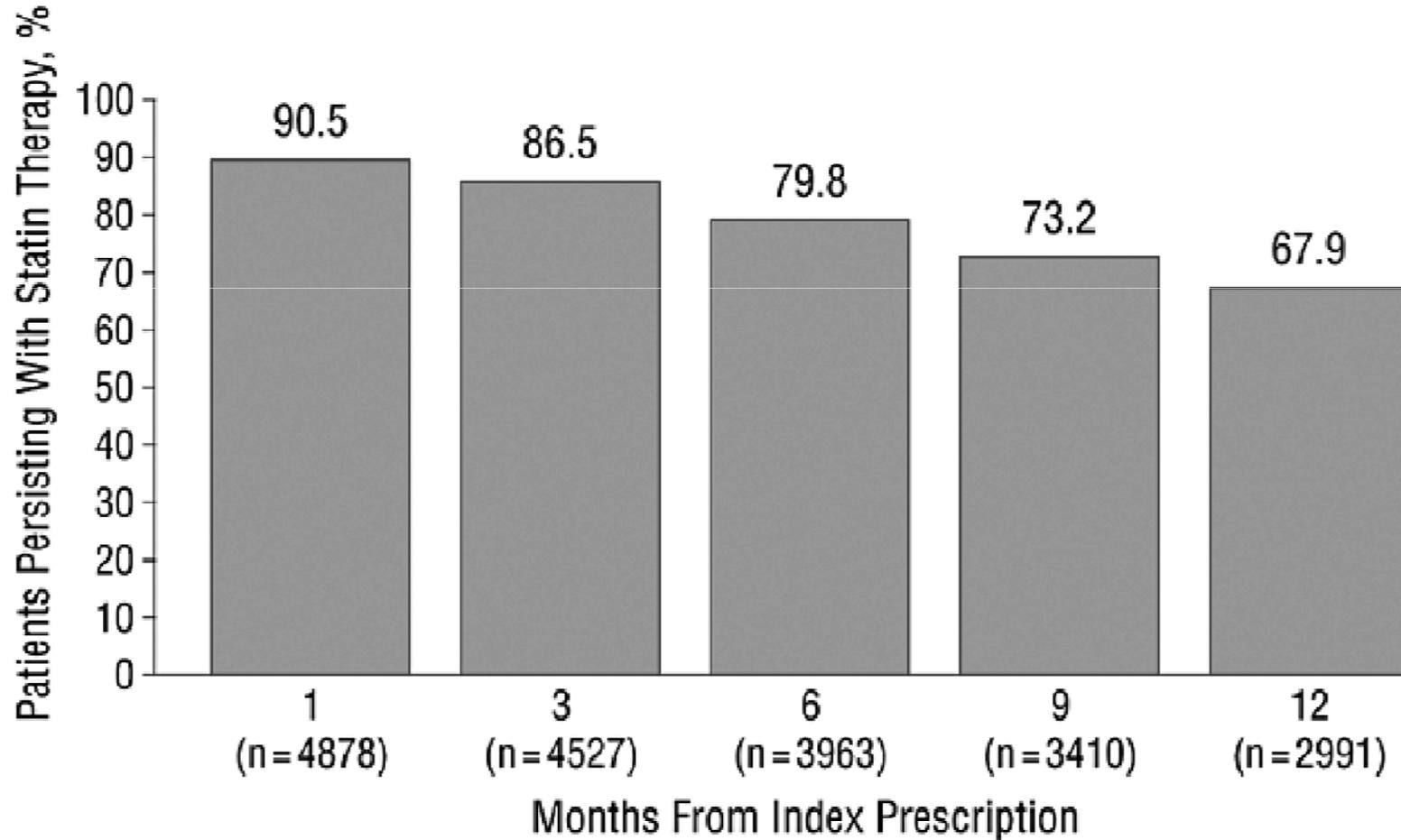
**Can electronic screening of VA health care records (CPRS/VistA) efficiently identify patients who stop taking prescribed medications for reasons that could be addressed by health care providers?**

- **Yes**
- **No**
- **Don't know**

# **BACKGROUND**

**Analyses of prescription data bases have repeatedly observed substantial percentages of patients stop taking medications that have been prescribed to help them manage chronic conditions.**

## Percentage of Patients Persisting with Statin Therapy Partners Community Healthcare, Boston, MA



Grant, R. W. et al. Arch Intern Med 2004;164:2343-2348.

# **BACKGROUND**

**Health care providers may be able to improve the effectiveness of health care for chronic conditions if they can identify and address their patients' reasons for stopping proven medications.**

# **CORRELATES OF CEASING TO FILL 'STATIN' PRESCRIPTIONS**

- **primary prevention → increase**
- **cardiovascular risk factors → decrease**
- **number of comorbidities, concurrent medications → decrease**
- **prior hospitalization, nursing home → decrease**
- **number of visits → decrease**
- **number of prescribers or pharmacies → increase**
- **number of medication doses per day → increase**
- **greater days supply → increase**
- **elderly → decrease**
- **female → increase**
- **African American → increase**
- **time taking → decrease**
- **out of pocket cost → increase**

Perreault et al. Br J Clin Pharmacol 2005;59:564

Caspard et al. Clin Therapeutics 2005;27:1639

Grant et al. Arch Intern Med 2004;164:2343

Ellis et al. J Gen Intern Med 2004;19:638

Yang et al. Br J Clin Pharmacol 2002;56:84

Benner et al. JAMA 2009;288:455

Jackevicius et al. JAMA 2002;288:462

# **OTHER REASONS FOR CEASING TO FILL STATIN PRESCRIPTIONS**

- **adverse effects (perceived or real) → increase**
- **ineffectiveness (perceived or real) → increase**
- **alternative therapy → increase**
- **alternative source of medication supply → increase**
- **patient death → increase**

**To address this well-documented phenomenon, need to determine when patients stop taking a medication and why.**

## **BACKGROUND**

**Ideally, electronic health records could be used for real-time continuous monitoring of patients' prescription supplies to identify dropouts.**

**Need to efficiently find and assimilate several bits of information.**

**Undocumented and less accessible information may greatly reduce the efficiency of screening records.**

# **PROJECT OBJECTIVES**

**Develop & test a program to repeatedly screen VISTA records to identify patients that become past due for a resupply of a statin that was prescribed and supplied by VA health care providers**

# **PROJECT OBJECTIVES**

## **Determine**

- **Percentage of positive screens in 'statin' cohort**
- **Percentage of true and false positives as determined by subsequent DSS prescription records**
  - **Positive predictive value**
- **Reasons true positives stopped getting a statin from the VA as reported by a patient follow-up survey**
- **Overall yield of potential candidates for reinstatement of a statin**

# SCREEN PERFORMANCE

VistA	DSS Confirmed	DSS Not Confirmed	Total
Positive Screen	A (True +)	B(False +)	A + B
Negative Screen	C	D	Not followed
Statin Cohort	-	-	Total

**% Positive = (A + B)/Total**

**% True Positive = A/Total = sensitivity (prevalence)**  
**Positive Predictive Value (PPV) = A/(A+B)**

**% False Positive = B/Total = (1-specificity)(1-prevalence)**

# METHODS

## Developed MUMPS program to screen VistA files

- Statin prescription records from file #52 (new), 52.1 (refills), 52.2 (partial fills) that had release dates during the previous 240 days were extracted to begin to identify the dynamic cohort of statin users
  - updated each run.
- Extracted inpatient stays from file #45 (PTF)
- Extracted dates of death and addresses from the patient file (#2)

# METHODS

- Beginning in February with 9 months of historical prescription records, ran program about every 2 weeks to identify a cohort of patients that had received at least 2, 30-day statin supplies from the Minneapolis VA Health Care System
- Excluded if patient or patient treatment file indicated the patient had died
- During each biweekly run, calculated an out of medication date as the last release date + days supply + carry over supply + partial fills + inpatient days

# **METHODS**

Carry over supply - # days supply was released before previous out of medication date

Days without supply - # days supply was released after previous out of medication date or date of screening

Past Due Date – when days without supply was  $\geq 120$  on date screening program was run

If a patient was past due and not known to be deceased, then remote VA sites (other VistA systems) were searched for other statin supplies, inpatient stays, and records of death

# METHODS

- Mailed follow-up survey to first 1000 positive (past due) screens
  - still taking 'statin name' from the VA?
  - if not, why?
  - statin supplies from non-VA pharmacies
  - help with medicine costs
  - extended travel
  - dosage reductions

# METHODS

- Nine months after last positive screen was identified, extracted baseline and follow-up data from Austin Information Technology Center (AITC)
  - DSS Pharmacy NDE
  - Medical SAS Data Sets (inpatient & outpatient encounters and diagnoses)
  - Enrollment file, month of last statin release & all months for deaths

# POSITIVE SCREENS

(2/17 TO 7/28/2010)

VistA	DSS Confirmed	DSS Not Confirmed	Total
Positive Screen			1000
Statin Cohort			21,935

Positive Screens = 4.6% (95% CI 4.3% to 4.8%)

# POSITIVE SCREENS (N=1000)

Screened Statin Supplies	
Two	76%
Three	19%
Average supply = 90 days	90%
Average carryover supply > 7 days	20%
Average interim days without supply > 7	29%
Last Supply	
Physician order	85%
CBOC prescription	41%
New order rather than refill	46%
Mailed (by CMOP)	96%
Days to becoming past due	214 ± 23
Simvastatin	79%
Rosuvastatin	10%
Pravastatin	7%
Other (atorvastatin, fluvastatin, lovastatin)	4%
Not on VA formulary	12%

# POSITIVE SCREENS (N=1000)

Demographics	
Age	71 ± 12
Male	97%
Race	
White	61%
Black	2%
Other	1%
Not recorded	36%
Married	65%
Years enrolled in VA	7.9 ± 3.2
Enrollment priority	
1 (no Rx copayment)	17%
≥ 7 (Rx copayment)	32%
Other active health insurance	75%
Medicaid	4%

# POSITIVE SCREENS (N=1000)

Baseline (1 yr) VA Healthcare	
Outpatient visits	4 (2 – 10)
Hospital stays	8%
Recorded Diagnoses†	
Hypertension	65%
Diabetes mellitus	36%
Ischemic heart disease	24%
Depression	20%
Cardiac arrhythmia	14%
COPD	12%
Obesity	11%
Heart failure	8%

†Quan H, et al. Medical Care 2005;43:1130-39

# POSITIVE SCREENS (N=1000)

Baseline (1 yr) VA Prescriptions	
Number dispensed Statin supplies	20 (10 – 37) 3.1 ± 1.7
ACEI or ARB	50%
Beta-blocker	46%
Diuretic	35%
Diabetes mellitus	32%
Antidepressant	24%
Calcium channel blocker	19%
Respiratory disease	18%
Nitrate	16%
Other for hyperlipidemia	8%

# TRUE & FALSE POSITIVE SCREENS

VistA	DSS True +	DSS False +	Total
Positive Screen	824	176	1000
Statin Cohort			21,935

True+ =  $824/21,935 = 3.8\%$  (95% CI 3.5% to 4.0%)

False+ =  $176/21,935 = 0.8\%$  (95% CI 0.7% to 0.9%)

Positive Predictive Value =  $824/1000 = 82\%$  (95% CI 80% to 85%)

# Follow-up Survey Response

- **Mailed within  $18 \pm 10$  days of past due date**
- **Response rate =  $786/867(91\%)*$** 
  - 640 DSS True+**
  - 146 DSS False+**

**\*Excludes 95 deceased, 17 nursing home residents, and 21 undeliverable addresses**

# SURVEY VS. RX RECORDS

	Survey			
DSS Rx Records	Not Taking	Taking	No Answer	Total
False + row % column %	27 18%	114 78% 33%	5	146
True+ row % column %	377 59% 93%	236 37%	27	640

## SURVEY VS. RX RECORDS

	DSS Rx True + (n=640)	
	Not Taking (n=377)	Taking (n=236)
Priority 7-8	40%	31%
Active insurance	80%	68%
Non-VA pharmacy	39%	10%
Other payers	36%	19%
Carryover > 7 days	34%	48%
No prior gap	39%	57%
Last new Rx order	39%	64%
Resupply within 6 mo. after past due	22%	74%

More reliant on VA & accumulated supply? Are some True +, False +?

# **FALSE POSITIVE SCREENS**

- **76% were given another VA statin supply within 6 months of being past due.**
- **The missed prescription supplies all were in the first month of screening.**
- **Compared to the true positives, there were no remarkable differences in baseline characteristics or survey items including questions about dose reductions, etc.**

# **TRUE POSITIVE SCREENS (N =824)**

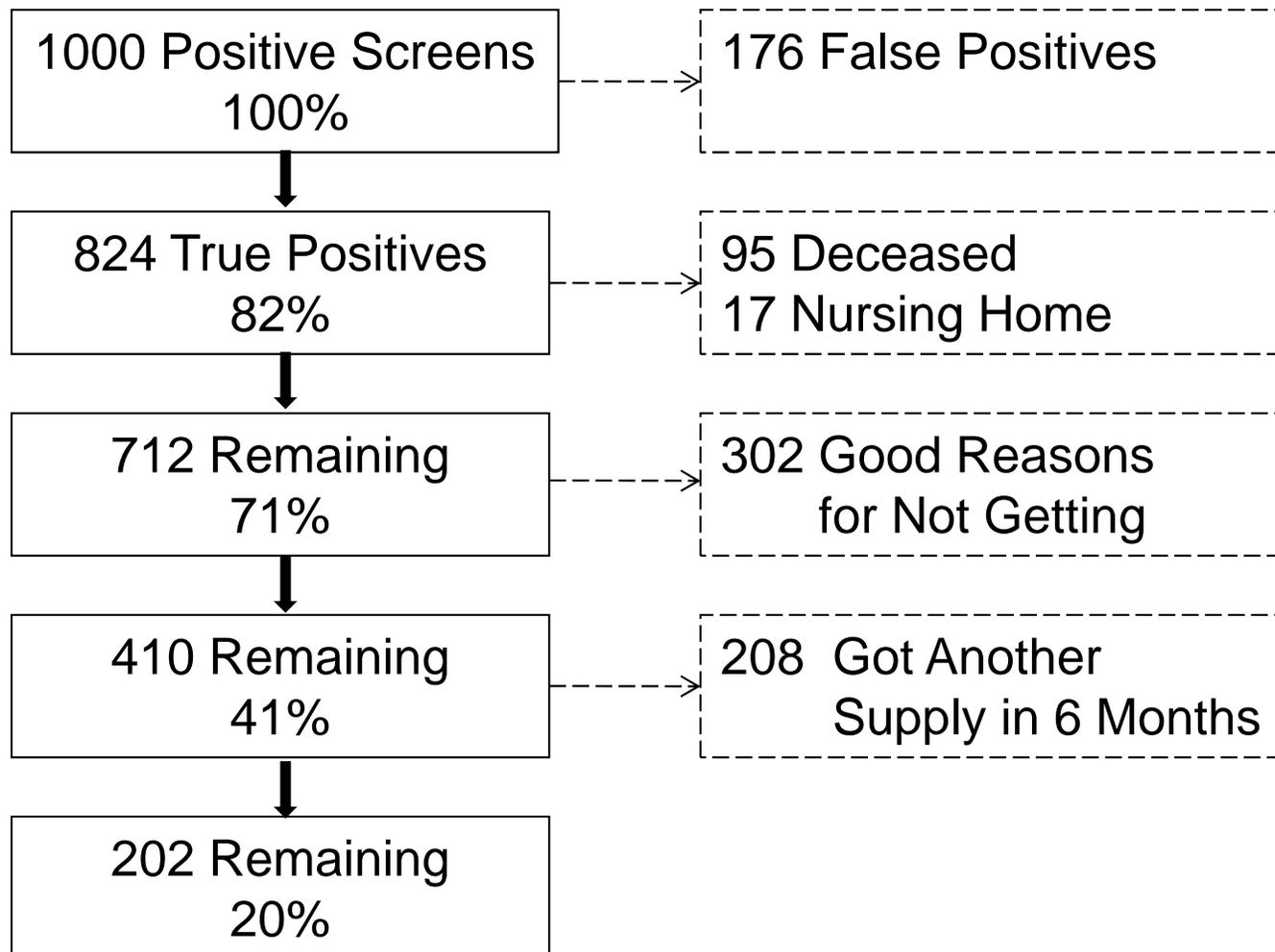
- **112 deceased or living in a nursing home**
- **302 reported one or more good reasons for stopping their statin**
  - **84 provider told them to stop**
  - **77 side effect**
  - **53 started alternative treatment**
  - **52 didn't like the way they felt when taking**
  - **3 had excess supply (write-in)**
  - **178 getting a statin from a non-VA pharmacy**

# TRUE POSITIVES

## Other Reasons For Stopping VA Statin

- 74 none
- 64 concerned might be harmful
- 52 wanted to see how they would do without
- 36 to cut cost of medicines
- 35 didn't think medicine was helpful
- 29 not seeing VA provider who prescribed
- 21 too difficult to get prescription filled
- 17 didn't want to become dependent on the pills
- 17 taking too many pills
- 16 prescriber didn't say had to keep taking
- 15 family or friend told them to stop
- 13 never wanted doctor to prescribe the pills
- 13 didn't feel well enough
- 12 didn't want to split the pills
- 9 kept forgetting to take
- 8 didn't care any more
- 7 too difficult to take
- 4 interfering with other medicine
- 2 waiting until next appointment, administrative issue (write-in)

# SCREENING YIELD



# **CONCLUSIONS**

**This program to screen electronic VISTA records for patients who appeared to discontinue a statin identified a large number for follow-up, many of whom were not good candidates to reinstate statin use.**

# **CONCLUSIONS**

## **To Improve the Yield**

- **Reduce false positives**
- **Need timely information about deaths and transitions to institutional care**
- **Modify screening algorithm to search for**
  - **orders to discontinue a prescription**
  - **side effects including lab abnormalities**
  - **switches to alternative treatments**
  - **adequate cholesterol control**

# **CONCLUSIONS**

## **To Improve the Yield**

- **Capture non-VA sources of supply (med reconciliation?)**
- **Prolong the 120-day grace period (excess supply due to unrecognized dosage reductions or poor adherence?)**
- **Develop a more practical method to follow-up positive screens & determine undocumented reasons for stopping statin use**

# **CONCLUSION**

**Allocation of resources to this type of mass screening program would have to be justified by the magnitude of improvement in patient outcomes that would depend on the yield of patients who discontinue a medication for reasons that could be satisfactorily addressed by health care providers**

**QUESTIONS?**