

Normalizing RxNorm: Experiences using medication information standards for data integration

Nicolas B Rayner

David Maier

Portland State University

Paul N Gorman

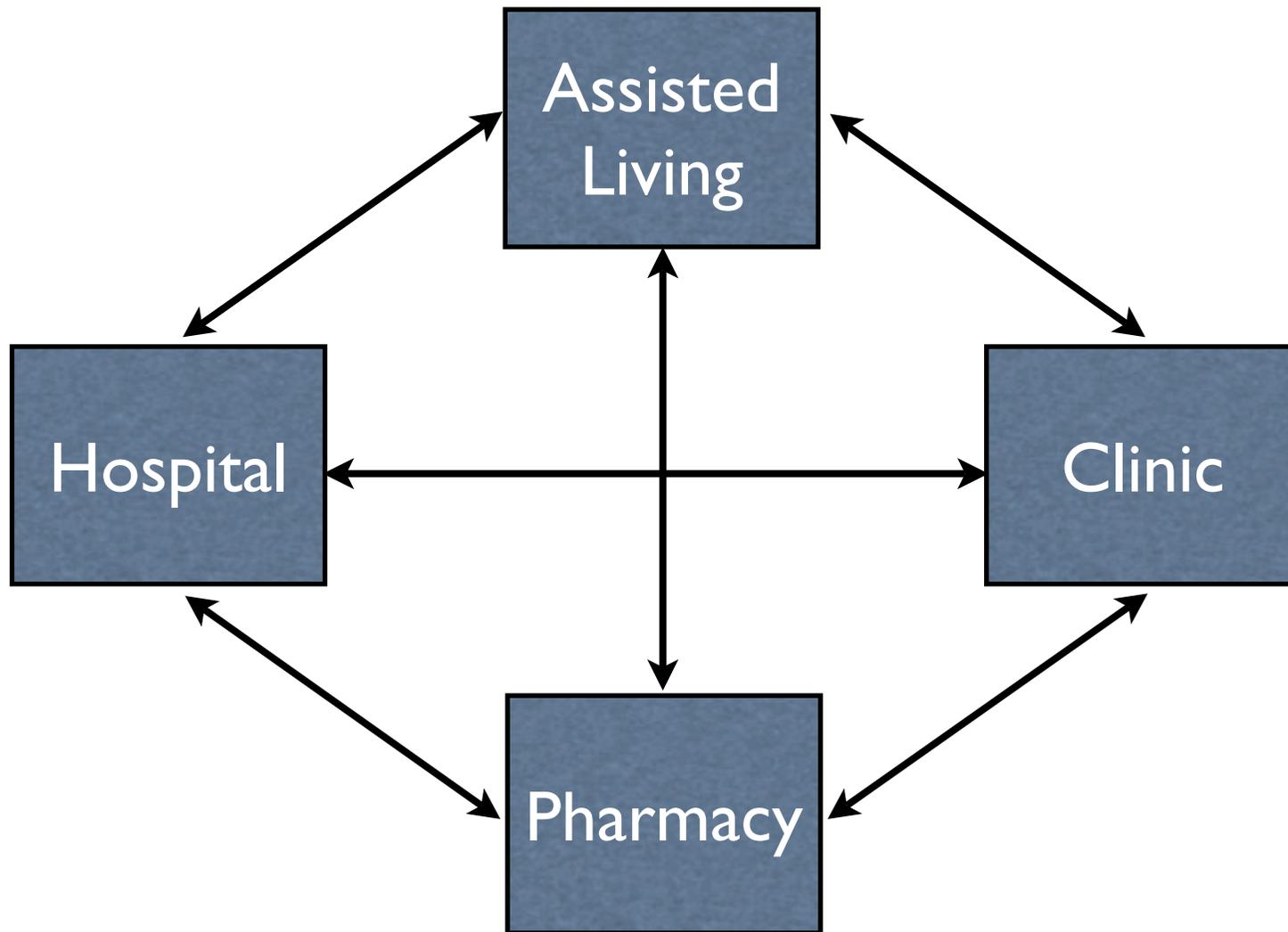
Judith R Logan

Oregon Health & Science University

Acknowledgments

- Patients
- Partner institutions and care providers
- AHRQ: 1 UC1 HS 014928-01
- NLM, FDA, VA, . . . , all those working to develop useful standards

The RxSafe Combined Medication List (CML) Setting



Sample De-identified Data

Site 1

Drug	Dose	Sig	Route	Quant	Dir
LASIX (FUROSEMIDE)	40mg	QD	PO	100	
TOPROL XL	50MG	qd	PO	30	1 TAB
MECLIZINE HCL	25MG	tid	PO	270	1 TAB

Site 2

Drug	Dose	Form	Unit	Route
BUPIVACAINE HCL 0.5 %	2	TAB	TAB	PO
CEFTRIAXONE SOD	1	AMP	MG	IM
MORPHINE SULFATE	1	VIAL	GM	IV
ONDANSETRON	0	EA	EA	MC

What would be helpful?

- Basic approach: “Look-up table” that translates from drug name (as listed) to standard identifier
- Advanced approach: parsing of drug name string, recognition of lexical elements, combination with other fields to pick out referenced standard

What is available (free)?

- RxNorm
 - part of UMLS Metathesaurus
 - designated as nomenclature standard for clinical drugs
 - under development by NLM
- National Drug Data File
 - includes National Drug Code Directory (NDCD)
 - published by FDA
 - designated as standard for drug products
 - data reported by producers
- National Drug File - Reference Terminology
 - also in UMLS Metathesaurus
 - designated as standard for drug classifications
 - maintained by VA

Profiling

NDCD trade names	18,913
RxNorm brand names	7,600
Strings in common	418
NDCD ingredient names	2,794
RxNorm ingredients	5,145
Strings in common	1,570

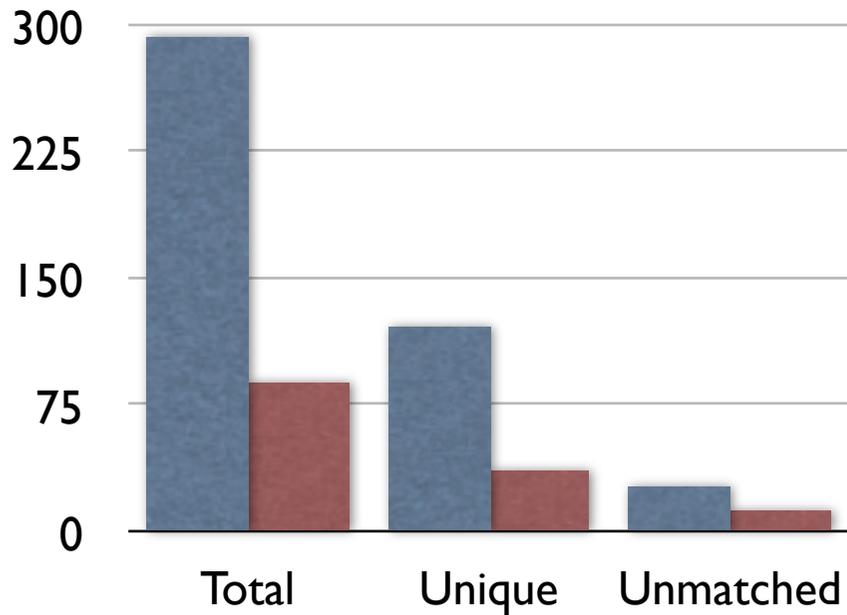
Creating the Basic Tool

```
SELECT a.RXCUI AS scd_cui, a.CONSO_STR AS clinical_drug,  
g.CONSO_STR AS brand_name, g.RXCUI AS bn_cui  
FROM RXNCONSO a INNER JOIN  
    RXNREL b ON a.RXCUI = b.RXCUI1 INNER JOIN  
    RXNCONSO c ON b.RXCUI2 = c.RXCUI INNER JOIN  
    RXNREL d ON c.RXCUI = d.RXCUI1 INNER JOIN  
    RXNCONSO e ON d.RXCUI2 = e.RXCUI INNER JOIN  
    RXNREL f ON e.RXCUI = f.RXCUI1 INNER JOIN  
    RXNCONSO g ON f.RXCUI2 = g.RXCUI  
WHERE (a.TTY = 'scd') AND (c.TTY = 'sbd') AND  
    (b.RELA = 'tradenam_e_of') AND (d.RELA = 'constitutes') AND  
    (e.TTY = 'sbdc') AND (f.RELA = 'ingredient_of') AND  
    (g.TTY = 'bn')
```

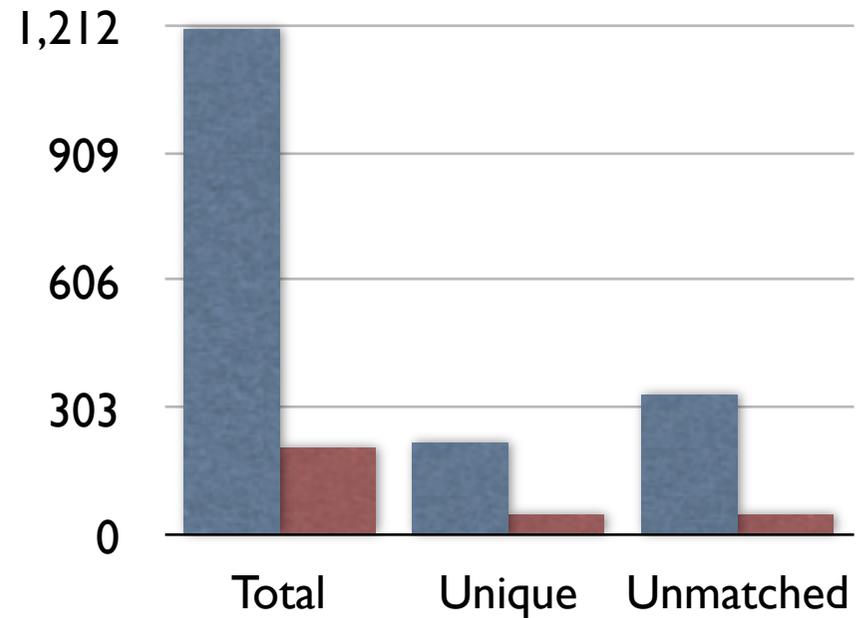
Term Matching

■ By Row ■ Distinct

Site 1



Site 2



Current Efforts and Future Directions

- Towards the advanced approach to clinical drug identification
- Exploring relationships between content of standards
- Exploring general methods for data understanding