

Utility of the “Polypharmacy” SNOMED CT Concept in Clinical Practice and Population Health Management

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Take-home Messages

- “Polypharmacy” is coded in a manner that is neither “nonvague” nor “nonambiguous” and is used inconsistently in practice.
- Caution is needed for its secondary use in areas like population health management.



Agenda

- Definitions of “Polypharmacy” in Literature
- SNOMED CT Concept of “Polypharmacy”
- Utilization in Clinical Practice
- Integration into Population Health Service (Pharmacy Care)
- Recommendations
- Future Work

FEATURE

PHARMACEUTICALS

Polypharmacy: a necessary evil

The rise of patients taking four or more drugs is an aspect of modern medicine that requires some urgent attention, finds a new report. **Jacqui Wise** examines its recommendations

Jacqui Wise *freelance journalist*

London, UK

Polypharmacy is a term that first appeared in the medical literature more than 150 years ago, but according to a major report from the King's Fund there is now an urgent need to tackle the issue.¹

says general practice consultations should be longer for patients with multiple conditions to allow enough time to review drug treatment. There needs to be consideration of whether each drug has been prescribed appropriately or inappropriately, both

1. Definitions of “Polypharmacy” in Literature

- Multiple medications (simple count)
 - Different thresholds: 2, 4, 5, 6, 8 or 9
 - Different medications: Any med; Long-term-use med; Prescription med only;
 - Different time frames: “recent”, on a particular day, 84 days, 3 months, etc.
- Inappropriate use medications
 - Use of a medication that is not indicated
 - Duplication
 - High risk medication
 - Drug and drug interaction

Table 1 Definitions of polypharmacy

Specific definitions of polypharmacy (Polypharmacy is...)	Number of articles	Other descriptions of inappropriate medication use	Number of articles
Medication does not match the diagnosis*	4 ^{5,9,16,22}	Drug/drug interactions	3 ^{2,10,22}
Many medications	3 ^{10,14,22}	Excessive duration	3 ^{2,10,22}
Duplication of medication*	3 ^{5,9,16}	Inappropriate drugs (ie, lack of proven benefit, drug indication, etc.)	2 ^{2,10}
Drug/drug interactions*	2 ^{9,16}	Drugs that cause adverse effects	2 ^{10,22}
Inappropriate dosing frequency (excessive, too low, too long)*	2 ^{5,16}	Drug/disease interactions	2 ^{2,22}
Medication prescribed to treat the side effect of another medication (except for cases where there is no other option)*	2 ^{5,16}	Availability of an equally effective, lower-cost alternative	2 ^{2,22}
Two or more drugs of the same chemical class	1 ⁸	Excessive dosages	2 ^{2,10}
Two or more meds to treat the same condition	1 ⁸	Inappropriate dosing frequency (excessive, too low, too long)	2 ^{2,10}
Two or more agents with the same or similar pharmacologic actions to treat different conditions	1 ⁸	Complicated drug regimen affecting compliance	2 ^{2,10}
Minor polypharmacy = 2–4 meds. Major polypharmacy ≥5 meds.	1 ²⁰	Prescription of multiple meds by different specialists for treating concurrent conditions	1 ²
3,5, or 6 different medications	1 ¹⁷	Medication does not match the diagnosis	1 ²²
Two or more medications	1 ¹⁸	Medication prescribed to treat the side effect of another medication (except for cases where there is no other option)	1 ²²
Greater than 5 medications	1 ⁵	Polypills	1 ²²
Excessive use of medication	1 ¹⁶	More than one pharmacy used	1 ²²
Unnecessary use of medication	1 ¹⁶	Multiple prescribers of medication	1 ²²
Medications prescribed greater than twice per day	1 ⁵	High risk medications	1 ²²
Complicated drug regimen effecting compliance*	1 ⁹	Number of medications	1 ²²
Contraindicated in the elderly	1 ⁹	Diet	1 ²²
Taking an OTC medication, an herbal product or another person's medication	1 ⁹	Frequency of medication therapy monitoring	1 ²²
Availability of an equally effective, lower-cost alternative*	1 ⁵	Male Gender	1 ²²
Patient misunderstanding of the use of the medication (purpose, how to take it, side effects possible, toxicity signs, etc)	1 ⁵	New resident to nursing home	1 ²²
Dosage does not reflect age/renal/liver status	1 ⁵	Medication is not the most effective available	1 ²²
Improvement after discontinuation of medications	1 ¹⁶	Treatment goals unmet	1 ²
Diagnosis no longer present	1 ⁵	Duplication of medication	1 ²

2. SNOMED CT Concept of “Polypharmacy”

Concept Details

Summary

Details

Diagram

Expression

Refsets

Members

References

Parents

▶ ● Drug therapy finding (finding)

● Polypharmacy (finding) ☆ ↗

SCTID: 129846003

129846003 | Polypharmacy (finding) |

Polypharmacy

Polypharmacy (finding)

No attributes

Children (3)

- ● Nutraceutical polypharmacy (finding)
- ● On four or more medications (finding)
- ● Patient on numerous drugs (finding)

SNOMED CT Editorial Guide:

- 4.2.1.2 Nonvagueness and nonambiguity

Codes must have one meaning ("nonvagueness") and no more than one meaning ("nonambiguity").

3. Utilization in Clinical Practice

- 0.3% (1382 out of 439448) of all members we received SNOMED CT diagnosis from Electronic Health Records

ORIGINAL CONTRIBUTION

Recent Patterns of Medication Use in the Ambulatory Adult Population of the United States

The Slone Survey

David W. Kaufman, ScD

Context Data on the range of prescription and over-the-counter drug use in the United

7%: ≥ 5 meds in the preceding week

Original Article

A Survey on Polypharmacy and Use of Inappropriate Medications

Sujit Rambhade, Anup Chakarborty, Anand Shrivastava, Umesh K. Patil, Ashish Rambhade¹

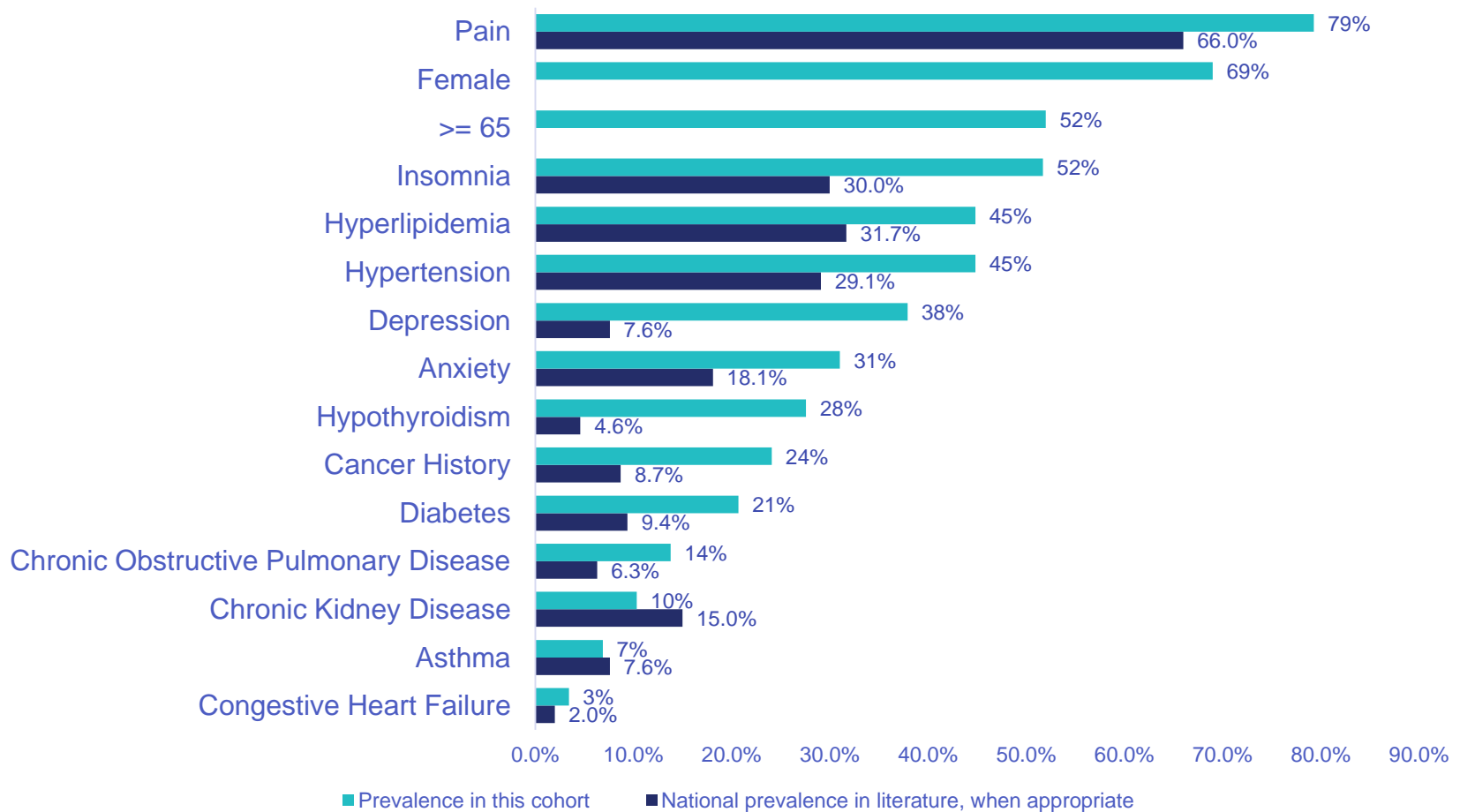
Department of Pharmacology Peoples Institute of Pharmacy & Research Center, Peoples Group, Bhopal, ¹Sagar Institute of Research Technology and Science, Ayodhya Nagar, Bhopal, Madhya Pradesh, India

Table 1: Data analysis and results

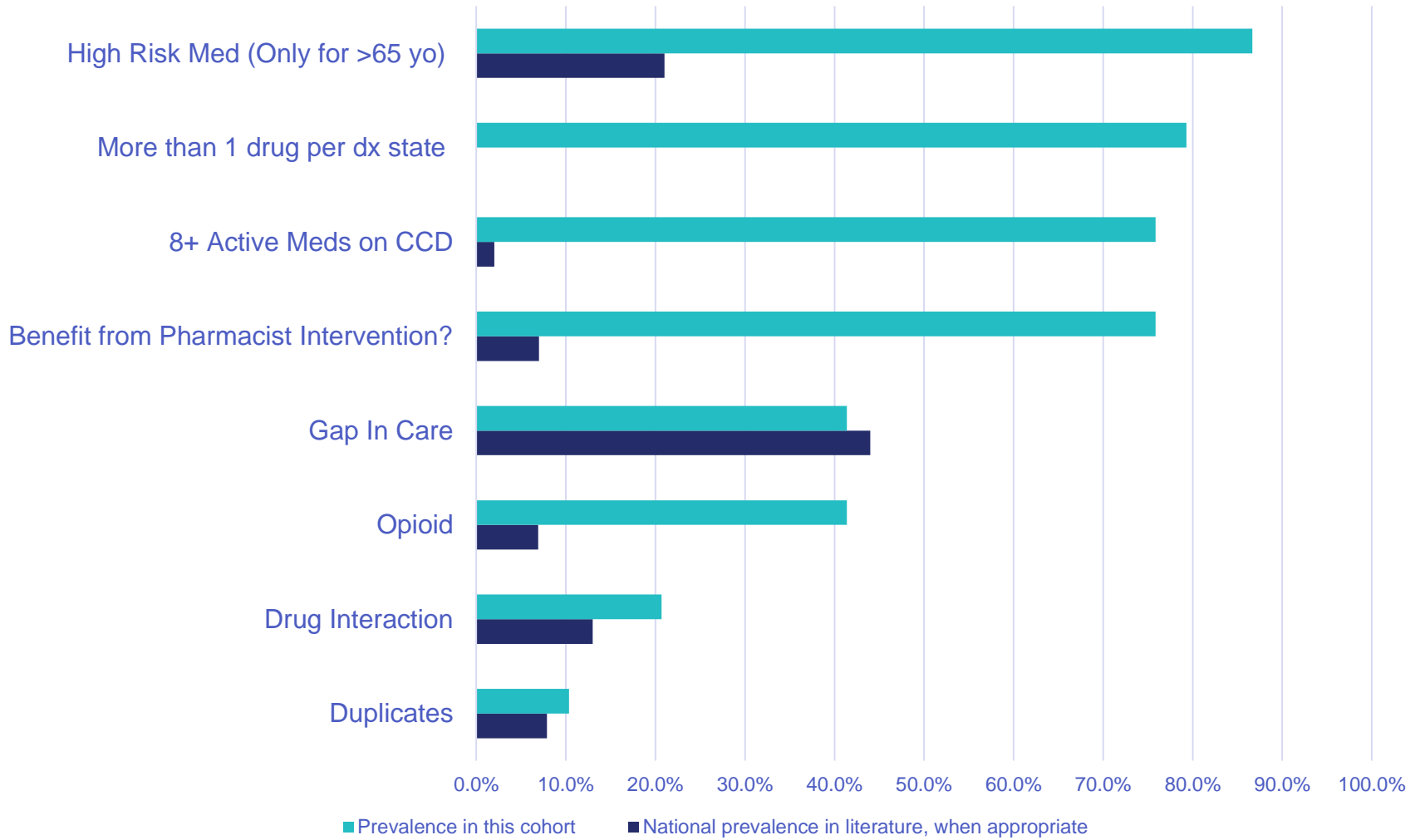
Polypharmacy	8.73%
Over prescribing, unnecessary use of drugs	2.38%
Repetitive drugs, inappropriate drug combinations	3.96%
Drug-drug interactions, food drug interaction	2.38%

3. Its Utilization in Clinical Practice

- Pharmacist randomly selected 29 patients for chart review



3. Its Utilization in Clinical Practice



3. Its Utilization in Clinical Practice

- We outreached to 3 physicians for explanation on their diagnoses



3. Its Utilization in Clinical Practice

- Dr1
 - Based on **sheer volume** of medications
 - Does not use the diagnosis very often
 - Patient had an “Extreme med list” or hospitalization
 - “not sure if the list could be paired down”
 - Stated both patients would benefit from our Pharmacy Care /Population Health program

3. Its Utilization in Clinical Practice

- Dr2
 - Stated her patient is doing much better and would no longer benefit from our Pharmacy Care /Population Health program.
 - The patient's wife was giving him multiple OTC drugs without speaking to doctor
 - many visits were spent counseling on not taking medications without talking to doctor and confusion over medications
 - patient went to hospital for constipation when he was taking too much codeine
 - Patient was having trouble keeping up with medications (dementia)
 - Typically gives this diagnosis when
 - patients can't keep up with them/difficulty managing medications, or
 - OTC drugs are being taken with no reason, or
 - if visits are spent counseling on these types of issues (drug interaction)
 - If they can keep up with them and have no problem she would not typically give it for the sheer number of medications
 - OTC is worrying

3. Its Utilization in Clinical Practice

- Dr3
 - Patient has complicated medical conditions
 - Non-adherence to medications due to polypharmacy
 - From clinical note:

“I refilled all of her medications restarting metformin and glyburide today I gave her all of her prescriptions on paper today with multiple refills. Nurse case manager [from the hospital system] is here to talk with her today. We discussed strategies of keeping her on her medication regimen. Perhaps considering a bubble pack for her medications.”
 - Prescription claims confirm her historical nonadherence to diabetic meds.



4. Integration into Evolent Population Health Service (Pharmacy Care)

\$600M+

Capital raised

100%

Focused on
Value-Based Care

2,400+

Employees across
the country today

mission

To change the health of the nation by changing the way health care is delivered

our vision

Build a national network of providers transforming care under value-based payment initiatives

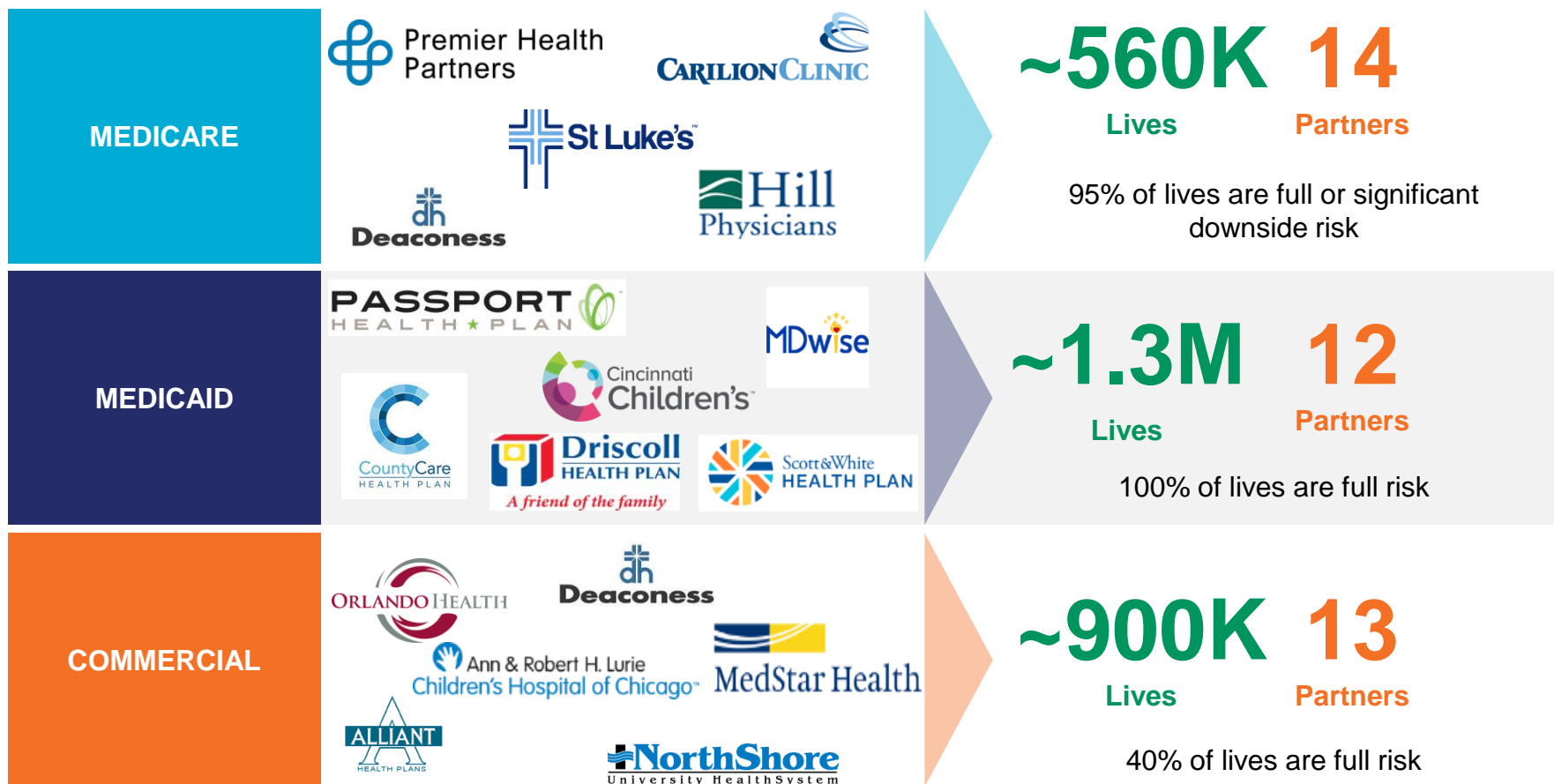
partnership pillars

- aligned partner
- clinical value
- full solution
- proven results

*as of March 31, 2017

4. Integration into Evolent Population Health Service (Pharmacy Care)

Select Evolent Partners

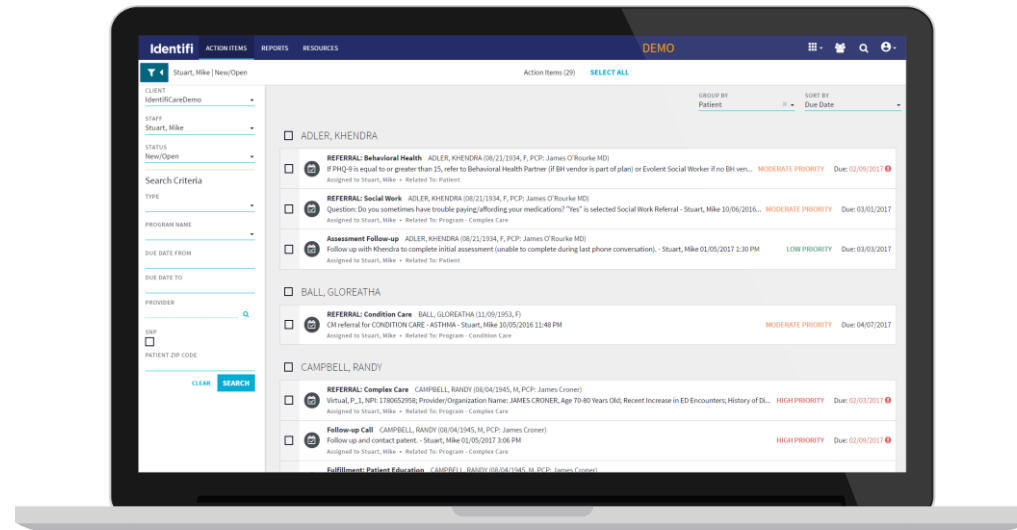


Note: Partners counted in multiple lines of business

Configurable web-based care management workflow application to coordinate clinical work across care teams

Key Features

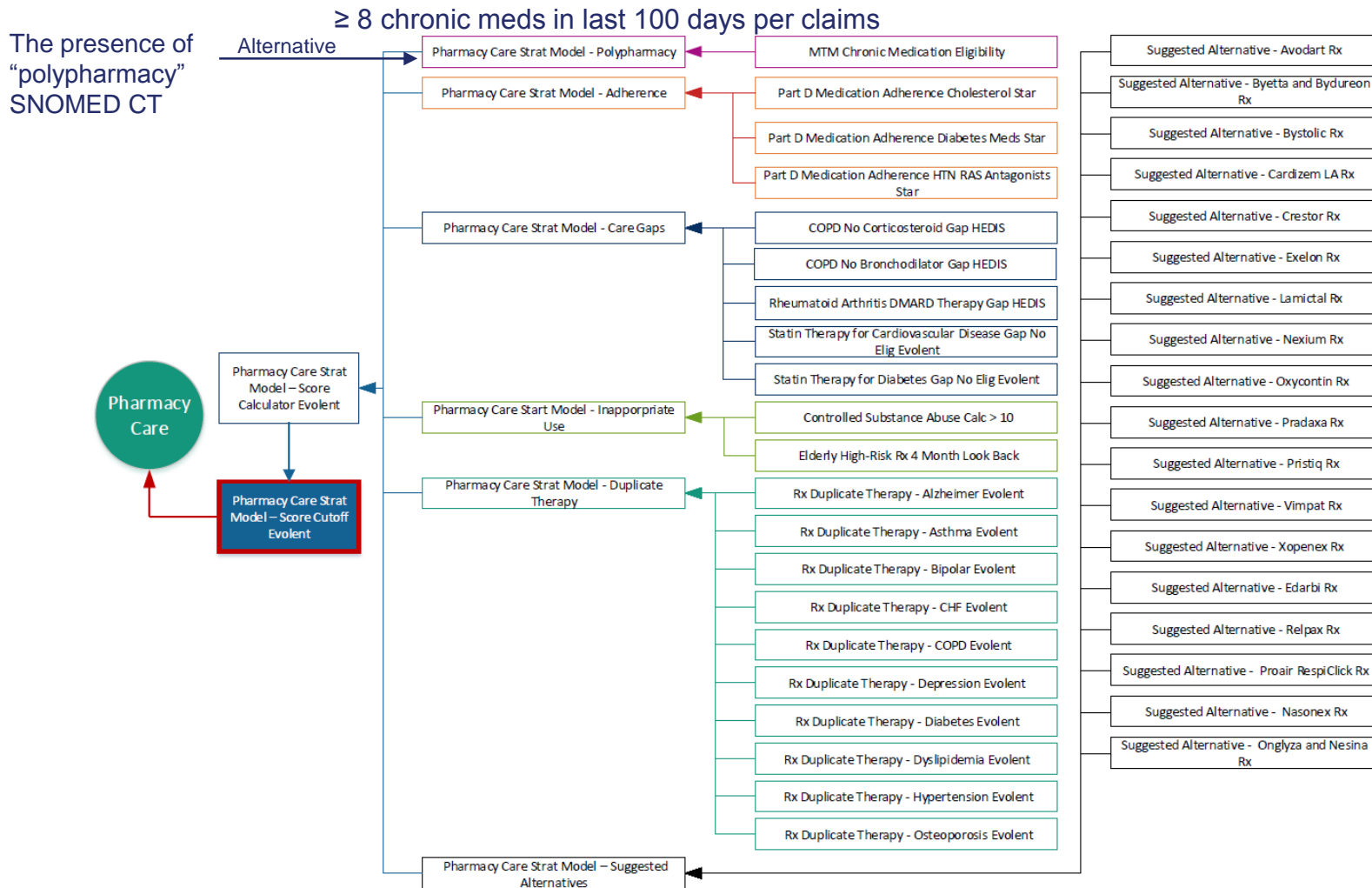
- Pre-loaded, NCQA-compliant clinical program workflow with evidence-based clinical content
- Single point of access to view member profiles and patient history
- Guided workflow and tools to support Program Enrollment, Patient Assessments, Care Plans and PGIs, Care Note Records and Communication
- Advanced KPI analytics and performance management reporting
- Supports cross-functional collaboration with entire care team
- Configurable by LOB



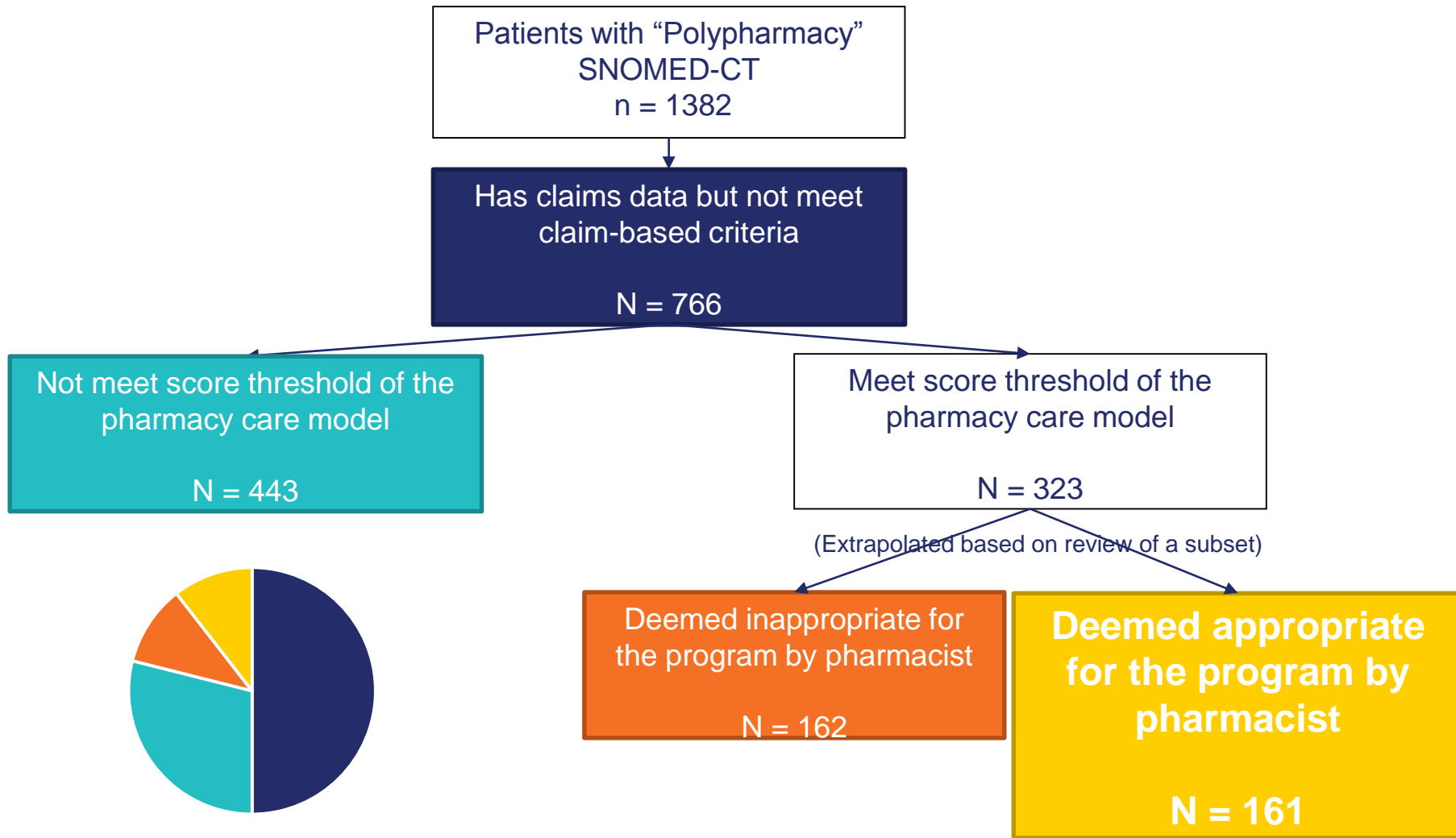
Users

- Care Managers
- Pharmacists
- Social Workers
- Nutritionists / Dieticians
- Behavioral Health Specialists

4. Integration into Evolent Population Health Service (Pharmacy Care)



4. Integration into Pharmacy Care – Additional Patients Identified by This Concept



5. Recommendation to Terminology Community

- Embrace the variety of definitions of polypharmacy
- Differentiate the cause versus consequence of polypharmacy
- Reduce vagueness and ambiguity
- Appropriate level of granularity

5. Recommendation to Terminology Community

- Example from related concepts

● Noncompliance with medication regimen (finding) ☆ 📄
SCTID: 129834002
129834002 | Noncompliance with medication regimen (finding) |
Noncompliance with medication regimen
Noncompliance: medication regimen
Noncompliance with medication regimen (finding)

Interprets → Ability to manage medication
Interprets → Compliance behavior

Children (11)

- ● 🇺🇸 Discontinued medication without order (finding)
- ● 🇺🇸 Medication non-adherence due to hearing impairment (finding)
- ● 🇺🇸 Medication non-compliance due to cognitive impairment (finding)
- ● 🇺🇸 Medication non-compliance due to excessive pill burden (finding)
- ● 🇺🇸 Medication non-compliance due to visual impairment (finding)
- ● 🇺🇸 Medication taken at higher dose than recommended (finding)
- ● 🇺🇸 Medication taken at lower dose than recommended (finding)
- ● Noncompliance with antiretroviral medication regimen (finding)
- ● 🇺🇸 Refuses to discontinue medication (finding)
- ● 🇺🇸 Stops taking medication too soon (finding)

5. Recommendation to Terminology Community

- Example from related concepts

Parents

▶ ● Fatigue (finding)

● Fatigue due to treatment (finding) ☆ 📄

SCTID: 704369007

704369007 | Fatigue due to treatment (finding) |

Fatigue due to treatment
Exhaustion from treatment
Fatigue due to treatment (finding)
Mental and physical fatigue from prolonged or difficult treatment.




Interprets → Energy / stamina
Associated with → Therapeutic procedure

Children (1)

- ● Fatigue due to chemotherapy or radiation therapy (finding)

5. Recommendation to Terminology Community

- Create more specific concepts and semantic relationships
 - For polypharmacy itself
 - Polypharmacy due to necessary use of two to seven medications
 - Polypharmacy due to necessary use of eight or more medications
 - Polypharmacy due to mismatch between medications and diagnosis
 - Polypharmacy due to other inappropriate use of medication
 - For the consequence of polypharmacy
 - Adverse drug interaction due to polypharmacy
 - Confusion due to polypharmacy
- Educate providers
 - For example, if non-adherence to medication is the root cause, code non-adherence instead of polypharmacy

- ▼ ● Adverse drug interaction with drug (disorder)
- ●  Adverse drug interaction with over-the-counter medication (disorder)
- ●  Adverse drug interaction with prescription medication (disorder)
- ●  Toxic adverse drug interaction with drug (disorder)

6. Future Work

- Investigate those patients identified by both claim-based and diagnosis-based criteria
- Flexible thresholds for claim-based criteria.
- Evidence-based review of common consequences of polypharmacy to propose structure for parent and child concepts within the SNOMED hierarchy.
- Test “polypharmacy” as a criterion for care management predictive models.

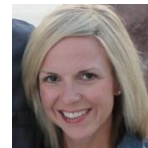
Conclusions

- SNOMED CT Concept “Polypharmacy” is used for various reasons in clinical practice
- Combined with other clinical logic, this concept would identify additional high-risk patients for population health service (pharmacy care).
- We recommend terminology community to create more specific concepts and to educate providers.

Project Participants Look Forward to Your Questions and Feedback!



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