Use Case Scenario Summary

Use Case Scenario Name:	Medication Management Bundle
Use Case to Which Scenario Belongs	Computable Knowledge
Sponsor:	Michigan Department of Health and Human Services
Date:	12-11-19

Executive Summary

This brief section highlights the purpose for the use case and its value. The executive summary gives a description of the use case's importance while highlighting expected positive impact.

Almost half of the U.S. population uses prescription medications each month and the proportion of people using prescription medications to manage health conditions rises with age.[1] In adults 65 and over, 90% use at least one prescription drug and more than 40% use five or more medications.[2]

Although medications can improve the health of patients, there are many challenges which arise with medication use and require active medication management strategies. Some of the main challenges faced by healthcare professionals, patients, and caregivers are:

- Managing polypharmacy, which is the use of many medications by a single patient;
- Medication misuse, dependency, and addiction;
- The high cost of certain medications such as those which treat Hepatitis C;
- Medication regimen adherence, and
- Medication errors and adverse drug events.

These challenges can lead to higher costs, unintended harm, and confusion. There is consensus among the healthcare community that addressing the complex issues related to medication use is necessary to support patient healthcare and reduce costs associated with medication treatments. However, the solutions to these problems vary by the patient and

[1] "Products - Data Briefs - Number 332 - February 2019," Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, March 19, 2019), https://www.cdc.gov/nchs/products/databriefs/db334.htm.

[2] "Table 79. Prescription drug use in the past 30 days, by sex, race and Hispanic origin, and age: United States, selected years 1988–1994 through 2011–2014," Centers for Disease Control and Prevention, accessed November 4th, 2019, https://www.cdc.gov/nchs/data/hus/2017/079.pdf.

their medication regimen. One solution is to use computable knowledge to flag potential harmful medication interactions, score the complexity of a patient's medication list, or assist in determining the most appropriate medication for an individual patient's needs. The Medication Management Bundle provides computable knowledge which give providers and the patients care team actionable information to address medication-related issues.

Purpose of Use Case Scenario: The Medication Management Bundle use case scenario applies medication management Knowledge Objects (KOs) holding computable knowledge in the form of implemented computer algorithms to enrich health information already flowing through the Michigan Health Information Network Shared Services (MiHIN). Each KO in this bundle addresses a specific medication-related challenge, enabling more actionable and timely reports and messages to be delivered to care team members.

Overview

This overview goes into more details about the use case.

The safety of using prescription drugs depends on several factors including the types of medications, dosages, and individual psychosocial factors. The KOs in the Medication Management Bundle aim to address various challenges presented by prescribing and managing prescription use for patients. There are several different categories of KOs which are detailed in the Computable Knowledge Use Case Summary.

Medication Management Bundle KOs have the potential to serve numerous populations from patients to practitioners to health system administrators. As new KOs are added to the Medication Management Bundle, they will be detailed herein.

Medication Regimen Complexity Index (MRCI) Scoring

Patients using multiple medications often have complex home medication regimens. Highly complex medication regimens are linked to higher readmission rates[3] and decreased adherence.[4] Those with the most complex medication regimens tend to be elderly[5] and require support to achieve intended and desirable medication-use outcomes.

Medication regimen complexity is based on many factors of the regimen including:

- Number of different drugs used by the patient (polypharmacy);
- The total number of doses per day to be taken (pill load);

[3] Rosen, Olga Z., Rachel Fridman, Bradley T. Rosen, Rita Shane, and Joshua M. Pevnick. "Medication adherence as a predictor of 30-day hospital readmissions." Patient preference and adherence 11 (2017): 801.

[4] Dr. Jennifer Gibson, "Medication Therapy Management Intervention MRCI." ScienceDocs, accessed November 4, 2019, https://www.sciencedocs.com/medication-regimen-complexity-index/.

[5] "Table 79. Prescription drug use in the past 30 days, by sex, race and Hispanic origin, and age: United States, selected years 1988–1994 through 2011–2014," Centers for Disease Control and Prevention, accessed November 4th, 2019, https://www.cdc.gov/nchs/data/hus/2017/079.pdf.

- The number of times per day that medications must be taken (daily dosing events);
- How the medication is taken (ex, pills, inhalers, injections);
- Drug-drug and drug-food interactions associated with simultaneous ingestion, and
- More.[6]

To determine the complexity of a patient's medication regimen, the Medication Regimen Complexity Index (MRCI) can be used to create a medication regimen complexity score. Low scores (<10) indicate a simpler medication regimen and high scores (>15) indicate more complex regimens.

The MRCI was originally described in 2004 and has been used across many healthcare and social service settings. Since then, numerous studies have demonstrated that the MRCI is valid and reliable – in fact, it is considered the gold standard for Medication Complexity scoring.[7]

This KO will review the medication information from the Medication Reconciliation section of the Continuity of Care Document (CCD) sent after a hospital discharge and assign an MRCI score for that patient based on the data in the CCD. Those MRCI scores can then be distributed to the patient's care team for follow up and stored in the Active Care Relationship Service® (ACRS®) for future distribution.

Future KOs

In the future, additional KOs for this bundle are planned to assist with medication management. These KOs could provide algorithms to:

- Assess medication adherence;
- Make suggestions about how medication regimens could potentially be simplified, and
- Make suggestions on how the cost of medication regimens might be decreased.

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[6] Alves-Conceicao, Vanessa, Kérilin Stancine Santos Rocha, Fernanda Vilanova Nascimento Silva, Rafaella Oliveira Santos Silva, Daniel Tenório da Silva, and Divaldo Pereira de Lyra-Jr. "Medication regimen complexity measured by mrci: a systematic review to identify health outcomes." Annals of Pharmacotherapy 52, no. 11 (2018): 1117-1134.

[7] George, Johnson, Yee-Teng Phun, Michael J. Bailey, David CM Kong, and Kay Stewart. "Development and validation of the medication regimen complexity index." Annals of Pharmacotherapy 38, no. 9 (2004): 1369-1376; Paquin, Allison M., Kristin M. Zimmerman, Tia R. Kostas, Lindsey Pelletier, Angela Hwang, Mark Simone, Lara M. Skarf, and James L. Rudolph. "Complexity perplexity: a systematic review to describe the measurement of medication regimen complexity." Expert opinion on drug safety 12, no. 6 (2013): 829-840

Persona Story

To explain this use case, this section follows a persona example from start to finish.

Mille Bryant

Millie Bryant's concerns started with problems surrounding her obesity, which led to diabetes and increasing issues with mobility, especially with her hips and knees.

Now 72 years old, Millie is battling an increasing number of health problems and everything regarding her healthcare is very hard to her to accomplish. From getting to the doctor's office to finding the food for her special diet and managing her medications, Millie needs help.

Recently, Millie was admitted to the local emergency department with chest pains. She was diagnosed with coronary artery disease which led to congestive heart failure. Millie received a stent placement. In addition, she was also prescribed many new medications. Millie is used to taking her medications, but some of her new medications were more complicated than she's used to. When she was discharged from the hospital, a MRCI was assigned to Millie and she was assigned a high score, indicating that she is likely to have difficulty managing her medications at home.

Robert Kenswood, Pharmacist

Robert Kenswood has been working for the same independent pharmacy for more than ten years. He's committed to keeping his patients as healthy as they can be and does frequent counseling and Medication Therapy Management with his patients.

After Mille's discharge from the hospital, Robert received a message which highlighted her MRCI score. Once he saw the high score, Robert took a closer look at Millie's new medications and noticed how much more complex her new medication regimen was.

Robert reached out to Millie and scheduled a Medication Therapy Management (MTM) session to help support her new medication regimen. As a result of the MTM session, Millie worked with her physician to remove an unnecessary medication and Robert confirmed for Millie that she could take several pills safely at the same time, helping to reduce the complexity of her regimen a little further.

Ron Oatman, Care Coordinator

Ron Oatman, a care coordinator, got into healthcare with the dream of helping people. After watching his mother navigate her healthcare as she fought ovarian cancer, Ron knows he made the right decision. His favorite activities during the workday are the personal connections he makes with the patients. If Ron can help ease their burdens and worry, he feels successful. Those connections are the stories he shares with his family.

When Ron reviewed Millie's case after her recent visit to the hospital, he noticed her MRCI score was higher than most of the patient's he sees and knew he needed to take action. Ron reached out to Millie to help her find resources that will help her with medication management. With Ron's help, Millie now knows which physician is prescribing each medication and who to reach out to for additional information.

Knowing her new medications were going to be difficult to manage in the long term, Ron makes sure that he keeps in contact with Millie so he can continue to support her. Ron also connects with Millie's care providers frequently to ensure that needed therapeutic monitoring is taking place.

Diagram

This diagram shows the information flow for this use case.

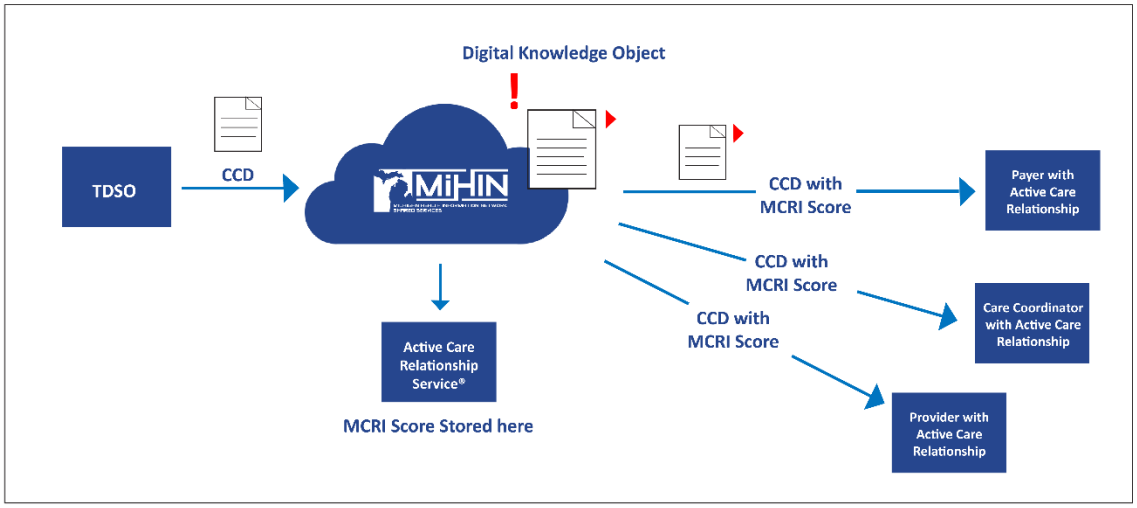

Figure 1: MRCI Score Data Flow

1. The Trusted Data Sharing Organization sends a CCD with a Medication Reconciliation to MiHIN.
2. MiHIN applies the MRCI KO to the medications listed in the CCD.
3. The KO produces an MRCI score.
4. MiHIN stores that score for a predetermined amount of time in ACRS as an attribute, making it available to enrich future messages.
5. MiHIN appends the MRCI score to the CCD and sends to participating organizations with an active care relationship.

Regulation

This section describes whether this use case is being developed in response to a federal regulation, state legislation or state level administrative rule or directive.

Legislation/Administrative Rule/Directive:

☐ Yes
☒ No
☐ Unknown

Promoting Interoperability:

☐ Yes
☒ No
☐ Unknown

Cost and Revenue

This section provides an estimate of the investment of time and money needed or currently secured for this use case.

To be determined.

Implementation Challenges

This section describes the challenges that may be faced to implement this use case.

Wherever possible, MiHIN's use cases leverage existing infrastructure within the existing network.

The Medication Management Bundle requires that the participant also be sending and receiving Medication Reconciliation messages via MiHIN. For more information about that use case please see: https://mihin.org/discharge-medication-reconciliation/.

Vendor Community Preparedness

This section addresses the vendor community preparedness to readily participate in the implementation of this use case.

Although health systems, Provider Organizations, and other existing Medication Reconciliation receivers' systems will not have difficulty ingesting the MRCI score, it is possible that there are other types of healthcare professionals who may benefit from this information.

Pharmacists would be in a position to use the MRCI score while providing Medication Therapy Management (MTM) services. The current capacity for pharmacy systems to ingest an MRCI score is currently unknown.

Wherever possible, outputs from the KOs will be appended to messages already flowing through MiHIN or leverage other existing infrastructure such as Direct Secure Messaging accounts or MiHIN's own Diretto service (more information is on Diretto is available here: https://mihin.org/services/diretto/).

Support Information

This section provides known information on support for this use case.

Political Support:

☐ Governor
☐ Michigan Legislature
☐ Health Information Technology Commission
☐ Michigan Department of Health and Human Services or other State of Michigan department
☐ Centers for Medicare and Medicaid Services/The Office of the National Coordinator for Health Information Technology
☐ Centers for Disease Control and Prevention
☒ MiHIN Board

Other: University of Michigan Department Learning Health Sciences

Sponsor(s) of Use Case

This section lists the sponsor(s) of the use case.

Michigan Department of Health and Human Services.

Metrics of Use Case

This section defines the target metrics identified to track the success of the use case.

- Percentage of outbound Medication Reconciliation messages with an MRCI score.
- Percentage of persons in ACRS with an active MRCI score.
- Number of MRCI scores assigned per participating organization monthly.
- Number of organizations participating in The Medication Management Bundle use case scenario.

Other Information

This section is provided to give the sponsor(s) an opportunity to address any additional information with regard to this use case that may be pertinent to assessing its potential impact.

The Computable Knowledge use case establishes the legal and technical infrastructure required for use of the KOs described in the Medication Management Bundle.

In order to participate in this use case scenario, participants must also participate in Computable Knowledge use case.

As additional medication management-related KOs are developed and integrated by MiHIN, new algorithms will be available in the Medication Management Bundle.

Future knowledge objects will be grouped into scenarios by the topic they address. For instance, the Opioid Assistance Bundle use case scenario contains more than one digital KO and can provide results in more than one opioid-related scenario.