



# Care Planning in FHIR

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# The Problem

- Patients are suffering from an increasing number of complex or chronic health conditions which require frequent episodes of care involving multiple providers. With this complexity, it is difficult to plan care for patients
- There needs to be a means of defining how care planning interventions can be derived from clinically relevant order sets, protocols, clinical practice guidelines as part of the clinical workflow.
- FHIR may provide a solution to the problem. However, there is not enough guidance on the use of FHIR resources to create CarePlan activities.

# Use case examples

- Transitions in care
  - Discharge from acute care to post-acute care
  - Acute care hospital discharge planning and transfer of care information
- Managing ongoing care
  - Home health services, Referrals, Consultations
  - Treatment plans, Plan of Care Orders

# Questions asked by Clinicians

- How do I use order sets when planning care?
- How do care plans identify what protocol it's adhering to?
- How can I use best practices or clinical practice guidelines while planning care?
- How do I close-the-loop?
- How do I know a request or an order has been satisfied?
- How does an event or a result point to the order that authorized it?
- How do I know who the patient care team members are so I am able to follow-up or direct care?

# We have Care Guides

Arthritis, Unspecified

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Allscripts CareGuide Template  Allscripts

File Date: 06/04/2017

Template: Arthritis, Unspecified	Template ID: 10037
Print Name: Arthritis	Review Status:
Physiologic Category: Rheumatology	Reviewed Date:
Age Range:	Date Edited: 12/13/2016
Sex:	Status: Active

**Monographs:**

**What is it?**  
Arthritis is a form of joint disorder that involves inflammation, deterioration or injury of one or more joints. There are many types of Arthritis, the most common is Osteoarthritis. Others include various types of autoimmune disease like Rheumatoid Arthritis and certain joint infections as well as reactive arthritis which can occur after an infection elsewhere in the body. Arthritis often causes pain, swelling, and and if severe enough can cause deformity. Arthritis can cause premature damage to joints. A joint is where bones meet. Tendons, cartilage, and muscles help hold the bones together and let the joint move.

**What is the cause?**  
The causes vary depending on the type of Arthritis. It may be due to wear and tear of the joint either prematurely or with aging or it may occur after significant trauma to a joint, both part of Osteoarthritis. Or it may be an autoimmune disorder such as for example Rheumatoid Arthritis. If the cause is an infection, usually it's a bacterial infection within the joint and in this case the condition often requires hospital treatment and is not fully covered here.

**What are the symptoms?**  
You most likely have pain in one or more joints. The pain is usually worse after using the joint. The joint may feel stiff, especially in the morning. The joint may swell.

**How is it treated?**  
Treatment depends on what is causing your arthritis. There are three goals for treatment: The first is to relieve your pain. Second, we want to stop or slow down any damage to your joint. Third, we want to keep your joints strong. Medicines are often prescribed to reduce pain and swelling. These can also keep your joint from being damaged permanently. We may inject medicine into a joint. We may need to drain fluid from a joint. Good nutrition and weight control are important. Being overweight can make your arthritis worse by increasing the sheer mechanical stress on the joint and its cartilage. Heat, cold, and ultrasound treatments can help keep your joint flexible. Exercises and physical activity are especially important to keep your joints and surrounding muscles strong. They will also help you keep your joints moving. Even if the joints are beginning to wear out, they often function longer with some activity than with no activity. Sometimes braces and walkers can be used to relieve joint stress. In severe cases, surgical joint replacement may be the best treatment.

**What can I expect?**  
Some kinds of arthritis can be cured completely. Most are long-term illnesses. With proper treatment, most patients with arthritis lead normal lives.

**What to watch for:**  
Let us know any time you have a red and painful swollen joint. Let us know if you start to have symptoms in a new joint. Let us know if you have abnormal pain.

**¿Qué es?**  
La artritis es una forma de enfermedad de un articulación que implica inflamación, la inflamación, el deterioro o el daño de una o más articulaciones. Hay muchos tipos de artritis, la más común es la osteoartritis. Otros incluyen varias tipos de enfermedades autoinmunes como la artritis reumatoide y ciertas infecciones en las articulaciones, así como la artritis reactiva, que puede ocurrir después de una infección en otra parte del cuerpo. Artritis a menudo provoca el dolor, el hinchazón, y si es lo

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# Make Care Guides computable

## PlanDefinition

- Definitions as a sharable, consumable, and executable artifact
- Pre-defined group of action definitions
  - Description of the activity to be performed
  - May be collected into hierarchical groups
- Defines behavior, relationships, and applicable conditions
- Can specify when and whether the action should take place
  - Trigger elements (when)
  - Condition elements (whether)
  - Dynamic values (specific intent)

<http://hl7.org/fhir/plandefinition.html>

## ActivityDefinition

- A conceptual description of a specific action that should be taken
- Provides a reusable template that can be used to construct specific request resources
- May be combined with contextual information for the particular patient

<http://hl7.org/fhir/activitydefinition.html>

# Example - Diabetes Mellitus Type II

## Protocol or Order Set (partial)

### Medications

First Line Monotherapy (ADA 2017)

MetFORMIN HCl - 500 MG Oral Tablet; TAKE one TABLET Twice daily with meals; Qty: 60; Tablet; Days Supply: 30; Refill: 2

MetFORMIN HCl - 850 MG Oral Tablet; TAKE one DAILY WITH MEALS; Qty: 30; Tablet; Days Supply: 30; Refill: 2

MetFORMIN HCLER (OSM) 500 MG Oral Tablet Extended Release 24 Hour; TAKE one TABLET Daily with evening meal; Qty: 30; Tablet Extended Release 24 Hour; Days Supply: 30; Refill: 2

### Initial Labs

Basic Metabolic Panel

Blood Glucose - Fasting

Blood Glucose - Fingerstick

Blood Glucose - Random

Comprehensive Metabolic Panel

Hb A1c

Hepatic Function Panel

Lipid Panel

Serum Thyroid Stimulating Hormone (TSH)

Urinalysis Routine

Urinalysis with Microscopy

### Screening for Complications

Diabetic Foot Examination

Examination of Retina

Macular Exam

Monofilament Foot Sensation Test

Pedal Pulse Taking

### Dietary Recommendations

Diabetes diet, specified calories; Follow a diabetic diet with 1500 calories.

Diet, DASH; We want to put you on the DASH diet for {count} calories.

Diet, high fiber; Start eating more fiber.

Diet, low sodium; Restrict the salt in your diet by avoiding highly salted foods.

Diet, low sodium, specified; Restrict your sodium (salt) intake to 2 grams per day.

Diet, Mediterranean; We recommend that you follow the "Mediterranean diet."

Diet, TLC; We want you to follow the Therapeutic Lifestyle Changes (TLC) diet.

## PlanDefinition

### actionDefinition (group)

#### First Line Monotherapy Metformin HCL 500 mg

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description: Metformin HCL 500 MG Oral Tablet; TAKE one TABLET Twice daily with meals; 60 tablet; 2 refills

purpose: Defines a guideline supported prescription for the treatment of DM Type II

usage: This activity definition is used as part of Diabetes Mellitus, Type 2, Adult +MU care guides

approvalDate: 04/28/2017

lastReviewDate: 05/04/2017

effectivePeriod: 05/04/2017 --> 05/04/2018

.....

#### Diet Recommendation – follow a 1500 calories diabetic diet

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description: Diabetes diet, specified calories; Follow a diabetic diet with 1500 calories.

purpose: Defines a guideline supported patient instructions for the treatment of DM Type II

usage: This activity definition is used as part of Diabetes Mellitus, Type 2, Adult +MU care guides

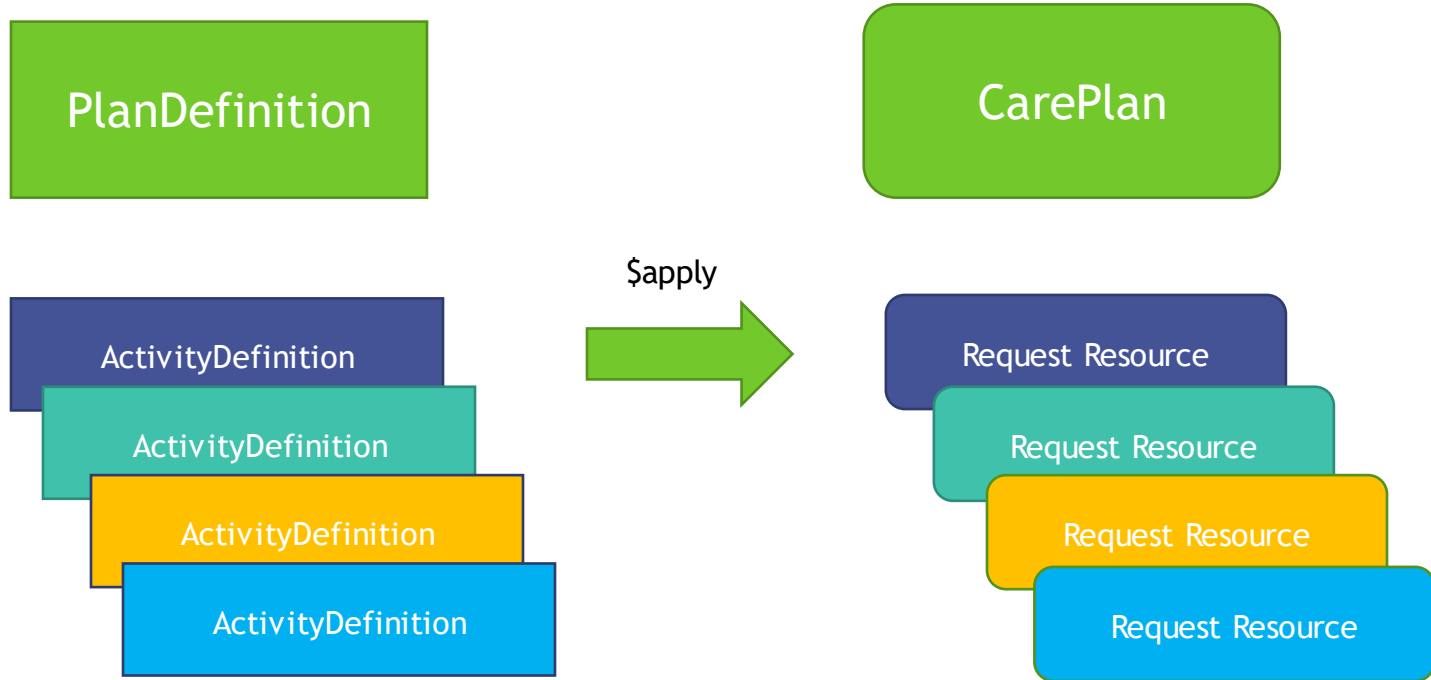
approvalDate: 04/28/2017

lastReviewDate: 05/04/2017

effectivePeriod: 05/04/2017 --> 05/04/2018 .....



# The \$apply Operation



# Dynamic values

- Provide information about how to transform the activity to a specific intent resource
- Use expression languages (CQL, FHIRpath) and the Expression data type to represent logic
- May be unstructured (natural language) or structured (a formal expression)
  - Structured elements may be used by systems that support computation
- Expressions may be either in-line or referenced

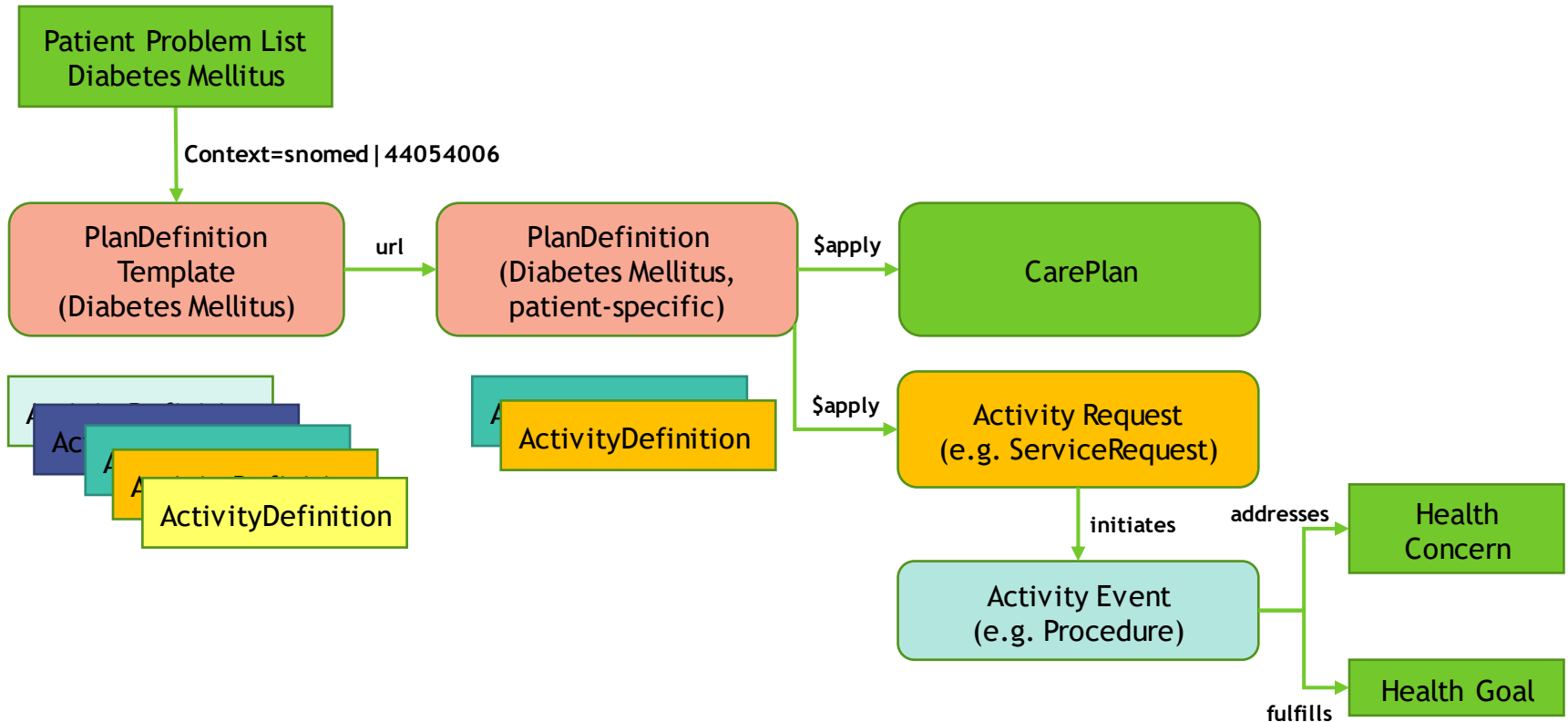
# Close - but not quite

- The \$apply operation was only available at the instance level
  - PlanDefinition/[id]/\$apply
  - The definition had to be available on the server
- No clinical search parameters
  - Unable to search for definitions by problem

# New in R4

- Resource level \$apply
  - PlanDefinition/\$apply
  - Definition could be included in the payload
  
- Search by context
  - UseContext DataType
  - Allowed for search by code (SNOMED, ICD-10)

# Patient-centered, evidence-based care planning



# Allscripts Care Manager

## Welcome to Allscripts Care Manager

Allscripts Care Manager is a tool for creating care plans for patients using care guides .

## Create a Care Plan

Create a new Care Plan for a patient, using evidence-based plan definition templates

[Create a Care Plan »](#)

## Add a Patient

Create a new patient record to be used for creating care plans.

[Add a Patient »](#)

# Next Steps

- Finish Care Planning application
- Continued Connectathon testing
- Integrate Care Team management
- Implement dynamic values



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