**Integrating the Healthcare Enterprise**



**IHE Patient Care Coordination**

**Technical Framework Supplement**

**Dynamic Care Planning**

**(DCP)**

**Draft for Public Comment**

Date: May xx, 2016

Author: PCC Technical Committee

Email: pcc@ihe.net

**Please verify you have the most recent version of this document.** See [here](http://ihe.net/Technical_Frameworks/) for Trial Implementation and Final Text versions and [here](http://ihe.net/Public_Comment/) for Public Comment versions.

**Foreword**

This is a supplement to the IHE Patient Care Coordination Technical Framework V10.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is published on May xx, 2016 for public comment. Comments are invited and may be submitted at [http://www.ihe.net/PCC\_Public\_Comments](http://www.ihe.net/PCC_Public_Comments/). In order to be considered in development of the trial implementation version of the supplement, comments must be received by June xx, 2016.

This supplement describes changes to the existing technical framework documents.

“Boxed” instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume.

Amend Section X.X by the following:

Where the amendment adds text, make the added text bold underline. Where the amendment removes text, make the removed text bold strikethrough. When entire new sections are added, introduce with editor’s instructions to “add new text” or similar, which for readability are not bolded or underlined.

General information about IHE can be found at: [http://ihe.net](http://ihe.net/).

Information about the IHE Patient Care Coordination domain can be found at: [http://ihe.net/IHE\_Domains](http://ihe.net/IHE_Domains/).

Information about the organization of IHE Technical Frameworks and Supplements and the process used to create them can be found at: [http://ihe.net/IHE\_Process](http://ihe.net/IHE_Process/) and [http://ihe.net/Profiles](http://ihe.net/Profiles/).

The current version of the IHE IT Infrastructure Technical Framework can be found at: [http://ihe.net/Technical\_Frameworks](http://ihe.net/Technical_Frameworks/).

CONTENTS

[Introduction to this Supplement 6](#_Toc450739271)

[Open Issues and Questions 6](#_Toc450739272)

[Closed Issues 6](#_Toc450739273)

[General Introduction 8](#_Toc450739274)

[Appendix A - Actor Summary Definitions 9](#_Toc450739275)

[Appendix B - Transaction Summary Definitions 10](#_Toc450739276)

[Glossary 10](#_Toc450739277)

[Volume 1 – Profiles 11](#_Toc450739278)

[Copyright Licenses 11](#_Toc450739279)

[Domain-specific additions 11](#_Toc450739280)

[X Dynamic Care Planning (DCP) Profile 12](#_Toc450739281)

[X.1 DCP Actors, Transactions, and Content Modules 12](#_Toc450739282)

[X.1.1 Actor Descriptions and Actor Profile Requirements 14](#_Toc450739283)

[X.1.1.1 Care Plan Contributor 14](#_Toc450739284)

[X.1.1.2 Care Plan Consumer 14](#_Toc450739285)

[X.1.1.3 Care Plan Service 15](#_Toc450739286)

[X.2 DCP Actor Options 15](#_Toc450739287)

[X.2.1 Subscribe to Care Plan Updates 15](#_Toc450739288)

[X.3 DCP Required Actor Groupings 15](#_Toc450739289)

[X.4 DCP Overview 16](#_Toc450739290)

[X.4.1 Concepts 17](#_Toc450739291)

[X.4.2 Use Case 17](#_Toc450739292)

[X.4.2.1 Use Case: Chronic Conditions 17](#_Toc450739293)

[X.4.2.1.1 Chronic Conditions Use Case Description 17](#_Toc450739294)

[X.4.2.1.1.1 Encounter A: Primary Care Physician Initial Visit 18](#_Toc450739295)

[X.4.2.1.1.2 Encounter(s) B: Allied Health Care Providers and Specialists 20](#_Toc450739296)

[X.4.2.1.1.3 Encounter(s) C: ED Visit and Hospital Admission 24](#_Toc450739297)

[X.4.2.1.1.4 Encounter D: Primary Care Follow-up Visits 25](#_Toc450739298)

[X.5 DCP Security Considerations 26](#_Toc450739299)

[X.6 DCP Cross Profile Considerations 26](#_Toc450739300)

[Appendices 28](#_Toc450739301)

[Appendix A – DCP Structure of Shared Care Planning 29](#_Toc450739302)

[Appendix B – DCP Chronic Condition Use Case 30](#_Toc450739303)

[Volume 2 – Transactions 32](#_Toc450739304)

[3.Y1 Update Care Plan [PCC-Y1] 32](#_Toc450739305)

[3.Y1.1 Scope 32](#_Toc450739306)

[3.Y1.2 Actor Roles 32](#_Toc450739307)

[3.Y1.3 Referenced Standards 32](#_Toc450739308)

[3.Y1.4 Interaction Diagram 33](#_Toc450739309)

[3.Y1.4.1 Update Care Plan 33](#_Toc450739310)

[3.Y1.4.1.1 Trigger Events 33](#_Toc450739311)

[3.Y1.4.1.2 Message Semantics 33](#_Toc450739312)

[3.Y1.4.1.3 Expected Actions 33](#_Toc450739313)

[3.Y1.5 Security Considerations 34](#_Toc450739314)

[3.Y2 Retrieve Care Plan [PCC-Y2] 34](#_Toc450739315)

[3.Y2.1 Scope 34](#_Toc450739316)

[3.Y2.2 Actor Roles 34](#_Toc450739317)

[3.Y2.3 Referenced Standards 34](#_Toc450739318)

[3.Y2.4 Interaction Diagram 35](#_Toc450739319)

[3.Y2.4.1 Retrieve Care Plan 35](#_Toc450739320)

[3.Y2.4.1.1 Trigger Events 35](#_Toc450739321)

[3.Y2.4.1.2 Message Semantics 35](#_Toc450739322)

[3.Y2.4.1.3 Expected Actions 35](#_Toc450739323)

[3.Y2.5 Security Considerations 35](#_Toc450739324)

[3.Y3 Subscribe to Care Plan Updates [PCC-Y3] 36](#_Toc450739325)

[3.Y3.1 Scope 36](#_Toc450739326)

[3.Y3.2 Actor Roles 36](#_Toc450739327)

[3.Y3.3 Referenced Standards 36](#_Toc450739328)

[3.Y3.4 Interaction Diagram 36](#_Toc450739329)

[3.Y3.4.1 Subscribe to Care Plan Updates 37](#_Toc450739330)

[3.Y3.4.1.1 Trigger Events 37](#_Toc450739331)

[3.Y3.4.1.2 Message Semantics 37](#_Toc450739332)

[3.Y3.4.1.3 Expected Actions 38](#_Toc450739333)

[3.Y3.5 Security Considerations 38](#_Toc450739334)

[3.Y4 Provide Care Plan [PCC-Y4] 38](#_Toc450739335)

[3.Y4.1 Scope 38](#_Toc450739336)

[3.Y4.2 Actor Roles 38](#_Toc450739337)

[3.Y4.3 Referenced Standards 39](#_Toc450739338)

[3.Y4.4 Interaction Diagram 39](#_Toc450739339)

[3.Y4.4.1 Provide Care Plan 39](#_Toc450739340)

[3.Y4.4.1.1 Trigger Events 39](#_Toc450739341)

[3.Y4.4.1.2 Message Semantics 39](#_Toc450739342)

[3.Y4.4.1.3 Expected Actions 40](#_Toc450739343)

[3.Y4.5 Security Considerations 40](#_Toc450739344)

[3.Y5 Search for Care Plan [PCC-Y5] 40](#_Toc450739345)

[3.Y5.1 Scope 40](#_Toc450739346)

[3.Y5.2 Actor Roles 40](#_Toc450739347)

[3.Y5.3 Referenced Standards 41](#_Toc450739348)

[3.Y5.4 Interaction Diagram 41](#_Toc450739349)

[3.Y5.4.1 Search for Care Plan 41](#_Toc450739350)

[3.Y5.4.1.1 Trigger Events 41](#_Toc450739351)

[3.Y5.4.1.2 Message Semantics 41](#_Toc450739352)

[3.Y5.4.1.3 Expected Actions 41](#_Toc450739353)

[3.Y5.5 Security Considerations 42](#_Toc450739354)

[Appendices 43](#_Toc450739355)

[Volume 2 Namespace Additions 43](#_Toc450739356)

[Volume 3 – Content Modules 44](#_Toc450739357)

[5 Namespaces and Vocabularies 44](#_Toc450739358)

[6 Content Modules 45](#_Toc450739359)

[6.3.1 Content Modules 45](#_Toc450739360)

[6.6 HL7 FHIR Content Module 45](#_Toc450739361)

[6.6.1 Care Plan 45](#_Toc450739362)

[6.6.2 Subscription 48](#_Toc450739363)

[Appendices 50](#_Toc450739364)

[Volume 3 Namespace Additions 50](#_Toc450739365)

[Volume 4 – National Extensions 51](#_Toc450739366)

# Introduction to this Supplement

The Dynamic Care Planning (DCP) Profile provides the structures and transactions for care planning, using a shared Care Plan that meets the needs of many, such as providers, patients and payers. This shared Care Plan can be dynamically updated as the patient interacts with the healthcare system. FHIR®*[[1]](#footnote-1)* resources and transactions are used by this profile.

## Open Issues and Questions

1. Need to determine the FHIR version and what to do about future updates.
2. (closed on 2/15/16) This profile will not attempt to ‘discover’ all possible providers that have provided care for the patient. There are other means of discovering patient’s points of care such as state HIE services, Nationwide Health Information Network (NwHIN) and CommonWell Health Alliance. This profile will account for known providers that have provided care for the patient.
3. Care Plan Contributor vs. Care Plan Creator
4. Is an ATNA Grouping required? If so, how does that impact potential mobile uses of this profile?
5. When profiling the FHIR Resource make sure we can make references to existing documents. (4/25/16 – what / who is the source of this issue?)
6. Should the FHIR CarePlan.subject be restricted to Patient?
7. What does CarePlan.subject of type Group mean?
8. (closed 3/28/16) Does FHIR Search using POST create a resource when the search fails to match on the search criteria?
9. Concepts from the Care Plan model, DAM or C-CDA, do not have clear mappings to the FHIR CarePlan resource. See **Table 6.6.1-1: Care Plan Concepts**
10. The CarePlan resource, in **Table 6.6.1-1: Care Plan Concepts**, includes activity.actionResulting – need understanding how this related to Care Plan concepts.

## Closed Issues

1. 2/15/16 Scope: This profile will not attempt to ‘discover’ all possible providers that have provided care for the patient. …this means that information on the location of actors is not profiled and is obtained by methods outside of the scope of this profile (similar to how XDS actors know with whom they communicate).
2. (2/16/16) The Care Plan Contributor should use the following pattern, from <http://hl7.org/fhir/http.html#transactional-integrity>

* The server provides a [read](http://hl7.org/fhir/http.html#read) interaction for any resource it accepts [update](http://hl7.org/fhir/http.html#update) interactions on
* Before updating, the client [reads](http://hl7.org/fhir/http.html#read) the latest version of the resource
* The client applies the changes it wants to the resource, leaving other information intact (note the [extension related rules](http://hl7.org/fhir/extensibility.html#exchange) around this)
* The client writes the result back as an [update](http://hl7.org/fhir/http.html#update) interaction, and is able to handle a 409 or 412 response (usually by trying again)

If clients follow this pattern, then information from other systems that they do not understand will be maintained through the update.

Note that it's possible for a server to choose to maintain the information that would be lost, but there is no defined way for a server to determine whether the client omitted the information because it wasn't supported (perhaps in this case) or whether it wishes to delete the information.

1. (3/28/16) Does FHIR Search using POST create a resource when the search fails to match on the search criteria?  
   No, the search operation, indicated by \_search, does not cause creation of content on the server.

# General Introduction

Update the following Appendices to the General Introduction as indicated below. Note that these are not appendices to Volume 1.

Appendix A - Actor Summary Definitions

Add the following actors to the IHE Technical Frameworks General Introduction list of Actors:

|  |  |
| --- | --- |
| Actor | Definition |
| Care Plan Contributor | This actor creates and updates Care Plans by submitting a new or updated Care Plan to a Care Plan Service. |
| Care Plan Consumer | This actor reads a Care Plan from a Care Plan Service. This actor may subscribe to receive updated Care Plans. |
| Care Plan Service | This actor manages Care Plans received from Care Plan Contributors, and provides updated Care Plans to subscribed Care Plan Consumers. |

Appendix B - Transaction Summary Definitions

Add the following transactions to the IHE Technical Frameworks General Introduction list of Transactions:

|  |  |
| --- | --- |
| Transaction | Definition |
| Update Care Plan | Update an existing or create a new Care Plan |
| Retrieve Care Plan | Retrieve a Care Plan |
| Subscribe to Care Plan Updates | Subscribe to receive updated Care Plans for specific patients |
| Provide Care Plan | Provide updated Care Plans to subscribers |

Glossary

Add the following glossary terms to the IHE Technical Frameworks General Introduction Glossary:

| Glossary Term | Definition |
| --- | --- |
| Care Plan Domain Analysis Model | A common reference used to support the development of implementable care plan models[[2]](#footnote-2) |
| Coordination of Care Services Functional Model | Supports shared and coordinated care plans as well as support of multidisciplinary care team members to communicate changes resulting from care plan interventions and collaborate in removing barriers to care.[[3]](#footnote-3) |
| Care Plan (as used in this profile) | Tool used by clinicians to plan and coordinate care for an individual patient. It aids in understanding and coordinating the actions that need to be performed for the target of care. The care plan is known by several similar and often interchangeable names such as the plan of care and treatment plan.[[4]](#footnote-4) |

Volume 1 – Profiles

## Copyright Licenses

NA

Add the following to the IHE Technical Frameworks General Introduction Copyright section:

## Domain-specific additions

NA

Add Section X

# X Dynamic Care Planning (DCP) Profile

The Dynamic Care Planning (DCP) Profile provides the structures and transactions for care planning, using a shared Care Plan that meets the needs of many, such as providers, patients and payers. This shared Care Plan can be dynamically updated as the patient interacts with the healthcare system. FHIR resources and transactions are used by this profile.

Globally, the healthcare system is highly fragmented. Fragmentation can increase the number of hospital re-admissions. According to claims data reported for the Medicare beneficiaries in 2003-2004, 19.6% of re-hospitalizations occur within 30 days after discharge. This translated into $17.4 billion dollars in hospital payments from Medicare in 2004.[[5]](#footnote-5)

The numbers of service delivery encounters required by individuals, as well as, the failure to deliver and coordinate needed services, are significant sources of frustration and errors, and are drivers of health care expenditures. Providing person-centered care is particularly important for medically-complex and/or functionally impaired individuals given the complexity, range, and on-going and evolving nature of their health status and the services needed. Effective, collaborative partnerships between service providers and individuals are necessary to ensure that individuals have the ability to participate in planning their care and that their wants, needs, and preferences are respected in health care decision making. The ability to target appropriate services and to coordinate care over time, across multiple clinicians and sites of service, with the engagement of the individual (i.e., longitudinal coordination of care) is essential to alleviating fragmented, duplicative and costly care for these medically-complex and/or functionally impaired persons.

## X.1 DCP Actors, Transactions, and Content Modules

This section defines the actors, transactions, and/or content modules in this profile. General definitions of actors are given in the Technical Frameworks General Introduction Appendix A at [http://ihe.net/Technical\_Frameworks](http://ihe.net/Technical_Frameworks/).

Figure X.1-1 shows the actors directly involved in the DCP Profile and the relevant transactions between them. If needed for context, other actors that may be indirectly involved due to their participation in other related profiles are shown in dotted lines. Actors which have a mandatory grouping are shown in conjoined boxes.

Update Care Plan [PCC-Y1] ↓

Transaction 1 [1] ↓

↓ Search for Care Plan [PCC-Y5]

↓ Retrieve Care Plan [PCC-Y2]

↓ Subscribe to Care Plan Updates [PCC-Y3]

↑ Provide Care Plan [PCC-Y4]

Care Plan Service

Actor F

Care Plan Consumer

Actor B

Care Plan Contributor

Actor A

↓ Search for Care Plan [PCC-Y5]

↓ Retrieve Care Plan [PCC-Y2]

↓ Subscribe to Care Plan Updates [PCC-Y3]

↑ Provide Care Plan [PCC-Y4]

Figure X.1-1: DCP Actor Diagram

Table X.1-1: DCP Profile - Actors and Transactions

| Actors | Transactions | Optionality | Reference |
| --- | --- | --- | --- |
| Care Plan Contributor | Update Care Plan | R | PCC TF-2: 3.Y1 |
| Search for Care Plan | R | PCC TF-2: 3.Y5 |
| Retrieve Care Plan | R | PCC TF-2: 3.Y2 |
| Subscribe to Care Plan Updates | O | PCC TF-2: 3.Y3 |
| Care Plan Consumer | Search for Care Plan | R | PCC TF-2: 3.Y5 |
| Retrieve Care Plan | R | PCC TF-2: 3.Y2 |
| Subscribe to Care Plan Updates | O | PCC TF-2: 3.Y3 |
| Provide Care Plan | O (as receiver) (Note 1) | PCC TF-2: 3.Y4 |
| Care Plan Service | Search for Care Plan | R | PCC TF-2: 3.Y5 |
| Update Care Plan | R | PCC TF-2: 3.Y1 |
| Retrieve Care Plan | R | PCC TF-2: 3.Y2 |
| Subscribe to Care Plan Updates | R | PCC TF-2: 3.Y3 |
| Provide Care Plan | R (as initiator) | PCC TF-2: 3.Y4 |

Note 1: required when supported.

Table X.1-1 lists the transactions for each actor directly involved in the DCP Profile. To claim compliance with this Profile, an actor shall support all required transactions (labeled “R”) and may support the optional transactions (labeled “O”).

### X.1.1 Actor Descriptions and Actor Profile Requirements

Most requirements are documented in Transactions (Volume 2) and Content Modules (Volume 3). This section documents any additional requirements on profile’s actors.

#### X.1.1.1 Care Plan Contributor

This actor creates and updates Care Plans by submitting a new or updated Care Plan to a Care Plan Service. This actor is grouped with a Care Plan Consumer.

In order to ensure data integrity, as is necessary when multiple Care Plan Contributors are attempting to update to the same Care Plan, the Care Plan Contributor SHALL use the following pattern, (from http://hl7.org/fhir/http.html#transactional-integrity)

* Before updating, the Care Plan Contributor SHALL read the latest version of the Care Plan;
* The Care Plan Contributor SHALL apply the changes (additions, updates, deletions) it wants to the Care Plan, leaving all other information intact;
* The Care Plan Contributor SHALL write the Care Plan back as an update interaction, and is able to handle a failure response, commonly due to other Contributor Updates (usually by trying again).

If a Care Plan Contributor follows this pattern, then information from other systems that they do not manage will be maintained through the update.

#### X.1.1.2 Care Plan Consumer

This actor reads a Care Plan from a Care Plan Service. This actor may subscribe to receive updated Care Plans.

#### X.1.1.3 Care Plan Service

This actor manages Care Plans received from Care Plan Contributors, and provides updated Care Plans to subscribed Care Plan Consumers.

As described above under the Care Plan Contributor, the Care Plan Service receives a Care Plan and manages versions of the Care Plan as a whole.

## X.2 DCP Actor Options

Options that may be selected for each actor in this profile, if any, are listed in Table X.2-1. Dependencies between options when applicable are specified in notes.

Table X.2-1: DCP - Actors and Options

| Actor | Option Name | Reference  *<either reference TF-3 or the applicable X.2.x subsection below table>* |
| --- | --- | --- |
| Care Plan Contributor | Subscribe to Care Plan Updates | -- |
| Care Plan Consumer | Subscribe to Care Plan Updates | -- |
| Care Plan Service | No options defined | -- |

### X.2.1 Subscribe to Care Plan Updates

Support for this Subscribe to Care Plan Updates simply means that the optional Subscribe to Care Plan Updates [PCC-Y3] is supported.

## X.3 DCP Required Actor Groupings

Table X.3-1: DCP - Required Actor Groupings

| DCP Actor | Actor to be grouped with | Reference | Content Bindings Reference |
| --- | --- | --- | --- |
| Care Plan Contributor | none |  |  |
| Care Plan Consumer | none |  |  |
| Care Plan Service | none |  | -- |

## X.4 DCP Overview

Care planning is needed to manage medically complex and/or functionally impaired individuals as they interact with the health care system. Often, these individuals require real time coordination of the care as they receive care from multiple care providers and care settings. HL7®[[6]](#footnote-6) Care Plan Domain Analysis Model depicts the care plan as a tool used by clinicians to plan and coordinate care[[7]](#footnote-7). Effective care planning and care coordination for patient with complex health problems and needs are needed throughout the world. Both the European Union and the United States are currently working to encourage more effective use of information and communication technology to support the delivery of health services. This has led to the promotion of interoperability of health information and communication technology products and services.[[8]](#footnote-8)

In the United States, providers and payers are interested in ensuring that patients are receiving effective and efficient care. The Medicare and Medicaid EHR incentive programs provide financial incentives to care providers for the meaningful use of certified EHR technology that supports care coordination[[9]](#footnote-9). According to the United States Office of the National Coordinator for Health Information Technology’s Connecting Health and Care for the Nation Shared Nationwide Interoperability Roadmap, “Providers also play a critical role in coordinating care with other providers in support of patients. However, coordinating care and engaging with multi-disciplinary, cross-organization care, support and service teams has been incredibly difficult with the tools available today. Technology that does not facilitate the sharing and use of electronic health information that providers need, when they need it, which often creates additional challenges to care coordination. Additionally, care coordination via electronic means requires workflow changes for providers and their staff, particularly to close referral loops and ensure all of an individual’s health information is available to the entire care, support and services team. These workflow changes are not insignificant and must be overcome in order to enable interoperability.”[[10]](#footnote-10)

This profile depicts how multiple care plans can be shared and used to plan and coordinate care.

### X.4.1 Concepts

Care plans have many different meanings to many different people. Each discipline has its own definition of what a care plan is and what it contains. This profile uses the term ‘care planning’ for the process of sharing care plans for the patient. Dynamic care planning expands the concept of care planning from being only discipline specific to an interdisciplinary process where all disciplines that care for the patient are able to communicate their plans of care, treatment plans, health issues, interventions and goals/outcomes, etc. for the patient.

As identified in the IHE PCC Nursing White Paper to Advocate the Uptake of Patient Plan of Care and eNursing Summary Profiles July 2012, each clinical discipline’s plan of care or treatment plan should be incorporated into one overarching central Care Plan for the patient. This profile will address many of the needs not met in many document based static use case specific care plans:

* A shared dynamic care plan that meets the needs of many stakeholders (providers, patients, payers, etc.);
* A method to consolidate the many care plans that can be attached to a patient;
* Provide a framework for centralized dynamic care planning.

### X.4.2 Use Case

This profile reuses the HL7 Care Plan Domain Analysis Model specification storyboard 2: Chronic Conditions[[11]](#footnote-11) with permission from HL7 Patient Care Work Group. The storyboard includes chronic disease management as well as a transition of care episode.

For the purpose of IHE profiling, the storyboard is being referred to as a use case.

#### X.4.2.1 Use Case: Chronic Conditions

The use case provides narrative description of clinical scenarios where the care plan is accessed, updated or used during care provision.

##### X.4.2.1.1 Chronic Conditions Use Case Description

The purpose of the HL7 chronic conditions care plan storyboard (use case) is to illustrate the communication flow and documentation of a care plan between a patient, his or her primary care provider, ancillary providers and specialists involved in the discovery and treatment of a case of Type II Diabetes Mellitus. It consists of five types of encounters (although in reality there could be many more encounters) which also include an episode of care in which transition of care occurs. The following encounters are depicted:

* Encounter A: Primary Care Physician Initial Visit
* Encounter(s) B: Allied Health Care Provider Visits/Specialist Visits
* Encounter(s) C: ED Visit with hospital admission (inpatient stay)
* Encounter D: Primary Care Follow-up post hospital discharge Visit

The use case contains the following actors and roles.

* Primary Care Physician: Dr. Patricia Primary
* Patient: Mr. Bob Anyman
* Diabetic Educator: Ms. Edith Teaching
* Dietitian/Nutritionist: Ms. Debbie Nutrition
* Exercise Physiologist: Mr. Ed Active
* Pharmacist: Ms. Susan Script
* Optometrist: Dr. Victor Vision
* Podiatrist: Dr. Barry Bunion
* Psychologist: Dr. Larry Listener
* Emergency Department Physician: Dr. Eddie Emergent
* Hospital Attending Physician: Dr. Allen Attend

###### X.4.2.1.1.1 Encounter A: Primary Care Physician Initial Visit

**Pre-conditions:** Patient Mr. Bob Anyman attends his primary care physician (PCP) clinic because he has been feeling generally unwell in the past 7-8 months. His recent blood test results reveal abnormal glucose challenge test profile.

**Description of Encounter:** Dr. Patricia Primary reviews Mr. Anyman’s medical history, presenting complaints and the oral glucose tolerance test results and concludes the patient suffers from Type II Diabetes Mellitus (Type II DM). Dr. Primary accesses Mr. Anyman’s medical record, and records the clinical assessment findings and the diagnosis.

Dr. Primary discusses with Mr. Anyman the identified problems, potential risks, goals, management strategies and intended outcomes. After ensuring that these are understood by the patient, Dr. Primary begins to draw up a customized chronic condition (Type II DM) care plan based on a standardized multi-disciplinary Type II DM care plan adopted for use by her practice. Agreed goals and scheduled activities specific for the care of Mr. Anyman are entered into the care plan.

Dr. Primary also discusses with the patient the importance of good nutrition and medication management and exercise in achieving good control of the disease, as well as the criticality of good skin/foot care and eye care to prevent complications. Scheduling of consultations with diabetic educator, dietitian, exercise physiologist, community pharmacist, optometrist, and podiatrist (allied health care providers) is discussed and agreed to by the patient. The frequency of visit to allied health care providers is scheduled according to the national professional recommendation for collaborative diabetes care. Dr. Primary also notices signs and symptoms of mood changes in the patient after the diagnosis is made. She recommends that the patient may benefit from seeing a clinical psychologist to which the patient also agrees.

Dr. Primary generates a set of referrals to these allied health care providers. The referrals contain information about the patient’s medical history including the recent diagnosis of Type II diabetes, reasons for referral, requested services and supporting clinical information such as any relevant clinical assessment findings including test results. A copy of the care plan agreed to by the patient is made available with the referral.

**Post Condition:** Once the care plan is completed, it is committed to the patient’s medical record. The patient is offered a copy of the plan.

A number of referrals in the form of notification/request for services together with the care plan is made available to the relevant health care providers

The patient is advised to follow the referral practice/protocol specific to the local health care system or insurance plan. For the first appointment, the patient may wait for scheduled appointments from the relevant health care providers to whom referral/request for services have been made, or may be able to schedule his own appointment using booking systems of the specialist or allied health providers.

Figure X.4.2.1.1.1-1: Encounter A: Basic Process Flow in DCP Profile

Encounter A

Transaction\_1 [1]

PCP EHR  
as Care Plan Updater and Care Plan Consumer

Actor D/

Actor E

Care Plan Management System as Care Plan Manager

Actor A /

Actor B

Patient Portal as Care Plan Consumer

Update Care Plan

Transaction-B [B]

Provide Care Plan

Transaction-B [B]

Retrieve Care Plan

Transaction-B [B]

Subscribe to Care Plan Updates

Transaction-B [B]

Retrieve Care Plan

Transaction-B [B]

Search for Care Plan

Transaction-B [B]

###### X.4.2.1.1.2 Encounter(s) B: Allied Health Care Providers and Specialists

**Pre-conditions:** Mr. Anyman’s allied health care providers and specialists have received a referral with copy of care plan from Dr. Patricia Primary.

The allied health care providers and specialists have accepted the referral and scheduled a first visit with the patient – Mr. Bob Anyman.

The case has been assigned to the following individual allied health care providers and referrals made to the applicable specialists:

1. Ms. Edith Teaching (Diabetic Educator) for development and implementation of comprehensive diabetic education program and plan to ensure that the patient understands the nature of the disease, the problem, potential complications and how best to manage the condition and prevention of potential complications.
2. Ms. Debbie Nutrition (Dietitian/Nutritionist) for development and implementation of a nutrition care plan for diabetes to ensure effective stabilization of the blood glucose level with the help of effective diet control.
3. Mr. Ed Active (Exercise Physiologist) for development and implementation of an exercise regime.
4. In certain countries (e.g., Australia), the community pharmacist (Ms. Susan Script) provides patient with education on diabetic medications prescribed for the patient by Dr. Primary, and development and implementation of an effective and safe medication management program. The objectives are to gain and maintain effective control of the condition and to prevent hypo- and hyper- glycemic episodes.
5. Dr. Larry Listener (clinical psychologist) for counseling and to develop and implement an emotional support program; this includes a plan to reduce the impact of emotional stress brought about by the newly diagnosed condition and to improve the patient’s psychological well-being. The plan may include enrolling patient in diabetic support group.
6. Dr. Victor Vision (Optometrist) for regular (e.g., 6 monthly) visual and retinal screening and to educate patient on the eye care and how best to prevent/minimize the risks of ocular complications.
7. Dr. Barry Bunion (Podiatrist) for education on the risks of foot complications and to develop and implement an effective foot care program including regular self-assessment, care of the feet and follow-up visits.

**Description of Encounter:** The patient is registered at the allied health care provider/specialist’s reception. Any additional or new information provided by the patient is recorded in the health care record system operated by the allied health provider clinic.

During the first consultation, the allied health care provider/specialist reviews the referral and care plan provided by Dr. Primary.

During subsequent consultation, the allied health care provider/specialist reviews the patient’s health care record and most recent care plan of the patient.

At each consultation, the allied health care provider reviews the patient’s health record, assesses the patient, checks the progress and any risks of non-adherence (compliance) and complications, and discusses the outcomes of the management strategies and/or risks. Any difficulties in following the management strategies or activities by the patient are discussed. Any new/revised goals and timing, new intervention and self-care activities are discussed and agreed to by the patient. The new/changed activities are scheduled and target dates agreed upon.

The allied health care provider updates the clinical notes and the care plan with the assessment details, and any changes to the management plan including new advice to the patient. The date of next visit is also determined.

Table X.4.2.1.1.2-1: Allied Health Professionals/Specialists Encounters – Activities and Outcomes

| Provider / Allied Health Provider | Encounter Activities | Outcomes | Communications |
| --- | --- | --- | --- |
| Diabetic Educator | Review referral/patient progress  assess learning needs and strategy  discuss and finalize education plan | Develop/update education plan  Update clinical notes  Generate progress notes | New/updated education plan to patient  Summary care plan and progress note shared with primary care provider and other care providers, |
| Dietitian/Nutritionist | Review referral/patient progress  Assess diet management needs and strategies  Discuss and finalize diet management plan | Develop/update diet plan  Weight assessment; Exercise plan  Diet management plan;  Referral to educator and exercise therapy if necessary  Update clinical notes  Generate progress notes | New/updated care plan to patient  Summary care plan and progress note shared with primary care provider and other care providers, e.g., diabetic educator, exercise physiologist, etc. |
| Exercise Physiologist | Review referral/patient progress  Assess exercise/activity needs and strategies  Discuss and finalize exercise plan | Develop/update exercise plan:  Weight assessment; exercise plan  Update clinical notes  Generate progress notes | New/updated exercise plan to patient  Summary care plan and progress note shared with primary care provider and other care providers, e.g., diabetic educator, dietitian, etc. |
| Community Pharmacist | Review patient medication profile  Assess medication management (education, conformance, etc.) needs and strategies  Discuss and finalize medication management plan | Develop/update medication management plan:  patient current medication list assessment result;  recommendation on meds management; referral to other provider(s) if necessary  dispense record on dispensed meds  Update clinical notes  Generate progress notes | New/updated medication management plan to patient  Summary care plan and progress note shared with primary care provider and to other care providers, e.g., diabetic educator, dietitian, etc. |
| Clinical Psychologist | Review referral/patient progress  Assess emotional status, coping mechanisms and strategies  Discuss and finalize psychological management plan | Develop/update psychological management plan:  Emotion assessment;  Psychotherapy session plan  Update clinical notes  Generate progress notes | New/updated psychological management plan to patient  Summary care plan and progress note shared with primary care provider and other care providers, e.g., diabetic educator, dietitian, etc. |
| Optometrist | Review referral/patient progress  Assess eye care needs and strategies  Discuss and finalize eye care plan | Develop/update eye care plan:  Regular eye checks for early detection of Diabetic retinopathy (1yearly to 2 yearly depending on national protocol and how advanced is DM)  Stop smoking (prevent smoking related damage to eye cells)  Wear sun glasses when in sun (prevent UV accelerating eye damage) – dispense prescription sun glasses if necessary;  Referral to Dietitian/Nutritionist for counseling on diet rich in fruits and green leafy veg and Omega 3 fats along with effective weight control  Update clinical notes  Generate progress notes | New/updated eye care plan to patient  Summary care plan and progress note shared with primary care provider and other care providers, e.g., diabetic educator, dietitian, etc. |
| Podiatrist | Review referral/patient progress  Assess foot care needs and strategies  Discuss and finalize foot care plan | Develop/update foot care plan  Foot assessment  Foot care plan  Update clinical notes  Generate progress notes | New/updated foot care plan to patient  Summary care plan and progress note shared with primary care provider and other care providers, e.g., diabetic educator, dietitian, pharmacist, etc. |

**Post Condition:** An updated allied health domain specific care plan complete with action items and target dates is completed with patient agreement.

The patient is provided a copy of the new/updated care plan at the end of each allied health/specialist consultation.

At the end of each consultation a progress note is written by the allied health provider/specialist which documents the outcomes of the assessment, any new risks identified and changes to or new management strategies that have been included in the updated care plan. This allied health domain specific progress note is shared with the patient’s primary care provider, Dr. Primary. Any care coordination responsibilities required of Dr. Primary is also communicated. The progress note is also shared with any other allied health care provider(s) who may need to be informed about changes in risks, goals, and management plan that are relevant to the ongoing management of the patient. For example, progress note from a dietitian/nutritionist may contain clinical information that may need to be considered by the diabetic educator.

Encounter(s) B

Transaction\_1 [1]

Providers EHRs (e.g., specialists and Allied Care Providers) as Care Plan Updater / Care Plan Consumer

Actor D/

Actor E

Care Plan Management System as Care Plan Manager

Patient Portal as Care Plan Consumer

Update Care Plan

Transaction-B [B]

Provide Care Plan

Transaction-B [B]

Retrieve Care Plan

Transaction-B [B]

Subscribe to Care Plan Updates

Transaction-B [B]

Subscribe to Care Plan Updates

Transaction-B [B]

Retrieve Care Plan

Transaction-B [B]

Figure X.4.2.1.1.2-1: Encounter(s) B: Basic Process Flow in DCP Profile

###### X.4.2.1.1.3 Encounter(s) C: ED Visit and Hospital Admission

**Pre-Condition:** Mr. Bob Anyman took a 3-month holiday in Australia during the southern hemisphere spring season, missed the influenza immunization window in his northern hemisphere home country, and forgot about the immunization after he returned home. He develops a severe episode of influenza with broncho-pneumonia and very high blood glucose level (spot BSL = 23 mM) as complications. He suffers from increasing shortness of breath on a Saturday afternoon.

Mr. Anyman presents himself at the emergency department of his local hospital as Dr. Primary’s clinic is closed over the weekend.

**Description of Encounter:** Mr. Anyman is admitted to the hospital and placed under the care of physicians from the general medicine clinical unit.

During the hospitalization, the patient is given a course of IV antibiotics, insulin injections to stabilize the blood glucose level. The patient was assessed by the hospital attending physician, Dr. Allen Attend, as medically fit for discharge after four days of inpatient care. Dr. Attend reconciles the medication treatment during inpatient care, creates a discharge medication list, outlines follow up information and discusses post discharge care with the patient. He recommends the patient to consider receiving influenza immunization before the next influenza session and updates this as recommendation to Dr. Primary in the patient’s discharge plan.

Planning for discharge is initiated by the physician and the nurse assigned to care for the patient soon after admission as per hospital discharge planning protocol. The discharge plan is finalized on the day of discharge and a discharge summary is generated.

**Post Condition:** The patient’s discharge care plan is completed. This plan may include information on changes to medications, management recommendations to the patient’s primary care provider and the patient, and any health care services that are requested or scheduled.

The patient is given a copy of the discharge summary that includes the discharge care plan.

A discharge summary with summary of the discharge plan is shared with to the patient’s primary care provider, Dr. Primary with recommendation for pre-influenza season immunization.

Note: The process flow pattern for this encounter is the same as encounter(s) B. See Figure X.4.2.1.1.2-1.

###### X.4.2.1.1.4 Encounter D: Primary Care Follow-up Visits

**Pre-Condition:** Patient Mr. Bob Anyman is scheduled for a post-hospital discharge consultation with his primary care provider, Dr. Primary.

Mr. Anyman is seen by Dr. Primary at her clinic on the day of appointment.

The discharge summary information from the hospital is incorporated into the patient’s medical record and is ready for Dr. Primary to review at the consultation.

**Description of Encounter:** Primary Care Physician Dr. Patricia Primary reviews patient Mr. Anyman’s hospital discharge summary and discusses the pre-influenza season immunization recommendation with the patient. The patient agrees with the recommendation. The care plan is updated.

Dr. Primary notices that the patient has gained extra weight and the blood sugar level has not quite stabilized after discharge from hospital. Dr. Primary reviews the care plan and discusses with patient the plan to change the diet and medication. Patient agrees. The care plan is updated.

Dr. Primary issues a new prescription to the patient, and asks the patient to make an early appointment to see the dietitian to discuss new nutrition management strategy and plan.

Dr. Primary generates progress notes with nutrition management and exercise change recommendations are generated by Dr. Primary and shared with the patient’s dietitian. The care plan is updated and shared with relevant allied health providers.

Dr. Primary changes patient’s follow-up visits from four monthly to two monthly for the next two appointments with the aim to review the follow-up frequency after that.

**Post Condition:** A new prescription is shared with the patient’s community pharmacy. Ms. Script will discuss the new medication management plan with the patient when he goes to pick up his medications.

The patient also makes an early appointment to see the dietitian and exercise physiologist. A copy of progress notes from Dr. Primary will be made available to the dietitian and exercise physiologist before the scheduled appointment.

Patient gets a copy of the updated care plan, and a copy of the plan is also shared with relevant allied health providers.

Note: The process flow pattern for this encounter is the same as encounter A. See Figure X.4.2.1.1.1-1.

### X.5 DCP Security Considerations

In many other uses of the HTTP/REST pattern, applications are accessing far less sensitive information than patient identifiers and protected health information. When the mobile environment comes into use, the challenges of security and privacy controls are unique, simply because the devices are harder to physically control. The DCP Profile provides access to the patient identifiers and other protected health information managed in healthcare. These factors present a unique and difficult challenge for the security model. It is recommended that application developers utilize a Risk Assessment in the design of the applications, and that the operational environment utilize a Risk Assessment in the design and deployment of the operational environment. See FHIR DSTU2 Security http://hl7.org/fhir/DSTU2/security.html.

There are many reasonable methods of security for interoperability transactions, which can be implemented without modifying the characteristics of the DCP Profile transactions. The use of TLS is encouraged, as is the use of the ATNA Profile (see ITI TF-1:9).

User authentication on mobile devices and browsers is typically handled by more lightweight authentication schemes such as HTTP Authentication, OAuth, or OpenID Connect. IHE has a set of profiles for user authentication including: Enterprise User Authentication (EUA) on devices using HTTP and Internet User Authorization (IUA) for REST-based authentication. In all of these cases, the network communication security, and user authentication are layered in the HTTP transport layer and do not modify the interoperability characteristics defined in the DCP Profile. The use of strong trust keys is encouraged.

Actors in the DCP Profile should make use of the audit logging (ATNA) Profile. However, support for ATNA-based audit logging on mobile devices and lightweight browser applications may be beyond their ability. The operational environment must choose how to mitigate the risk of relying only on the service-side audit logging on the Care Plan Service. It is recommended that DCP Actors implement the Internet User Authentication (IUA) Profile, incorporating the subject of the IUA token in audit messages.

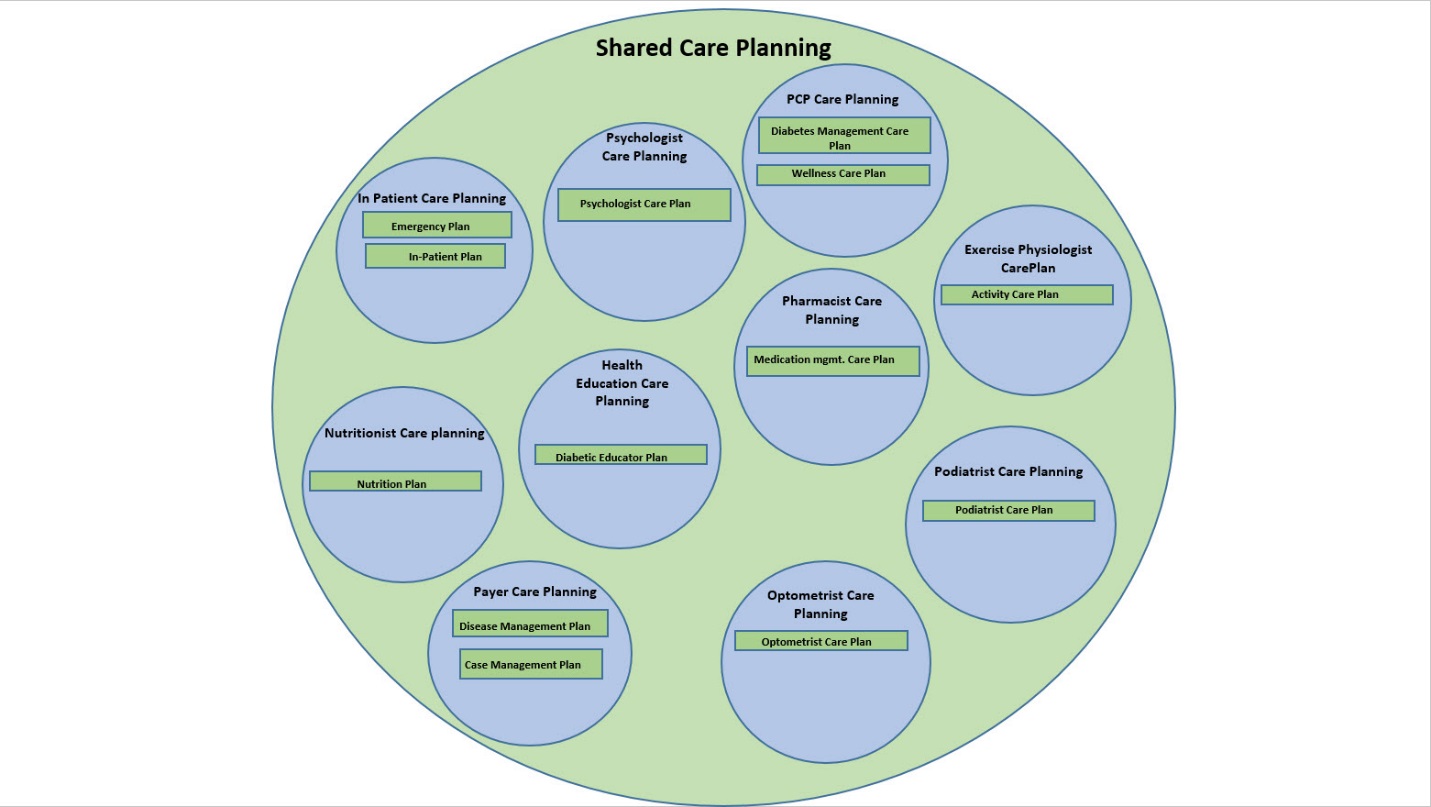
The Resource URL pattern defined in this profile means many requests may include Patient ID, names, or other demographic data as parameters for query. The advantage of this pattern is ease of implementation and clear distinction of a patient’s identity. The URL pattern does present a risk when using typical web server audit logging of URL requests and browser history. In both of these cases the URL with the Patient ID or Name query parameters is clearly visible.

## X.6 DCP Cross Profile Considerations

A Content Consumer in Patient Care Coordination might be grouped with a Care Plan Consumer to enable the filtering and display of Care Plan content. A Content Creator might be grouped with a Care Plan Updater to enable the creation or update of clinical content. A Reconciliation Agent might be grouped with a Care Plan Consumer and also with a Care Plan Creator to facilitate the reconciliation processes. As mentioned in the security considerations section, a Secure Node in the ATNA Profile might be grouped with any and all of the actors in this profile.

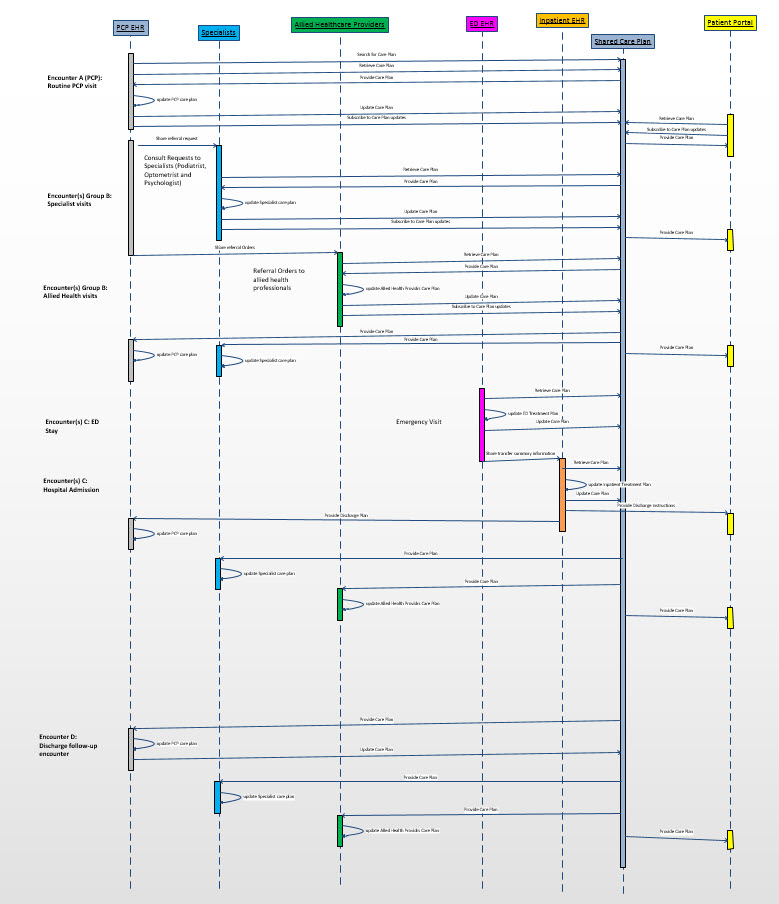
Appendices

Appendix A – DCP Structure of Shared Care Planning



Appendix B – DCP Chronic Condition Use Case

The following diagram depicts the chronic condition use case flow of interactions between care providers EHRs, the patient’s PHR and Dynamic Care Planning.



Volume 2 – Transactions

Add Section 3.Y1

## 3.Y1 Update Care Plan [PCC-Y1]

### 3.Y1.1 Scope

This transaction is used to update or create a care plan. A CarePlan resource is submitted to a Care Plan Service where the update or creation is handled.

### 3.Y1.2 Actor Roles

Care Plan Contributor

Actor ABC

Care Plan Service

Actor DEF

Figure 3.Y.2-1: Use Case Diagram

Table 3.Y.2-1: Actor Roles

|  |  |
| --- | --- |
| **Actor:** | Care Plan Contributor |
| **Role:** | The Care Plan Contributor submits a care plan that is updated, or newly created. |
| **Actor:** | Care Plan Service |
| **Role:** | The Care Plan Service receives submitted care plans for management as per FHIR Resource Integrity management. |

### 3.Y1.3 Referenced Standards

HL7 Fast Healthcare Information Resources (FHIR) DSTU 2.0

### 3.Y1.4 Interaction Diagram

Care Plan Contributor

Actor A

Update Care Plan

Message 1

Care Plan Manager

Actor D

#### 3.Y1.4.1 Update Care Plan

The Care Plan Contributor submits a care plan that has been newly created or edited to a Care Plan Service. The Care Plan Contributor shall be grouped with a Care Plan Consumer in order to perform a Retrieve Care Plan prior to performing the Update Care Plan transaction. The Care Plan Service handles the FHIR CarePlan Resource according to FHIR Resource integrity.

##### 3.Y1.4.1.1 Trigger Events

A care plan has been newly created or an existing care plan has been edited, and the set of activity for the care plan are to be committed to a Care Plan Service.

##### 3.Y1.4.1.2 Message Semantics

This is an HTTP or HTTPS PUT of a CarePlan resource, as constrained by this profile.

The base URL for this is: [base]/CarePlan/[id]

Where the body of the transaction contains the CarePlan resource.

See: http://hl7.org/fhir/http.html#update

##### 3.Y1.4.1.3 Expected Actions

The Care Plan Contributor is grouped with a Care Plan Consumer in order to perform a Retrieve Care Plan before updating an existing care plan. When updating an existing care plan, the Care Plan Contributor shall merge changes into a recently received CarePlan, leaving unchanged content unaltered.

If the Care Plan Service returns an error to the Update Care Plan transaction, as would happen if the version of the CarePlan is old, then the Care Plan Contributor should perform the steps of Retrieve Care Plan, merge changes, and then attempt Update Care Plan again. (add FHIR reference)

### 3.Y1.5 Security Considerations

See X.5 DCP Security Considerations

## 3.Y2 Retrieve Care Plan [PCC-Y2]

### 3.Y2.1 Scope

This transaction is used to retrieve a specific care plan using a known FHIR CarePlan resource id.

### 3.Y2.2 Actor Roles

Care Plan Consumer or Care Plan Updater

Actor ABC

Care Plan Service

Actor DEF

Figure 3.Y2.2-1: Use Case Diagram

Table 3.Y2.2-1: Actor Roles

|  |  |
| --- | --- |
| **Actor:** | Care Plan Consumer |
| **Role:** | The Care Plan Consumer requests a specific care plan using the CarePlan id |
| **Actor:** | Care Plan Service |
| **Role:** | The Care Plan Service returns the requested CarePlan resource, or an error if the requested id does not exist. |

### 3.Y2.3 Referenced Standards

HL7 Fast Healthcare Information Resources (FHIR) DSTU 2.0

### 3.Y2.4 Interaction Diagram

Care Plan Consumer

Actor A

Retrieve Care Plan

Message 1

Care Plan Manager

Actor D

#### 3.Y2.4.1 Retrieve Care Plan

The Care Plan Consumer retrieves a specific care plan from the Care Plan Service.

##### 3.Y2.4.1.1 Trigger Events

Any time a specific care plan needs to be retrieved, for the purposes of viewing or in conjunction with the preparation for an update to a care plan.

##### 3.Y2.4.1.2 Message Semantics

The message is a FHIR HTTP or HTTPS GET of a CarePlan resources where the parameter provided is the CarePlan.id with an option to ask for a specific version of the given CarePlan

The URL for this operation is: [base]/CarePlan/[id]

or, if this is an historical, version specific retrieval: [base]/CarePlan/[id]/\_history/[vid]

##### 3.Y2.4.1.3 Expected Actions

The Care Plan Consumer initiates the retrieve request using HTTP or HTTPS GET, and the Care Plan Service responds according to the [FHIR GET specification](http://hl7.org/fhir/search.html) with the requested care plan or an error message.

### 3.Y2.5 Security Considerations

No PHI are provided with this transaction so there are no additional HTTP or HTTPS GET concerns.

## 3.Y3 Subscribe to Care Plan Updates [PCC-Y3]

### 3.Y3.1 Scope

This transaction is used to *subscribe to updates made to a Care Plan.*

### 3.Y3.2 Actor Roles

Care Plan Consumer or Care Plan Updater

Actor ABC

Care Plan Service

Actor DEF

Figure 3.Y3.2-1: Use Case Diagram

Table 3.Y3.2-1: Actor Roles

|  |  |
| --- | --- |
| **Actor:** | Care Plan Consumer |
| **Role:** | The Care Plan Consumer subscribes to updates based upon changes to a CarePlan resource. |
| **Actor:** | Care Plan Service |
| **Role:** | The Care Plan Service evaluates the involved resources of the Subscription and uses the defined channel to notify a Care Plan Consumer about changes. |

### 3.Y3.3 Referenced Standards

HL7 Fast Healthcare Information Resources (FHIR) DSTU 2.0

### 3.Y3.4 Interaction Diagram

Care Plan Consumer

Actor A

Subscribe to Care Plan Updates

Message 1

Care Plan Manager

Actor D

#### 3.Y3.4.1 Subscribe to Care Plan Updates

A Care Plan Consumer may choose to receive updates as CarePlan resources are changed by using the Subscribe to Care Plan Updates transaction. Alternatively, a Care Plan Consumer could periodically query for a CarePlan resource history and determine that a Retrieve Care Plan was necessary.

Subscriptions are constructed in a manner that the Care Plan Service sends the entire CarePlan resources, using the Provide Care Plan [PCC-Y4] transaction, when the criteria are met.

##### 3.Y3.4.1.1 Trigger Events

Subscribing to Care Plan Updates is a business and workflow decision, and the use of this is optional in the DCP Profile.

The Subscription criteria, used to trigger updates, may be simple or complex.

A simple Subscription criteria includes only query parameters about a CarePlan resource, such as the id. A simple Subscription criteria results in notifications of changes to the CarePlan resource itself, but the subscription update would not be triggered by changes to a referenced resource.

A complex Subscription criteria contains chained parameters, such as parameters about resources that are referenced within the CarePlan. For example, chaining parameters about a goal referenced from a CarePlan results in notifications of changes to either the CarePlan or to the referenced goal.

##### 3.Y3.4.1.2 Message Semantics

This is an HTTP or HTTPS PUT of a Subscription resource, as constrained by this profile.

The base URL for this is: [base]/Subscription [id]

Where the body of the transaction contains the Subscription resource.

See: http://hl7.org/fhir/subscription.html

##### 3.Y3.4.1.3 Expected Actions

The Care Plan Consumer or Care Plan Updater shall check the response from the Care Plan Service.

The Care Plan Service shall check that the Subscription resource meets the constraints defined by this profile, in Section 6.6.2.

When a Subscription resource is accepted, the Care Plan Service sets the status to “requested” and returns in the Location header the Subscription’s logical id for use in future operations. This logical id shall be saved by the Care Plan Consumer or Care Plan Updater.

A Subscription may be rejected by the Care Plan Service for a number of reasons, such as the Care Plan Service does not support this functionality, or the Subscription is incomplete or does not meet the requirements of this profile.

As per FHIR POST protocol, a rejected transaction results in the return of a 406 – rejected HTTP response.

### 3.Y3.5 Security Considerations

See X.5 DCP Security Considerations

## 3.Y4 Provide Care Plan [PCC-Y4]

### 3.Y4.1 Scope

This transaction is used to provide an updated CarePlan resource to a Care Plan Consumer that has subscribed to updates.

### 3.Y4.2 Actor Roles

Care Plan Service

Actor ABC

Care Plan Consumer or Care Plan Updater

Actor DEF

Figure 3.Y4.2-1: Use Case Diagram

Table 3.Y4.2-1: Actor Roles

|  |  |
| --- | --- |
| **Actor:** | Care Plan Service |
| **Role:** | The Care Plan Service provides updated CarePlan resources to subscribed Care Plan Consumers. |
| **Actor:** | Care Plan Consumer |
| **Role:** | The Care Plan Consumer that has subscribed to care plan updates receives updates of changed CarePlan resources. |

### 3.Y4.3 Referenced Standards

HL7 Fast Healthcare Information Resources (FHIR) DSTU 2.0

### 3.Y4.4 Interaction Diagram

Care Plan Manager

Actor A

Provide Care Plan

Message 1

Care Plan Consumer

Actor D

#### 3.Y4.4.1 Provide Care Plan

The Care Plan Service sends a CarePlan resource to the endpoint specified in the Subscription resource.

##### 3.Y4.4.1.1 Trigger Events

A change to a resource causes a Subscription Criteria to evaluate as true, so the Care Plan Service sends the updated CarePlan resource to the designated endpoint.

##### 3.Y4.4.1.2 Message Semantics

This is an HTTP or HTTPS POST of a CarePlan resource, as constrained by this profile.

The base URL for this is specified in the registered Subscription resource.

Where the body of the transaction contains the CarePlan resource.

See: http://hl7.org/fhir/subscription.html

##### 3.Y4.4.1.3 Expected Actions

The Care Plan Consumer receives the CarePlan resource in the body of the POST.

### 3.Y4.5 Security Considerations

See X.5 DCP Security Considerations

## 3.Y5 Search for Care Plan [PCC-Y5]

### 3.Y5.1 Scope

This transaction is used to find a care plan. The Care Plan Consumer searches for a care plan of interest. A care plan located by search may then be retrieved for viewing, shared with a Care Plan Contributor when updates are needed, and the Care Plan Consumer may subscribe to receive updates for the care plan.

### 3.Y5.2 Actor Roles

Care Plan Consumer or Care Plan Updater

Actor ABC

Care Plan Service

Actor DEF

Figure 3.Y5.2-1: Use Case Diagram

Table 3.Y5.2-1: Actor Roles

|  |  |
| --- | --- |
| **Actor:** | Care Plan Consumer |
| **Role:** | The Care Plan Consumer initiates Search for Care Plan in order to locate a care plan of interest. |
| **Actor:** | Care Plan Service |
| **Role:** | The Care Plan Service responds to the Search for Care Plan according to the search parameters and values provided in the transaction. |

### 3.Y5.3 Referenced Standards

HL7 Fast Healthcare Information Resources (FHIR) DSTU 2.0

### 3.Y5.4 Interaction Diagram

Care Plan Consumer

Actor A

Search for Care Plan

Message 1

Care Plan Manager

Actor D

#### 3.Y5.4.1 Search for Care Plan

The Search for Care Plan is implemented through the FHIR search operation using the REST platform constrained to the HTTP or HTTPS GET.

##### 3.Y5.4.1.1 Trigger Events

The Search for Care Plan may be initiated for a number of different reasons:

1. need to view a care plan;
2. need to update a portion of a care plan
3. need to subscribe to updates for a care plan

##### 3.Y5.4.1.2 Message Semantics

This is a standard FHIR search operation on the CarePlan resource. It SHALL use the HTTP or HTTPS GET protocol

The URL for this operation is: [base]/CarePlan/\_search

See the FHIR [CarePlan resource Search Parameters](http://hl7.org/fhir/careplan.html#search)

##### 3.Y5.4.1.3 Expected Actions

The Care Plan Consumer initiates the search using HTTP or HTTPS GET, and the Care Plan Service responds according to the [FHIR Search specification](http://hl7.org/fhir/search.html) with zero or more care plans that match the search parameter values supplied with the search message. Specifically, the Care Plan Service returns a [bundle](http://hl7.org/fhir/bundle.html) as the HTTP Response, where the bundle includes the resources that are the results of the search.

### 3.Y5.5 Security Considerations

The typical FHIR search operation uses HTTP GET with name/value pairs of query parameters and values. Since this might expose PHI, additional care must be taken in a browser environment. See Section X.5.

Appendices

None

Volume 2 Namespace Additions

Add the following terms to the IHE General Introduction Appendix G:

None

Volume 3 – Content Modules

# 5 Namespaces and Vocabularies

Add to Section 5 Namespaces and Vocabularies

NA

Add to Section 5.1.1 IHE Format Codes

NA

Add to Section 5.1.2 IHE ActCode Vocabulary

NA

Add to Section 5.1.3 IHE RoleCode Vocabulary

# 6 Content Modules

### 6.3.1 Content Modules

NA

## 6.6 HL7 FHIR Content Module

### 6.6.1 Care Plan

A care plan represents concerns, goals and interventions. Concerns are in the CarePlan resource under the addresses element. Care plan goals are references of the goal element. Interventions are found under activity either by referencing specified resources or by specifying in-line activity details. A care plan typically involves collaboration between care team members. The participant element is used for members of the care team.

Table 6.6.1-1: Care Plan Concepts

|  |  |  |
| --- | --- | --- |
| Care Plan Concept | FHIR Resource Element | Implementation |
| Health Concern | addresses | reference to a Condition resource |
| Health Concern Supporting Observation | in referenced Condition.evidence |  |
| Goal | goal | reference to a Goal resource |
| Progress toward Goal Observation | see open issue 8 |  |
| Goal Outcome Observation | in referenced Goal.outcome |  |
| Intervention | activity.reference or activity.detail | reference to any resource or in-line detail |
| Progress toward Goal Observation | CarePlan.activity.progress |  |
| Intervention Outcome Observation | see open issue 8 |  |
| see open issue 9 | activity.actionResulting |  |
| care team | participant.member | reference to a Practitioner, Patient, RelatedPerson or Organization resource |

The following table shows the DynamicCarePlan structured definition, which constrains the CarePlan resource. Constraints applied to the CarePlan base resource by this profile are shown in bold. The xml of the StructuredDefinition is available [here](ftp://ftp.ihe.net/TF_Implementation_Material/PCC/fhir/careplan_dynamic_profile_20160427.xml).

Table 6.6.1-2: CarePlan resource

| Name | Card. | Description & Constraints | Comments |
| --- | --- | --- | --- |
| .. CarePlan |  | Healthcare plan for patient |  |
| ...identifier | **1**..\* | External Ids for this plan | **This version of the profile requires at least one identifier.** |
| ...subject | **1**..1 | **Identifies the patient.** | **For this version of the profile, the use of  group is not supported.** |
| ...status | 1..1 | proposed | draft | active | completed | cancelled |  |
|  |  | CarePlanStatus (Required) |  |
| ...context | 0..1 | Created in context of | **This profile allows for CarePlan creation outside of the context of an encounter or episode.** |
| ...period | **1**..1 | Time period plan covers | **This version of the profile requires at least a start time for the CarePlan.** |
| ...author | **1**..\* | Who is responsible for contents of the plan | **This version of the profile requires at least one author.** |
| ...modified | **1**..1 | When last updated | **This version of the profile  requires modified to indicate how current the plan is.** |
| ...category | **1**..\* | Type of plan | **This version of the profile fixes the code system to Snomed; http://snomed.info/sct** |
| ...description | **1**..1 | Summary of nature of plan | **This version of the profile requires a description** |
| ...addresses | **1**..\* | Health issues this plan addresses | **This version of the profile requires one of more addressed conditions/problems/concerns/diagnoses** |
| ...support | 0..\* | Information considered as part of plan |  |
| ...relatedPlan | 0..\* | Plans related to this one | **This version of the profile requires that a related DynamicCarePlan be referenced when it is a relatedPlan.** |
| ....code | 0..1 | includes | replaces | fulfills |  |
|  |  | CarePlanRelationship (Required) |  |
| ....plan | 1..1 | Plan relationship exists with |  |
| ...participant | **1**..\* | Who's involved in plan? |  |
| ....role | 0..1 | Type of involvement |  |
|  |  | Participant Roles (Example) |  |
| ....member | **1**..1 | Who is involved | **This version of the profile requires a member declaration.** |
| ...goal | **1**..\* | Desired outcome of plan | **This version of the profile requires at least one Goal.** |
| ...activity | 0..\* | Action to occur as part of plan |  |
|  |  | Provide a reference or detail, not both |  |
| ....actionResulting | 0..\* | Appointments, orders, etc. |  |
| ....progress | 0..\* | Comments about the activity status/progress |  |
| ....reference | 0..1 | Activity details defined in specific resource |  |
| ....detail | 0..1 | In-line definition of activity |  |
| .....category | 0..1 | diet | drug | encounter | observation | procedure | supply | other |  |
|  |  | CarePlanActivityCategory (Example) |  |
| .....code | 0..1 | Detail type of activity |  |
|  |  | Care Plan Activity (Example) |  |
| .....reasonCode | 0..\* | Why activity should be done |  |
|  |  | Activity Reason (Example) |  |
| .....reasonReference | 0..\* | Condition triggering need for activity |  |
| .....goal | 0..\* | Goals this activity relates to |  |
| .....status | 0..1 | not-started | scheduled | in-progress | on-hold | completed | cancelled |  |
|  |  | CarePlanActivityStatus (Required) |  |
| .....statusReason | 0..1 | Reason for current status |  |
|  |  | GoalStatusReason (Example) |  |
| .....prohibited | 1..1 | Do NOT do |  |
| .....scheduled[x] | 0..1 | When activity is to occur |  |
| ......scheduledTiming |  |  |  |
| ......scheduledPeriod |  |  |  |
| ......scheduledString |  |  |  |
| .....location | 0..1 | Where it should happen |  |
| .....performer | 0..\* | Who will be responsible? |  |
| .....product[x] | 0..1 | What is to be administered/supplied |  |
|  |  | SNOMED CT Medication Codes (Example) |  |
| ......productCodeableConcept |  |  |  |
| ......productReference |  |  |  |
| .....dailyAmount | 0..1 | How to consume/day? |  |
| .....quantity | 0..1 | How much to administer/supply/consume |  |
| .....description | 0..1 | Extra info describing activity to perform |  |
| ...note | 0..1 | Comments about the plan |  |

### 6.6.2 Subscription

The following table documents the CarePlanSubscription, which constrains the Subscription resource. Changes to the base Subscription resource are shown in bold. The xml of the StructuredDefinition is available [here](ftp://ftp.ihe.net/TF_Implementation_Material/PCC/fhir/CarePlanSubscription.structuredefinition_20160427.xml).

Table 6.6.2-1: Subscription resource

| Name | Card. | Description | Comments |
| --- | --- | --- | --- |
| .. Subscription |  | A server push subscription criteria |  |
| ...criteria | 1..1 | Rule for server push criteria |  |
| ...contact | 0..\* | Contact details for source (e.g., troubleshooting) |  |
| ...reason | 1..1 | Description of why this subscription was created |  |
| ...status | 1..1 | requested | active | error | off |  |
|  |  | SubscriptionStatus (Required) |  |
| ...error | 0..1 | Latest error note |  |
| ...channel | 1..1 | The channel on which to report matches to the criteria |  |
| ....type | 1..1 | **rest-hook** | **This version of the profile constrains the channel type to rest-hook** |
|  |  | SubscriptionChannelType (Required) |  |
| ....endpoint | **1**..1 | Where the channel points to | **This version of the profile constrains the channel type to rest-hook, the endpoint must be a valid URL for the Provide Care Plan [PCC-Y4] transaction.** |
| ....payload | 1..1 | Mimetype to send | **This version of the profile constrains the channel payload to a non-blank value - the CarePlan resource must be the payload.** |
| ....header | 0..1 | Usage depends on the channel type |  |
| ...end | 0..1 | When to automatically delete the subscription |  |
| ...tag | 0..\* | A tag to add to matching resources |  |
|  |  | SubscriptionTag (Example) |  |

Appendices

None

Volume 3 Namespace Additions

Add the following terms to the IHE Namespace:

None

Volume 4 – National Extensions

Add appropriate Country section

None

1. FHIR is the registered trademark of Health Level Seven International. [↑](#footnote-ref-1)
2. Care Plan Project - PCWG. (2015, November 5). Retrieved February 15, 2016, from <http://wiki.hl7.org/index.php?title=Care_Plan_Project_-_PCWG>

   Care Plan Domain Analysis Model (DAM) Documents [↑](#footnote-ref-2)
3. Care Coordination Capabilities. (2014, February 8). Retrieved February 15, 2016, from http://wiki.hl7.org/index.php?title=Care\_Coordination\_Capabilities [↑](#footnote-ref-3)
4. Care Plan Project - PCWG. (2015, November 5). Retrieved February 15, 2016, from <http://wiki.hl7.org/index.php?title=Care_Plan_Project_-_PCWG>

   Care Plan Domain Analysis Model (DAM) Documents [↑](#footnote-ref-4)
5. Coleman, MD. MPH, Eric A. "Preparing Patients and Caregivers to Participate in Care Delivered Across Settings: The Care Transitions Intervention." *Journal of the American Geriatric Society* 52, (2004): 1817-1825. [↑](#footnote-ref-5)
6. HL7 is the registered trademark of Health Level Seven International. [↑](#footnote-ref-6)
7. Care Plan Domain Analysis Model. (2015, November 5). Retrieved February 12, 2016, from <http://wiki.hl7.org/images/1/1d/PCWG_Care_Plan_DAM_Specification_-_Part_1_-_Draft_2015-11-04.pdf> [↑](#footnote-ref-7)
8. Transatlantic eHealth/health IT Cooperation Roadmap. (2015, November). Retrieved February 12, 2016, from https://www.healthit.gov/sites/default/files/eu-us-roadmap\_final\_nov2015\_consultationversion.pdf [↑](#footnote-ref-8)
9. Health IT Regulations: Meaningful Use Regulations. (2015, March 20). Retrieved February 12, 2016, from <https://www.healthit.gov/policy-researchers-implementers/meaningful-use-regulations> [↑](#footnote-ref-9)
10. Connecting Health and Care for the Nation A Shared Nationwide Interoperability Roadmap. (2015, December 22). Retrieved February 12, 2016, from <https://www.healthit.gov/sites/default/files/hie-interoperability/nationwide-interoperability-roadmap-final-version-1.0.pdf> [↑](#footnote-ref-10)
11. HL7 Care Plan Domain Analysis Model specification retrieved from http://wiki.hl7.org/images/1/1d/PCWG\_Care\_Plan\_DAM\_Specification\_-\_Part\_1\_-\_Draft\_2015-11-04.pdf on December 20, 2015 from [↑](#footnote-ref-11)