File name



Patient Care Workgroup

Care Plan Storyboards

Based on HL7 HDF Release 1.5

Working Document v0.1

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# Introduction

Storyboard Purpose

A storyboard is a narrative description of a series of steps involving some exchange of information between different participants to achieve the objectives of a healthcare business process. The list of steps can be in generalized, abstract terms, or in the form of a real-world example. A storyboard illustrates the basic path, simple path, alternate, or error path of information and its content is comprised primarily from guidance by the domain experts.

* Storyboards should be written using business terminology to illustrate the context for the message exchange, functional model, etc.
* The content of the initial storyboards should be representative of normal business processes. Avoid exception cases. Attempting to document all exception cases in a business process can be an exhaustive task that diverts focus from the typical case, particularly at this early stage of the requirements process.
* A storyboard may be imprecise or incomplete in its initial draft. It should be revised over time if changes/updates are deemed important. It typically has no branching or decision points. The information in a storyboard will typically be made more precise when the corresponding Activity Diagram is created.
* The storyboard may include examples (e.g. names of people, organizations, systems, and data values) as appropriate. This helps make storyboards illustrative of the real work and also to make clear that items of interest may be of different types than assumed (e.g. that a patient in some cases may be an animal, that a guarantor may be an organization, etc).
* Avoid the use of acronyms, abbreviations, etc.; because the intended audience is a diverse group, some of whom would likely be confused. If these constructs are deemed important for the intended audience, they can be included in parentheses after the term. For example, Department of Motor Vehicles (DM).

Storyboard Scope

Storyboards identify the system under design. Storyboarding is an initial steps in the HDF methodology and are the least formal. Their semantics are somewhat loose, and their detail somewhat sparse, facts that are consistent with their purpose of being the "first-cut" at system requirements. Use them for what they are good for and do not expect them to provide information they cannot.

List of Storyboards for Care Plan

The following list of storyboards covers the relevant range of situations sufficient to identify the needs for Care Plan interoperability.

* Acute Care
* Chronic Care
* Home Care
* Perinatology
* Allergy/Intolerance

## Storyboard Timing

Storyboarding, the semi-structured process of collecting time sequenced anecdotes or "stories" in a somewhat *ad hoc* fashion from domain experts, is often a more effective and thus essential prelude to formal Use Case analysis. In particular, storyboards, i.e., the documentation of simple narratives involving a series of interactions and/or message communications that "makes sense" to the domain expert, typically contain more than one Use Case and multiple Application roles. As such, they serve as a valuable source of material from which individual Use Cases can be mined, i.e., explicitly extracted and formally modeled.

Within the context of the HDF, HL7 has made the decision to create Use Case analysis as its methodology for capturing user requirements. However, as explained in the previous Section, Use Case analysis is often most productively done as the first *formal* process to follow the more *informal* process of Storyboarding. The first sub-process in the Requirements Documentation process analyzes specific issues or requirements in the context of the healthcare business process that is to be improved either by developing new software or through HL7-based interoperability. This is accomplished using one or more storyboards

## Storyboard Outline

* *Pre-Condition:* Identifies the setting, the roles of the participants or actors, and identifies the name of the characters. Identifies what must be true before the storyboard can be triggered and perhaps another storyboard must precede this one
	+ *Sample:* Christine, age 46, was recently diagnosed with stage II breast cancer. She is scheduled to receive her first round of chemotherapy in a few days. Susan, an RN, is seeing Christine in the clinic.
* Storyboard / Activities:
	+ *Sample:* Christine expresses concern about the nausea & vomiting in chemotherapy. Susan reviews Christine’s chart including the problem list, allergies, chemotherapy protocol, orders, results and the patient education plan. She schedules Christine for education on the disease and on the side effects of chemotherapy.
* *Post-Condition:* Identifies what must be true upon completion of the storyboard
	+ *Sample:* Christine is scheduled to receive education on side effects related to the chemotherapy and education on the disease.

Storyboard Naming Standards

The names of persons, places and organizations that are used in storyboards and examples are fictional. Any resemblance of actual persons, living or dead, or places and/or organizations is unintentional and coincidental. See in Appendix A HL7 publishing committee’s storyboard names for the names of persons, places and organizations that are used in storyboards.

Steps for writing storyboards

* Determine and Narrow the Topic
* Identify Actors:

It is often helpful to begin the process of Storyboarding and/or Use Case analysis by identifying the key stakeholders in the system-of-interest, i.e., in Use Case parlance, the Actors. Clear and consistent definitions of Actors -- *each* Actor should have a short, concise, and *clear* definition associated with its (noun) name -- result in consistent definitions of system boundaries. Conversely, the inability to define Actors in a clear and consistent fashion often indicates an unclear Scope Statement. Left unchecked, this deficiency can lead to unrelenting "scope creep" with the inevitable result of having a Technical Committee full of frustrated and unproductive domain experts. Identifying Actors, particularly through the process of Storyboarding, is also quite helpful as a tool for Use Case discovery. Once an Actor is identified, write down the Product(s) of Value that the Actor expects / wants / needs to obtain from the system.

* Identify the Pre-condition
	+ Setting
	+ Roles of Participants / Actors
	+ Name of Characters
* Sequence of Events
	+ Write the Story
	+ Simple Sentences: Subject, verb, object and linear
	+ Describe interactions with system(s)
* Check Flow of Story
	+ Send out for review and validation by domain experts
	+ Iterative Process With Other Problem-Space Artifacts
* Declare Post-condition

# Storyboard Example: Chronic Care Plan

Determine and Narrow the Topic

The purpose of the chronic care plan and story board is to illustrate the communication flow and documentation of a care plan between a patient, his or her primary care provider and the specialist involved for a patient diagnosed with type II diabetes.

Identify Actors and Roles

Primary Care Physician

 Dr. Patricia Primary:

Patient

 Bob Glucose Patient:

Diabetes Educator

 Debbie Diabetic Educator

Podiatrist

 Dr. Paul Bunion

Optician

 Dr. Victor Vision

Pharmacist

 Susan Script

Psychologist

 Larry Listener

Dietician

 Connie Chow

Electronic Health System

Electronic Care Plan

Pre-Condition

Adam Everyman, a 56 year old male is sitting in the clinic of his primary care physician, Dr. Patricia Primary. Dr. Patricia Primary after reviewing the results of Adam Everyman’s oral glucose tolerance test has just diagnosed Adam Everyman with Type II diabetes. Dr. Patricia Primary Care has accessed Adam Everyman’s EMR and has added type II diabetes to the problem list.

Sequence of Events, Storyboard, Activities

While Dr. Patricia Primary is in Adam Everyman’s EMR She updates the care plan with activities common to diabetes care. The updated care plan includes a schedule of activities that are to be performed by the patient, the physician and the care team. The care team has been identified as a diabetes educator, podiatrist, optician, pharmacist, and a psychologist. Dr. Patricia Primary reviews the care plan, and adds any final notes. Dr. Patricia Primary gives Adam Everyman a copy of the care plan in either paper or electronic form and answers any unresolved questions. Once the care plan is updated, a referral in the form of a notification is sent to the team notifying them of the intent of Adam Everyman to schedule an appointment. As part of the notification the message includes the notes and activities associated with the care plan. Each member on the referral list, on receiving notification, accesses Adam Everyman’s care plan and acknowledges receipt of the notification. As Adam Everyman visits with the healthcare provider, each provider updates a summary statement “tweet” indicating the status of the relevant activities in the care plan. The providers may also choose to submit an encounter record including any reports relating to the encounter.

Post Condition:

Six months later, Adam Everyman visits Dr. Patrician Primary for a regular review. Dr. Patricia Primary is able to access the care plan and can see the updates relating to Adam’s activities including visits to his care team. Adam has also been able to access his personal health record attached to the EMR and enter data relating to his self monitoring activities including visits to his care team. Adam has entered data relating to his self monitoring activities with random blood glucose and weight records. There is a record of assessment, a diagram and an update from the podiatrist. The update indicates that the activities for podiatry are on track. There is an assessment and an update from the diabetes educator indicating that there is an issue warranting further attention. Dr. Patricia Primary finds the assessment from the diabetes educator in the repository, counsels Adam on the issue, and then encourages Adam to follow up on the issues flagged by the diabetes educator in the assessment. There is no update from the optician. Dr. Patricia Primary asks Adam if he has visited the Optician, and Adam confirms that there was no appointment made. Dr Patricia Primary counsels Adam on the risks of retinopathy and advises him to visit the optician for a check as soon as possible.

# Appendix: Storyboard naming standards

Table 5: Patient Information for Storyboards

| Cast | Family | Given | MI | Gender | SSN | Phone  |
| --- | --- | --- | --- | --- | --- | --- |
| patient, female | Everywoman | Eve | E | F | 444-22-2222 | 555-555-2003 |
| patient, male | Everyman | Adam | A | M | 444-33-3333 | 555-555-2004 |
| patient, child | Kidd | Kari  | K | F | 444-55-5555 | 555-555-2005 |
| family, daughter | Nuclear | Nancy | D | F | 444-11-4567  | 555-555-5001 |
| family, husband  | Nuclear | Neville | H | M | 444-11-1234  | 555-555-5001 |
| family, son  | Nuclear  | Ned | S | M  | 444-11-3456 | 555-555-5001 |
| family, wife | Nuclear | Nelda | W | F | 444-11-2345 | 555-555-5001 |
| next of kin (parent) | Mum  | Martha | M | F | 444-66-6666  | 555-555-2006 |
| next of kin (child) | Sons  | Stuart  | S | M | 444-77-7777  | 555-555-2007  |
| next of kin (spouse) | Betterhalf  | Boris | B | M | 444-88-8888  | 555-555-2008  |
| next of kin (other) | Relative | Ralph | R | M | 444-99-9999  | 555-555-2009 |
| contact person | Contact | Carrie | C | F | 555-22-2222 | 555-555-2010 |

Table 6: Healthcare Staff for Storyboards

| Cast | Family | Given | MI | Gender | SSN | Phone  |
| --- | --- | --- | --- | --- | --- | --- |
| healthcare provider | Seven | Henry | L | M | 333-33-3333 | 555-555-1002 |
| assigned practitioner | Assigned | Amanda | A | F | 333-44-444 | 555-555-1021 |
| physician | Hippocrates | Harold | H | M | 444-44-4444 | 555-555-1003 |
| primary care physician | Primary | Patricia | P | F | 555-55-5555 | 555-555-1004 |
| admitting physician | Admit | Alan | A | M | 666-66-6666 | 555-555-1005 |
| attending physician | Attend | Aaron | A | M | 777-77-7777 | 555-555-1006 |
| referring physician | Sender | Sam | S | M | 888-88-8888 | 555-555-1007 |
| intern | Intern | Irving  | I | M | 888-22-2222 | 555-555-1022 |
| resident | Resident | Rachel | R | F | 888-33-3333 | 555-555-1023 |
| chief of staff | Leader | Linda | L | F | 888-44-4444 | 555-555-1024 |
| authenticator | Verify | Virgil | V | M | 999-99-9999 | 555-555-1008 |
| specialist | Specialize | Sara | S | F | 222-33-3333 | 555-555-1009 |
| allergist/immunologist | Reaction | Ramsey | R | M | 222-22-3333 | 555-555-1025 |
| anesthesiologist | Sleeper | Sally | S | F | 222-66-6666 | 555-555-1012 |
| cardiologist | Pump | Patrick | P | M | 222-33-4444 | 555-555-1027 |
| cardiovascular surgeon | Valve | Vera | V | F | 222-33-5555 | 555-555-1028 |
| dermatologist | Scratch | Sophie | S | F | 222-33-6666 | 555-555-1029 |
| emergency medicine specialist | Emergency | Eric | E | M | 222-33-7777 | 555-555-1030 |
| endocrinologist | Hormone | Horace | H | M | 222-33-8888 | 555-555-1031 |
| family practitioner | Family | Fay | F | F | 222-33-9999 | 555-555-1032 |
| gastroenterologist | Tum | Tony | T | M | 222-44-2222 | 555-555-1033 |
| geriatrician | Sage | Stanley  | S | M | 222-44-3333 | 555-555-1034 |
| hematologist | Bleeder | Boris | B | M | 222-44-3344 | 555-555-1035 |
| infectious disease specialist | Pasteur | Paula | P | F | 222-44-5555 | 555-555-1036 |
| internist | Osler | Otto | O | M | 222-44-6666 | 555-555-1037 |
| nephrologist | Renal | Rory | R | M | 222-44-7777 | 555-555-1038 |
| neurologist | Brain | Barry | B | M | 222-44-8888 | 555-555-1039 |
| neurosurgeon | Cranium | Carol | C | F | 222-44-9999 | 555-555-1040 |
| OB/GYN | Fem | Flora | F | F | 222-55-2222 | 555-555-1041 |
| oncologist | Tumor | Trudy | T | F | 222-55-3333 | 555-555-1042 |
| ophthalmologist | Vision | Victor | V | M | 222-55-4444 | 555-555-1043 |
| orthopedic surgeon | Carpenter | Calvin | C | M | 222-55-5545 | 555-555-1044 |
| otolaryngologist (ENT) | Rhino | Rick | R | M | 222-55-6666 | 555-555-1045 |
| pathologist | Slide | Stan | S | M | 222-44-4444 | 555-555-1010 |
| pediatrician | Kidder | Karen | K | F | 222-55-7777 | 555-555-1046 |
| plastic surgeon | Hollywood  | Heddie | H | F | 222-55-8888 | 555-555-1047 |
| psychiatrist | Shrink | Serena | S | F | 222-55-9999 | 555-555-1048 |
| pulmonologist | Puffer | Penny | P | F | 222-66-2222 | 555-555-1049 |
| radiologist | Curie | Christine | C | F | 222-55-5555 | 555-555-1011 |
| rheumatologist | Joint | Jeffrey | J | M | 222-66-3333 | 555-555-1050 |
| surgeon | Cutter | Carl | C | M | 222-77-7777 | 555-555-1013 |
| urologist | Plumber | Peter | P | M | 222-66-4444 | 555-555-1051 |
| physician assistant | Helper | Horace | H | M | 222-66-5555 | 555-555-1052 |
| registered nurse | Nightingale | Nancy  | N | F | 222-88-8888 | 555-555-1014 |
| nursing assistant | Barton | Clarence | C | M | 222-99-9999 | 555-555-1015 |
| chiropractor | Bender | Bob | B | M | 222-66-6666 | 555-555-1053 |
| dentist | Chopper | Charlie | C | M | 222-66-7777 | 555-555-1054 |
| orthodontist | Brace | Ben | B | M | 222-66-8888 | 555-555-1055 |
| optometrist | Specs | Sylvia | S | F | 222-66-9999 | 555-555-1056 |
| pharmacist | Script | Susan | S | F | 333-22-2222 | 555-555-1016 |
| podiatrist | Bunion | Paul | B | M | 222-77-2222 | 555-555-1057 |
| psychologist | Listener | Larry | L | M | 222-77-3333 | 555-555-1058 |
| lab technician | Beaker | Bill | B | M | 333-44-4444 | 555-555-1017 |
| dietician | Chow | Connie | C | F | 333-55-5555 | 555-555-1018 |
| social worker | Helper | Helen | H | F | 333-66-6666 | 555-555-1019 |
| occupational therapist | Player | Pamela | P | F | 222-77-6666 | 555-555-1059 |
| physical therapist | Stretcher | Seth | S | M | 222-77-8888 | 555-555-1060 |
| transcriptionist | Enter | Ellen | E | F | 333-77-7777 | 555-555-1020 |
| Pastoral Care Director | Sacerdotal | Senior | S | M | 333-77-7777 | 555-555-1020 |
| Chaplain | Padre | Peter | P | M | 333-77-7777 | 555-555-1020 |
| Informal Career | Comrade | Connor | C | M | 333-77-7777 | 555-555-1020 |
| Electrophysiologist  | Electrode | Ed | E | M | 333-77-7777 | 555-555-1020 |
| Laboratory Specimen Processor | Spinner | Sam | S | M | 333-45-4545 | 555-555-1020 |
| IT System Administrator | Admin | I. | T. | M | 333-33-3333 | 555-555-1002 |
| Table 7: Organizations for Storyboards  |  |  |  |  |  |  |

Organizational Roles

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Role | Name | Phone | Address | City | State | ZIP |
| healthcare provider organization | Level Seven Healthcare, Inc. | 555-555-3001 | 4444 Healthcare Drive | Ann Arbor | MI | 99999 |
| healthcare insurer #1 | HC Payor, Inc. | 555-555-3002 | 5555 Insurers Circle | Ann Arbor | MI | 99999 |
| healthcare insurer #2 | Uare Insured, Inc. | 555-555-3015 | 8888 Insurers Circle | Ann Arbor | MI | 99999 |
| employer | Work Is Fun, Inc. | 555-555-3003 | 6666 Worker Loop | Ann Arbor | MI | 99999 |
| Health Authority | Health Authority West |  |  |  |  |  |
| terminology provider | Titan Terminology | 555-555-3099 | 22 Wordy Way | Ann Arbor | MI | 99999 |

Table 8: Facilities for Storyboards

| Role | Name | Phone | Address | City | State | ZIP |
| --- | --- | --- | --- | --- | --- | --- |
| healthcare provider | Community Health and Hospitals | 555-555-5000 | 1000 Enterprise Blvd | Ann Arbor | MI | 99999 |
| hospital | Good Health Hospital | 555-555-3004 | 1000 Hospital Lane | Ann Arbor | MI | 99999 |
| hospital unit (e.g., BMT) | GHH Inpatient Unit | 555-555-3005 (ext 123) |  |  |  |  |
| hospital ward | GHH Patient Ward | 555-555-3006 (ext 456) |  |  |  |  |
| hospital room | GHH Room 234 | 555-555-3007 (ext 789) |  |  |  |  |
| emergency room | GHH ER | 555-555-3008 (ext 246) |  |  |  |  |
| operating room | GHH OR | 555-555-3009 (ext 321) |  |  |  |  |
| radiology dept. | GHH Radiology | 555-555-3010 (ext 654) |  |  |  |  |
| laboratory, in-house | GHH Lab | 555-555-3011 (ext 987) |  |  |  |  |
| pharmacy dept. | GHH Pharmacy | 555-555-3012 (ext 642) |  |  |  |  |
| outpatient clinic | GHH Outpatient Clinic | 555-555-3013 (ext 999) |  |  |  |  |
| urgent care center | Community Urgent Care | 555-555-4001 | 1001 Village Avenue | Ann Arbor | MI | 99999 |
| physical therapy clinic | Early Recovery Clinic | 555-555-4006 | 1010 Village Avenue | Ann Arbor | MI | 99999 |
| home health care clinic | Home Health Care Clinic | 555-555-4008 | 1030 Village Avenue | Ann Arbor | MI | 99999 |
| chiropractic clinic | Bender Clinic | 555-555-4009 | 1040 Village Avenue | Ann Arbor | MI | 99999 |
| optician clinic | See Straight Opticians | 555-555-4010 | 1050 Village Avenue | Ann Arbor | MI | 99999 |
| pharmacy, retail | Good Neighbor Pharmacy | 555-555-4002 | 2222 Village Avenue | Ann Arbor | MI | 99999 |
| laboratory, commercial | Reliable Labs, Inc. | 555-555-4003 | 3434 Industrial Loop | Ann Arbor | MI | 99999 |
| nursing or custodial care facility | Green Acres Retirement Home | 555-555-4004 | 4444 Nursinghome Drive | Ann Arbor | MI | 99999 |
| residential treatment facility | Home Away From Home | 555-555-4005 | 5555 Residential Lane | Ann Arbor | MI | 99999 |
| satelite clinic | Lone Tree Island Satellite Clinic | 555-555-5001 | 1001 Lone Tree Rd | Ann Arbor | MI | 99999 |
| satelite clinic | Stone Mountain Satellite Clinic | 555-555-5002 | 1000 Mountain Way | Ann Arbor | MI | 99999 |
| satelite clinic | Three Rivers Satellite Clinic | 555-555-5003 | 1000 River Drive | Ann Arbor | MI | 99999 |
| satelite clinic | Bayview Satellite Clinic | 555-555-5004 | 1000 Lakeside Drive | Ann Arbor | MI | 99999 |

# References

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