



Bringing Care to
Where People Are



Prevvy Care Coordination platform

ONC FHIR Challenge: [Provider User-Experience](#).

05.20.2016

—
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1 Prevvy Connected Health ecosystem

Prevvy is a cloud-based, connected health ecosystem that provides patients, families and providers 24/7 access to their medical records and personal healthcare information from any connected device. Based on the foundation of HL7 FHIR, Prevvy has been built using an open-standards, open-source framework. It can interface with any physician or hospital EMR system (that is Meaningful Use Stage 2 - MU2 - or later) offering **Direct Messaging or SMART-FHIR container support** allowing a patient to receive their health data from virtually any physician or provider they see in the US. Our security and data storage policies meet all HIPAA requirements.

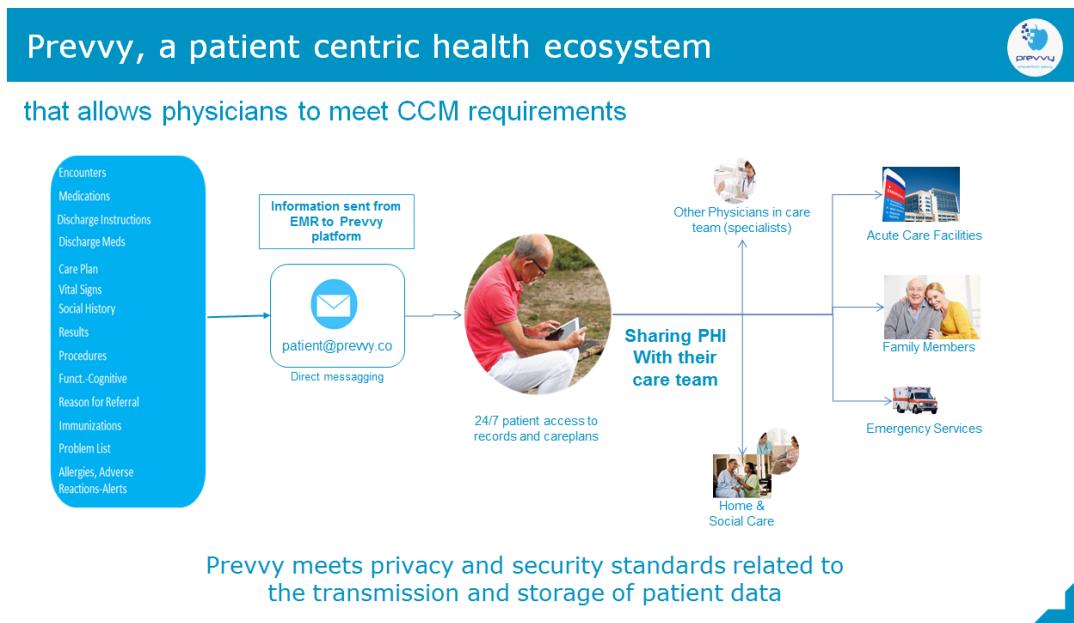


A Connected Health Ecosystem where the patient *is* the INFORMATION HUB

Prevvy was developed in part to address the needs of Medicare's Chronic Care Management (CCM) program. Implemented by CMS in 2015, the program for the first time allowed physicians to bill for care coordination services for their Medicare patients with two or more chronic conditions. The demographics of the population that would use the service and the requirements of the program made us step back from the traditional PHR application and make Prevvy intuitive and simple to use. It also made us consider some of the special characteristics and needs of the Medicare users, one of which was the prevalence of family support and caregivers that are, *de facto*, an integral part of the patient's care team. Therefore, one of the key features of Prevvy is that it allows a patient to share their PHI (in full or in part) with anyone in their immediate or extended care team.

2 Prevvy Care coordination platform

Prevvy was built for one purpose - **care coordination**. In that way Prevvy might be considered similar to care coordination solutions already on the market. But the comparisons essentially stop there. Prevvy does not rely on EMR custom programming based on interface libraries. And it is *not* a provider-centric system, unlike current physician or hospital EMR solutions that boast of adding modules to “reach” the patient.



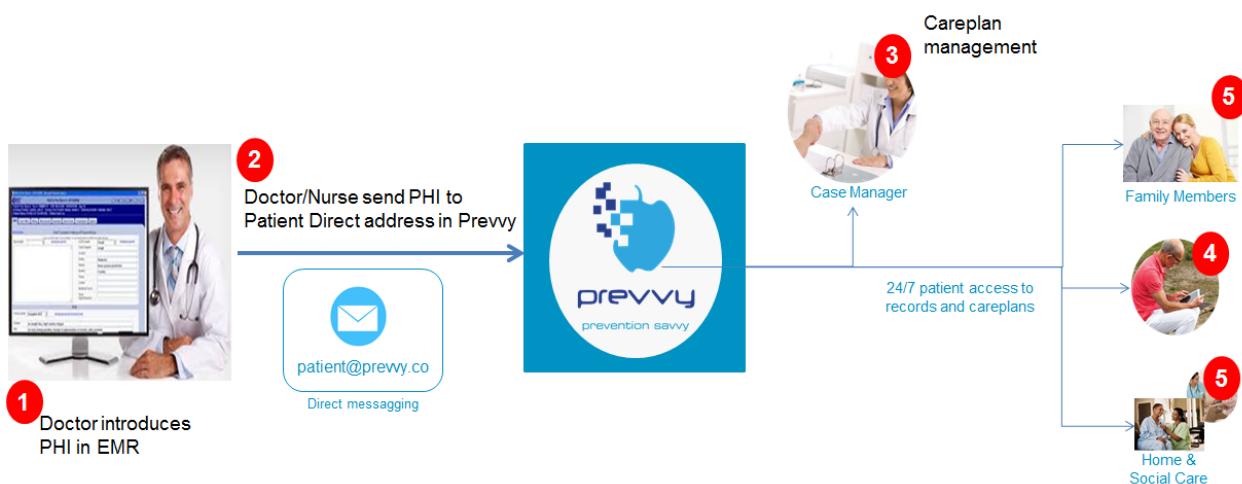
Prevvy is a **patient-centric solution** that is built around the new and evolving models of care. It is built on the foundation of HL7 FHIR and other open source technologies. What we believe really differentiates Prevvy from virtually all other platforms on the market is that Prevvy was built for care coordination across technologies, providers, and people, **beyond the clinic**. It is this distinct focus that really sets us apart, and has driven us to develop a solution that can be used across providers and populations.

2.1 Workflows EMR-Prevvy

We have already discussed the capability of Prevvy to work across different platforms, taking full advantage of the SMART on FHIR standards-based platform for medical apps. This capability results in easy integration into existing physician workflows. Depending on the physician EMR system, Prevvy can do this in one of two ways. Each is described below.

2.1.1 Workflow EMR-Prevvy using Direct messaging

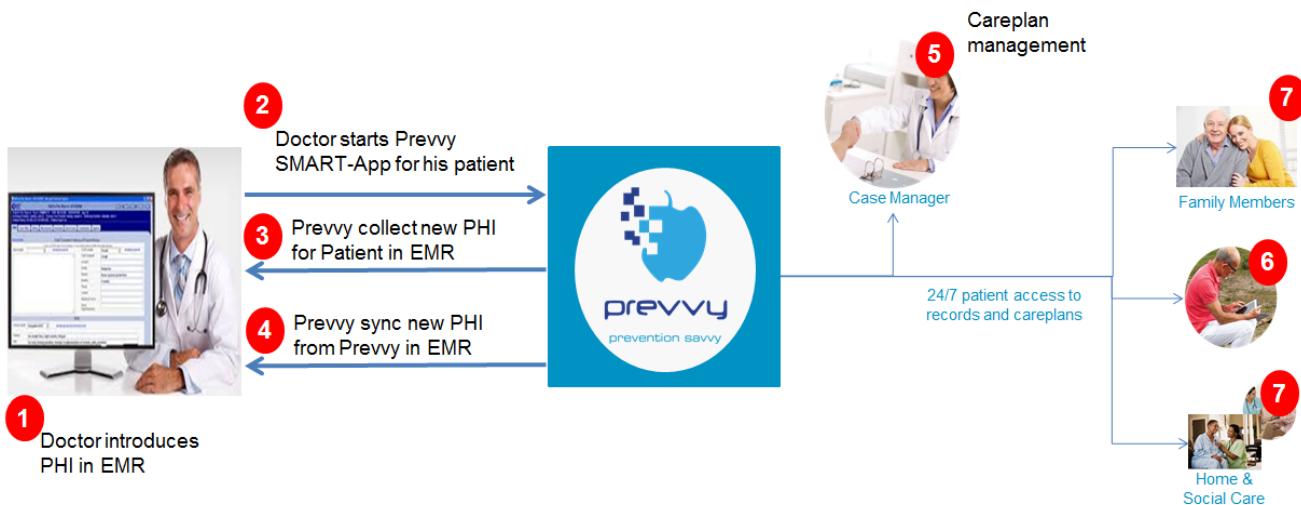
In the first scenario (Direct Message), the workflow in the clinic is diagrammed below:



1. The physician follows their current practice of entering the patient's information directly into the EMR system. This would include notes, new diagnoses, new meds, referrals, or anything else discussed during the visit.
2. Either at that time or after the visit, either the physician or clinical office staff sends the existing data and/or updated information to Prevvy using the patient's Direct Address in Prevvy (e.g., patient@prevvy.co). The Prevvy HISP receives and processes the message (CDA to FHIR conversion) and the information is consolidated in the patient's Personal Health Record (PHR).
3. Any member of the physician's care team can access Prevvy at any time. The Prevvy system tracks all activity within the application down to the object level with direct traceability to the user and date/time tracking. A care team member may:
 - Update the patient's information in Prevvy (add new meds, referrals, etc.)
 - Create or modify the careplan
 - Review the patient-generated data and check for adherence to the Careplan.
4. Once completed, the patient will receive the updates (or Careplan) in their Prevvy account. Notifications (e.g., email or text alert) for the update can be configured in the Prevvy system.
5. Depending on configuration, family caregivers or other clinicians may also receive notification on updates in the Prevvy system.

2.1.2 Workflow EMR-Prevvy using EMRs with SMART-FHIR container support (Web-App Launch)

In this scenario, the workflow in the clinic is:



1. Doctor introduces PHI in EMR
2. Doctor starts Prevvy SMART-App for his patient
3. Prevvy collects new PHI for Patient in EMR
4. Prevvy syncs new PHI from Prevvy in EMR
5. Case Manager: Careplan management
6. 24/7 patient access to records and careplans
7. Family Members
7. Home & Social Care

Once Prevvy is started, Prevvy will:

3. Synchronize the new patient information in the EMR with the Prevvy patient PHR;
4. Provide the option to the clinician to transfer information from Prevvy into the EMR (allowing the physician to review out-of-clinic readings)
5. Prevvy ask the doctor if that new patient information residing in the Prevvy PHR and nonexistent want now in the EMR is synchronized or not (vital signs, measures of exercise, compliance with care plans, clinical information from other providers ..). This synchronization process will allow the doctor EMR is updated with data generated by the patient and their interaction with other providers.
6. Any member of the physician's care team can access Prevvy at any time. The Prevvy system tracks all activity within the application down to the object level with direct traceability to the user and date/time tracking. A care team member may:
 - a. Update the patient's information in Prevvy (add new meds, referrals, etc.)
 - b. Create or modify the careplan
 - c. Review the patient-generated data and check for adherence to the Careplan.

7. Once completed, the patient will receive the updates (or Careplan) in their Prevvy account. Notifications (e.g., email or text alert) for the update can be configured in the Prevvy system.
8. Depending on configuration, family caregivers or other clinicians may also receive notification on updates in the Prevvy system.

3 App functional description

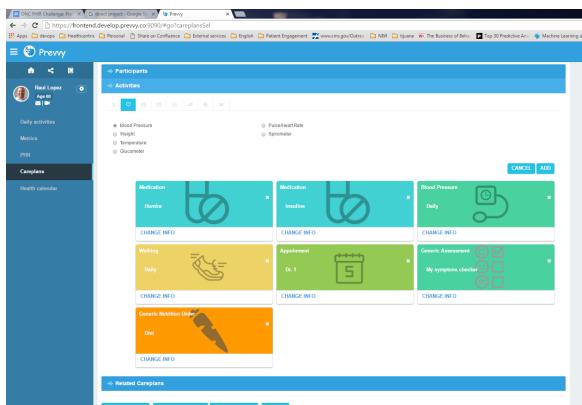
3.1 Use Cases

The use cases listed below will demonstrate both the technical functionality of Prevvy and the practical uses it has for patients, their care teams, and providers.

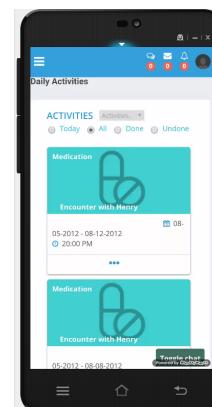
3.1.1 Use Case 1: Chronic Care Management

Prevvy was built to meet the requirements of the new Medicare Chronic Care Management (CCM) Program, and expanding on that functionality allows the Prevvy solution to be used across applications. This use case will focus on the CCM program, but include examples of how Prevvy can be used across populations.

Prevvy may be used by Care teams to create individual Careplans for patients, or to create templates for specific diagnoses on which customization for each patient could be layered (e.g., a basic template for diabetes, hypertension, heart failure) based on their particular needs and goals. Prevvy has built in functionality for activities such as appointments, assessments, and monitoring, and links to libraries for medication, diets, and education. A mobile app is part of the system, providing patients, the care team, or caregivers access to the patient's careplan at any time.



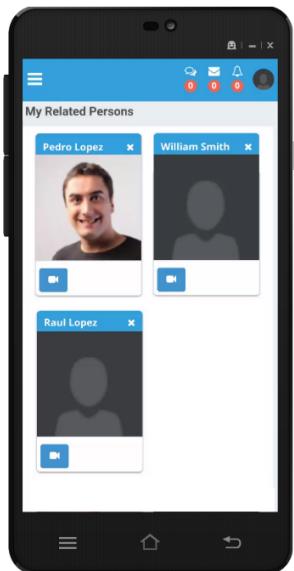
Careplan edition for patients



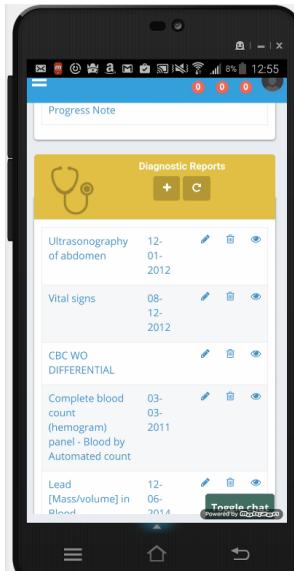
Daily activities for patients and caregivers

Once enrolled in the CCM program, a number of actions are set to take place. First, each user (patient) will be given a Direct Address through Prevvy ("user@prevvy.co"). This direct address is one of the keys to the program. Second, relevant information from the primary care provider's

EMR system will be transferred into the Prevvy system, where, for the probably the first time, the patient will have electronic access to information relevant to their care and health. This is where the care coordination begins. The patient can then share the Direct Address with other care providers (e.g., specialists), and their EMR records will supplement the primary care record (this is also where pharmacy reconciliation can begin). Finally, the patient can share their information with other care providers (e.g., home nursing, rehabilitation) and family members that are part of the patient's care team.

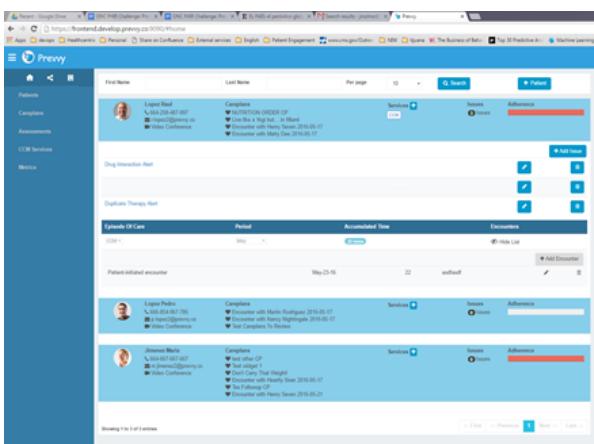


Patients can determine who can see their records, and what they can see.

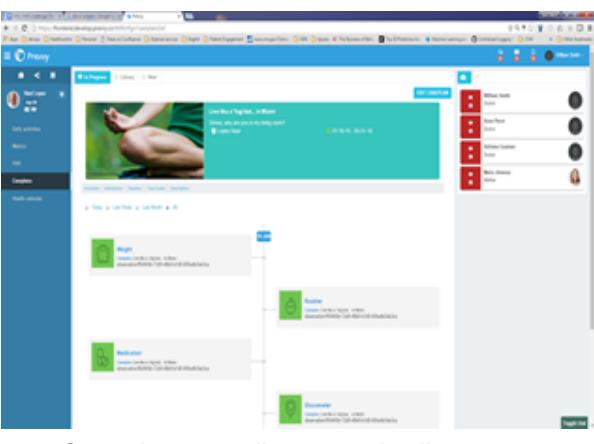


Prevvy consolidates information from different providers.

Adherence to careplans can be monitored and managed remotely, allowing the care team to provide support beyond the clinic. And as importantly for busy physician practices, Prevvy allows clinicians and the extended clinical care team to track their non face-to-face activities so they can properly bill CMS for their efforts.



CCM patients management:
Issues and Time tracking



Careplan compliance and adherence

3.1.2 Use Case 2: Medication Adherence and Reconciliation Management

Data ingestion from providers will include prescription data, which can be used for a number of purposes, including helping patients with adherence and prescription reconciliation. Each time Prevvy receives an update regarding a refill or a new prescription from one of their providers Prevvy will check potential drug interactions of this new medication with currently prescribed medications. Prevvy uses the NLM drug interaction REST service to identify potential drug interactions. Each potential drug interaction generates a notification to the patient, case manager or other care team members.

Bringing together the medication and other health-related information from multiple providers is only part of what Prevvy does. Prevvy goes a step beyond this aggregation and makes the information useful and *actionable*. Under the Prevvy Guidance functionality, Prevvy can be configured to:

- Provide medication reminders to patients (e.g., on their mobile device)
- Provide the same reminders to caregivers
- Ask the patient to confirm that medication was taken (Prevvy will tag this with a time/date stamp)
- Notify caregivers of compliance (or non-compliance)

The screenshot shows the Prevvy Care coordination dashboard. On the left, a sidebar lists navigation options: Patients, Caregivers, Assessments, CCM Services, and Metrics. The main area displays three patient profiles with their names, photo icons, and medical history. Each profile includes a 'Drug Interaction Alert' section with a red warning icon and a 'Medication Therapy Alert' section. The interface is clean with a blue header and white background.

Drug interaction as FHIR Detected issues in Prevvy Care coordination dashboard

The screenshot shows the Prevvy Care coordination dashboard with a 'Medication' section on the left. The main area features a large green banner with a person meditating and the text 'Live like a Yogi but... in Miami'. Below the banner, there's a 'Care Plan' section with a timeline showing various health metrics: Appointment NA, Medication NA, Medication NA, Blood Pressure NA, Blood Pressure NA, and Weight NA. The timeline is color-coded with green for healthy metrics and red for others.

Medication adherence

The screenshot shows a medication administration notification for 'Alex'. It features a large teal circle with a white cross and a white pill bottle icon. The text reads: 'Hi Alex it's time to take your Fluticasone - 1 pill'. At the bottom are two buttons: 'OK' and 'REMIND ME IN: [dropdown]'. The overall design is simple and modern.

Medication administration notification for patient or caregiver. Prevvy will collect information about medication adherence

The screenshot shows a detailed 'Medication' timeline for a patient named 'Alex'. The timeline is a vertical list of events with icons and dates: '17 JAN' (Weight), '17 JAN' (Routine), '17 JAN' (Medication), '17 JAN' (Glucosemeter), and '17 JAN' (Blood Pressure). Each event has a small description below it. A red dashed line on the right side of the timeline indicates a break in the sequence.

Medication adherence timeline

Prevvy enables caregivers and providers tools to measure a patient's compliance on medication. This can be critical in achieving optimal dosing. A common application - and one that can have significant impacts on a patient's health - is the case where an ACE-I is prescribed for hypertension at 2.5 mg/day. In a follow up with the patient, the physician will ask if the patient has been compliant on the meds (the inevitable answer from the patient is "yes"), and because there was no improvement in the patient's HT, the physician increases the dose. The risks are obvious, and with proper tools, care management, and care coordination, they are also entirely avoidable.

A potential extension of this service is the ability to aggregate data and look at factors such as adherence and outcomes across populations. The data therefore has potential uses for research and real-world evidence generation.

3.1.3 Use Case 3: Medical Emergencies while Traveling

Few things are as scary as having an emergency situation arise when traveling - unfamiliar care settings, new providers, and no clinical personnel that know your history. Prevvy addresses these issues, and allows any Provider to get a complete and unbiased overview of the patient they're seeing, not just the symptom presenting in front of them - while providing them in the same record the contact information for the primary provider. The patient can share their records with the new provider (via a direct message), show them their records on any connected device, or activate the emergency feature described above.

Patient send PHI Sharing
Invitation to new Provider

New provider has access to Patient's medical record and care team.

3.1.4 Use Case 4: Patient Engagement

Prevvy provides physicians a unique tool to proactively reach out to their patients between office visits. This could be especially helpful in ACO environments to promote flu shots, breast cancer awareness (for mammograms) or even social events (march with us to raise awareness for ...). For this purpose, the Prevvy solution can be utilized to identify specific groups of patients based on interests, condition, or even stage of disease.

Prevvy also has a social media-like functionality that can allow patients to interact directly with each other, share stories, and discuss different treatments in a safe and secure environment. Taken together with the benefits of care coordination, collaboration with family members, and a ready network of individuals sharing the same experiences, Prevvy can potentially help with one of the most important components of aging - helping people not feel alone.

The screenshot shows a patient education article titled "Why is it important for people with diabetes to be physically active?". The article discusses how physical activity can help control blood glucose, weight, and blood pressure, as well as reduce your "good" cholesterol. It also mentions how physical activity can prevent complications, reducing your risk of heart disease and nerve damage, which are often problems for people with diabetes. The article includes a photo of a person exercising and a sidebar with links to "Wellness Tools", "My Health Goals", "Daily Metrics", "Social Metrics", "Task Types", and "Patient Logins".

Patient Education content in Prevvy portal. Contents are sourced from multiple sources, e.g., CDC

The screenshot shows a social channel for a condition, featuring a post from the "American Heart Association" (@AmericanHeart) with a photo of a woman. The post reads: "Dr. Maurice White goes social". Below the post, there are comments from users like "IRON HEART FANS" and "Adrian is following Dr. West". There are also posts from "Barton Health of South Florida starts Miami Heart Study. Email at www.miamihearthstudy.com." and "Getting inspiration from The Beatles song 'Don't Cry For Me Argentina'." The sidebar includes links to "Daily Activities", "Metrics", "PHR", "Campaigns", "Health Calendar", and "Related persons".

Social Channel for a condition

The screenshot shows care feeds for a careplan. It displays an encounter with Martin Rodriguez (09:44-09:47) with a photo of a green apple and a pink dumbbell. The sidebar shows "William Smith, MD", "New Patient", "Hedgehog Doctor", "Highly-qualified Doctor", and "Patient Logins". The main content area includes a search bar and a "LOAD MORE POSTS" button.

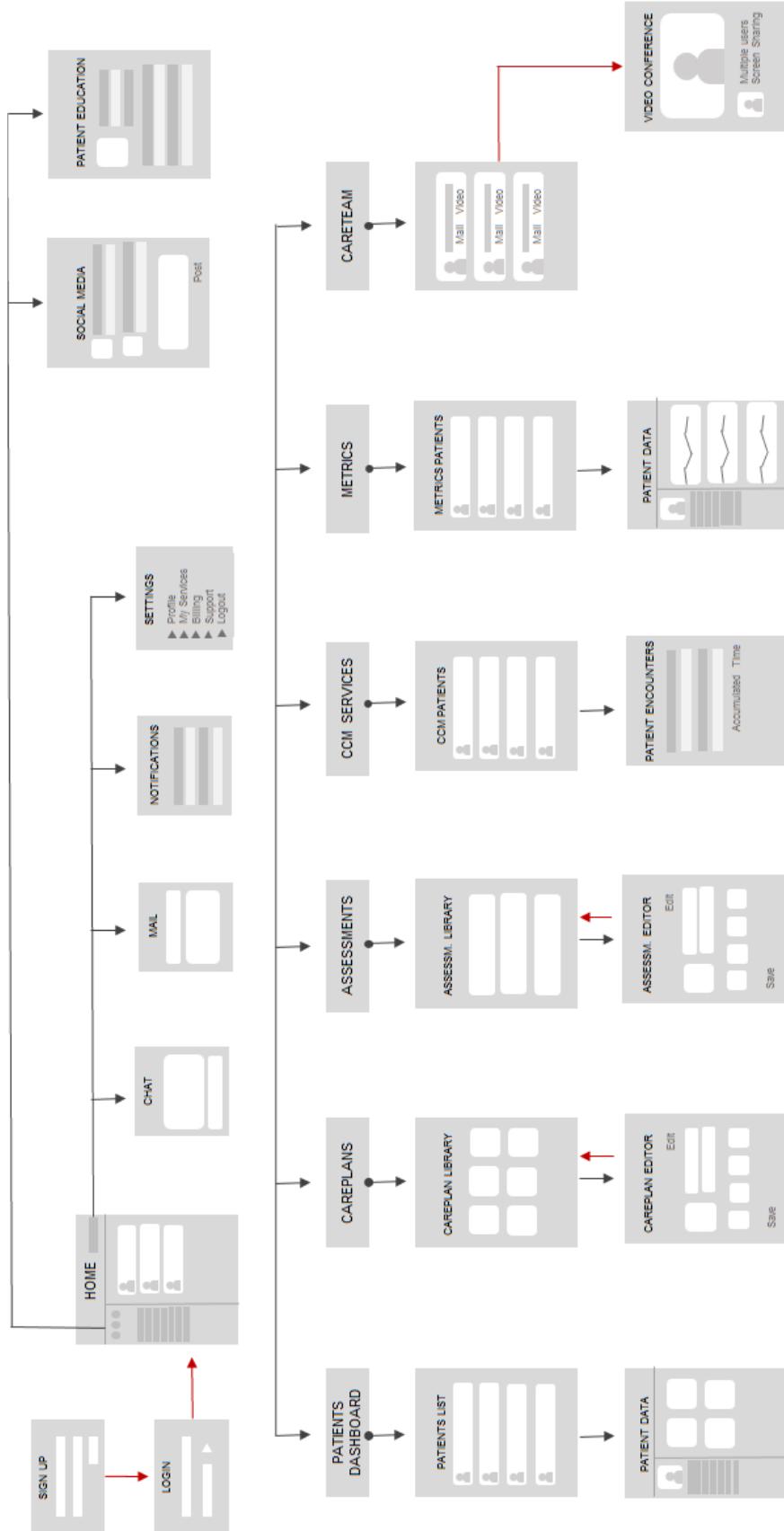
Care feeds for a careplan (Social channel for careteam)

3.2 Features

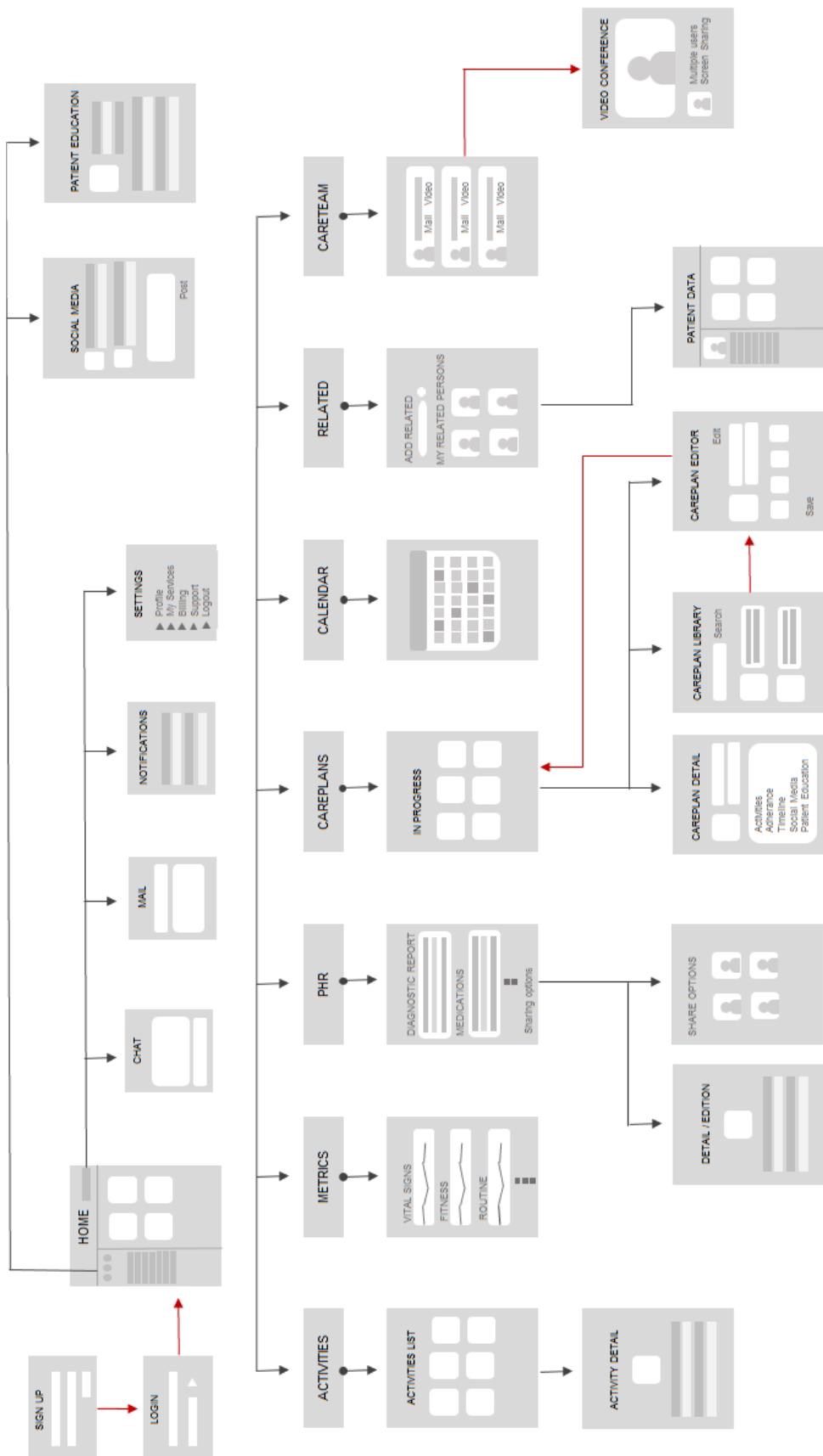
Feature	Feature description
Mobile App for patients and caregivers	Android and iOS mobile apps: managing PHI, careplans, calendars, careteams for families
Webapp for caregivers and practitioners	Web portal for managing PHI, careplans, calendars, careteams for families
Dashboard of Patients beyond the clinic	Dashboard showing care plans, adherence, issues, and connected health services
Dashboard of Patient metrics	Dashboard showing biometrics (if available), survey responses, and adherence / non-adherence issues.
Dashboard for Chronic Care Services	Billing and Encounter documentation management for any CCM episode of care billed to Medicare
Personal Health Record	Health data aggregator from different sources: EMRs, HIEs, and Patient generated data
Sharing PCHR	Enabling shared PHI with families, providers and emergency situations.
Careplan Management	Creation , assignment of wellness or care plans for a family member or patient
Careplan adherence management	Dashboards about care plans compliance activities adherence by patients.
Metrics	Dashboards about adherence, laboratories, signal vitals, ...
PHI Management for related persons	Access to PHI for patients who has given Consent for accessing their PHI
Care Team management	Provisioning and communication with care team members
Communication Tools	Secure messaging, Instant Messaging, Video conference, social network channels based on conditions or care plans
Patient Education	Patient education network with different content providers such as CDC, or other available platforms
Emergency Services	PHI Sharing in emergency situations

3.3 Wireframes for Mobile App And Web

Web Navigation (Clinicians)

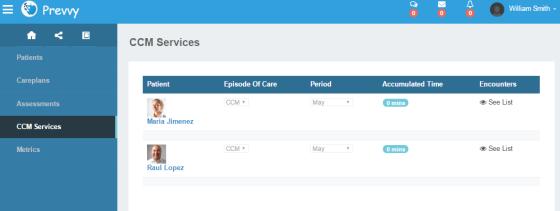
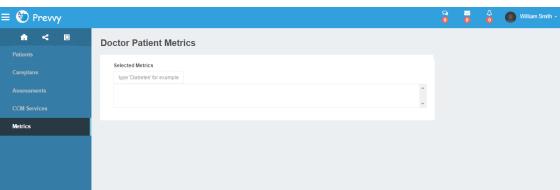
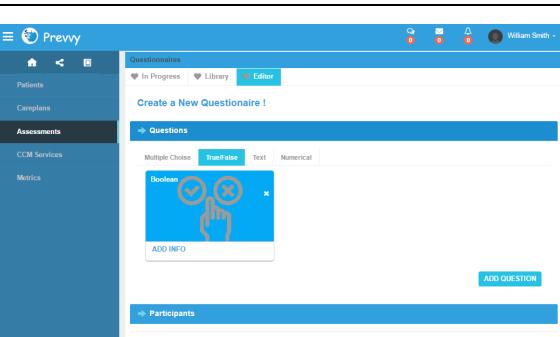


App Navigation (Patient)

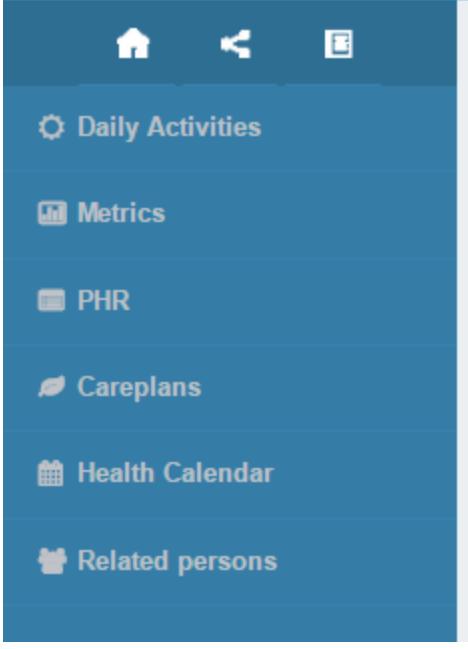
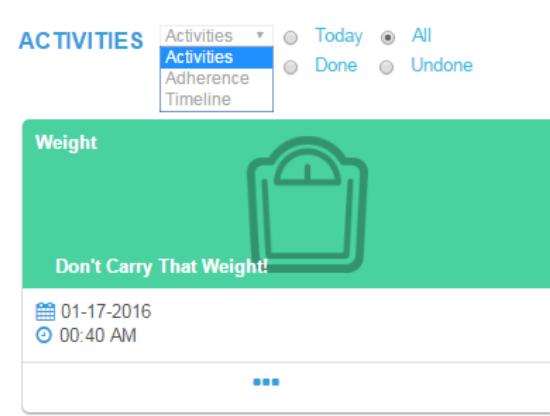
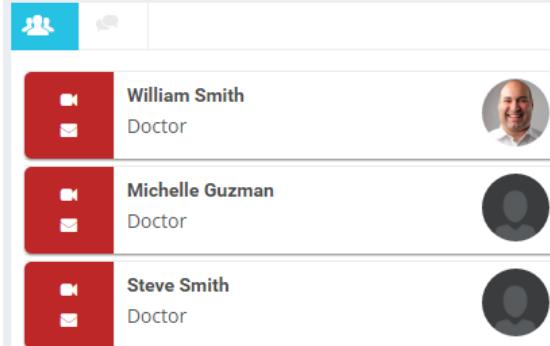


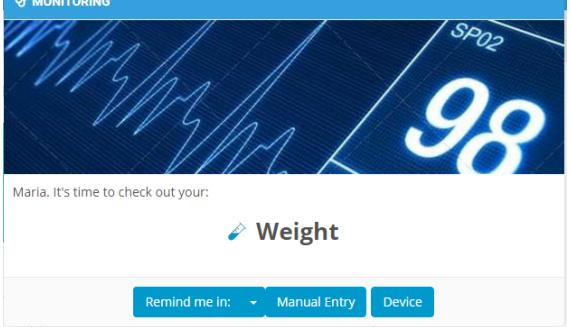
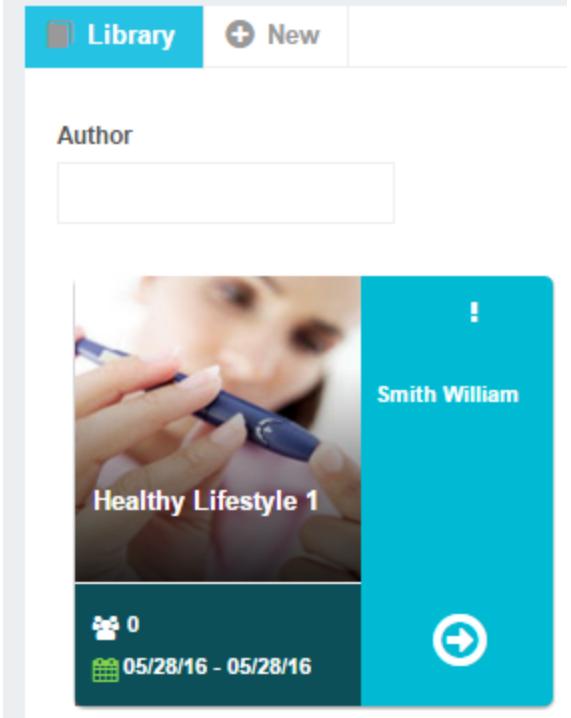
3.3.1 Layouts

Clinician Dashboards

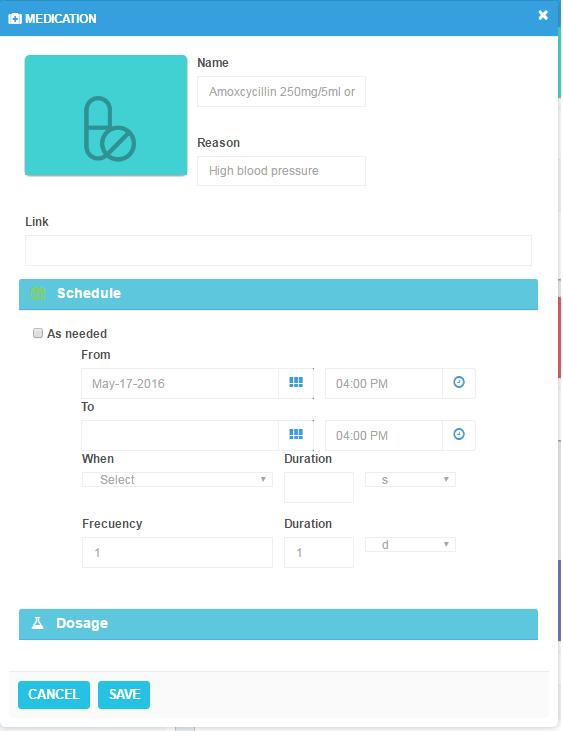
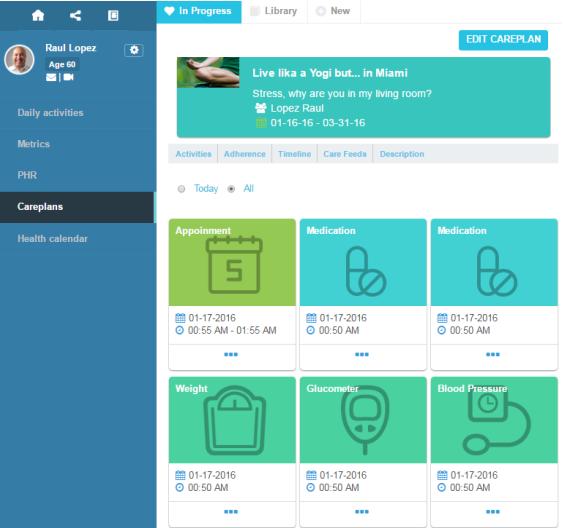
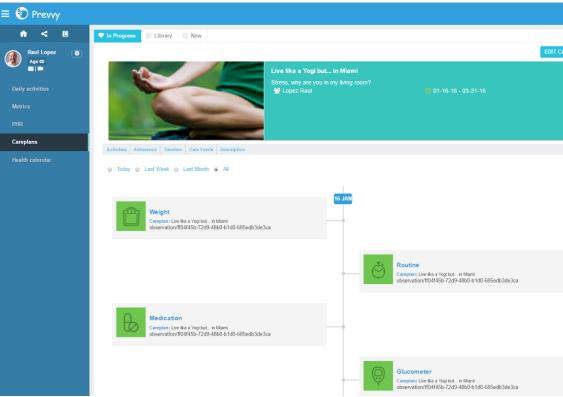
Functionality	Mockup Detail	Comments
CCM Service		Careplan development, time tracking, and audit functionality
Metrics Patients		Overview with patient metrics and notifications for out-of-range readings
Assessment Editor		A tool that allows assignment of assessments (e.g., SF-8)

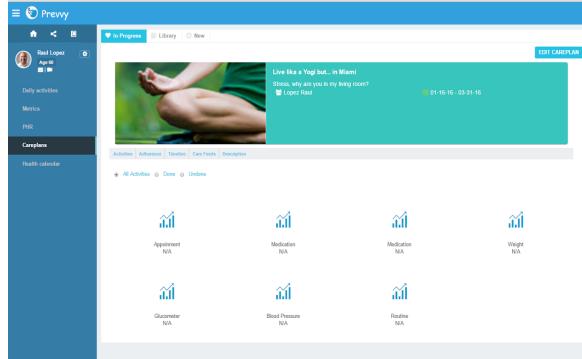
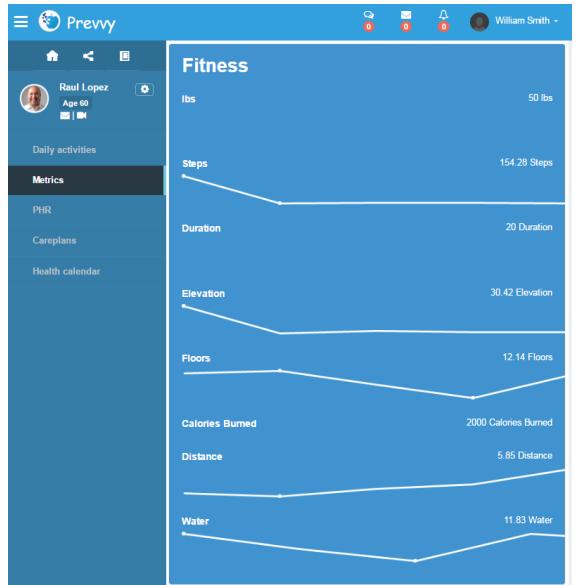
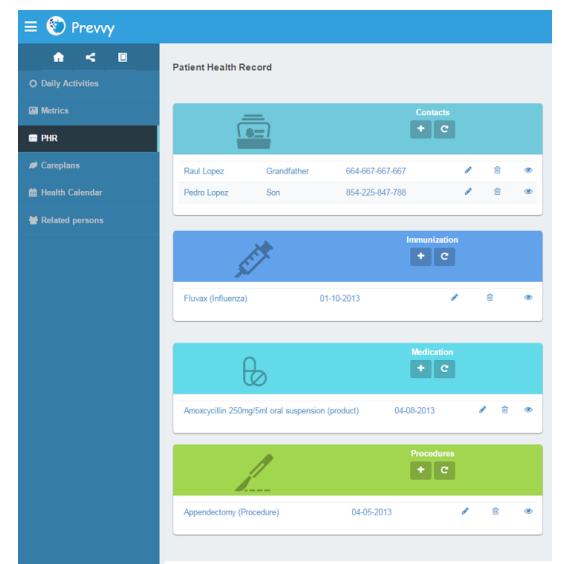
Clinicians and Patients

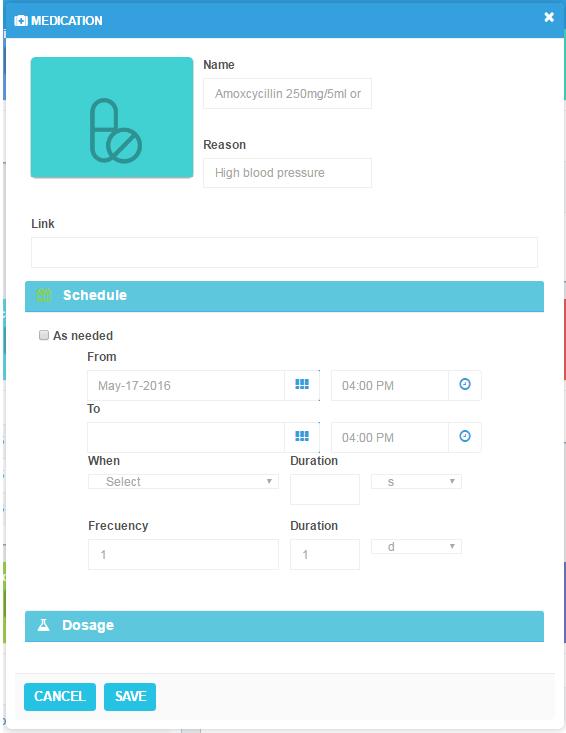
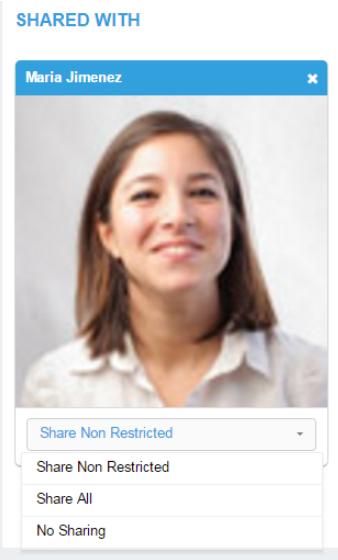
Functionality	Mockup Detail	Comments
Patient Menu		Easy-to-navigate main menu that allows user access to the most important sections of the app or portal
Daily Activities		Activities can be grouped or listed in the care plan to meet the needs of the clinician / patient.
Careteam		Careteam members can be reached by secure email or videoconference (if that is offered on the provider side).

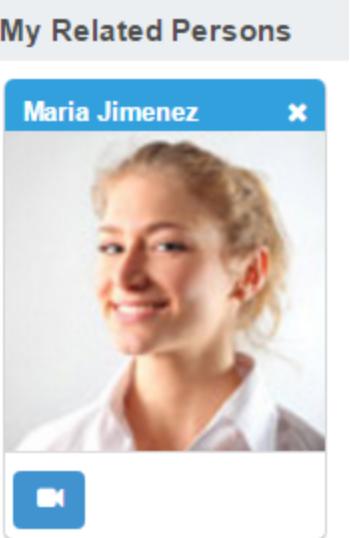
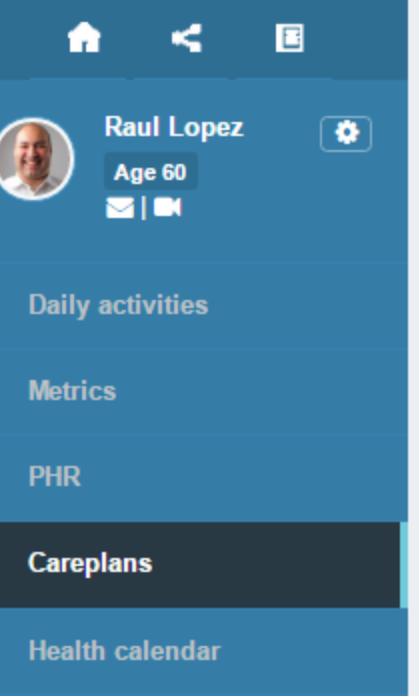
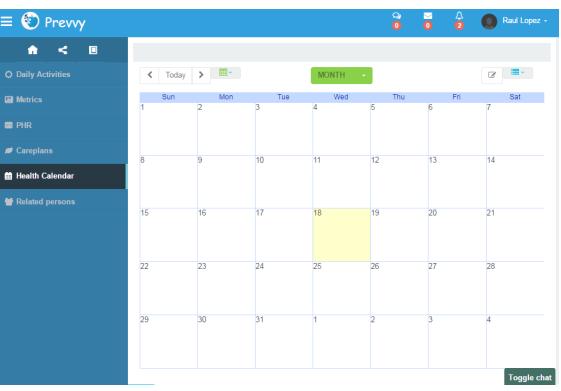
Notification		<p>The Prevvy Guidance system can send notifications (e.g., medication reminders) through multiple channels (mobile notifications, desktop notifications, emails). The system can be configured to require responses, ignore messages, and send notifications as agreed to by the patient and the care team.</p>
Careplans for a patient		<p>This section lists the careplan(s) in which the patient is participating, including the ability for patients to update status or activities.</p>
Careplan libraries		<p>Careplan templates based on condition can be created to use across populations, and then further customized to meet the needs and goals of each patient.</p> <p>Careplans and templates are saved to the library, where clinical users can select the most appropriate modules for their patient.</p>

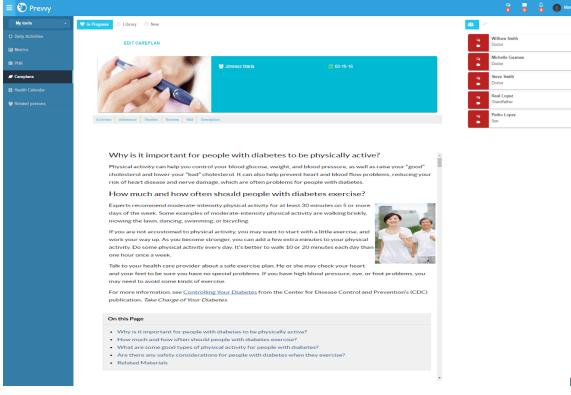
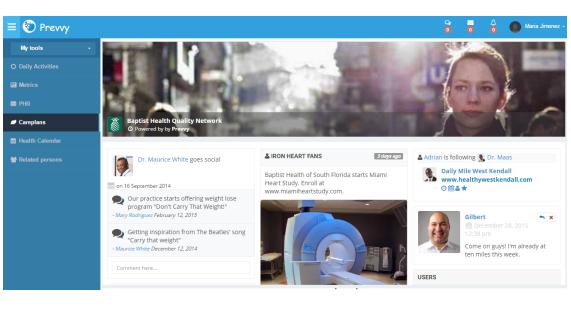
Careplan Editor	<p>Create a New Careplan !</p> <p>➡ Category & Description</p> <p>CATEGORY <input checked="" type="checkbox"/> Health <input type="checkbox"/> Wellness <input type="checkbox"/> Lifestyle</p> <p>DESCRIPTION</p>  <p>CHANGE IMAGE</p> <p>* Name <input type="text"/></p> <p>* Description <input type="text"/></p> <p>FROM May 17, 2016 <input type="button" value="CALENDAR"/></p> <p>TO May 17, 2016 <input type="button" value="CALENDAR"/></p> <p>EDIT CMS</p> <p>➡ Participants</p> <p>➡ Activities</p> <p></p> <p><input checked="" type="radio"/> Blood Pressure <input type="radio"/> Weight <input type="radio"/> Temperature <input type="radio"/> Glucometer <input type="radio"/> Pulse/Heart Rate <input type="radio"/> Spirometer</p> <p><input type="button" value="CANCEL"/> <input type="button" value="ADD"/></p> <p>Blood Pressure  <input type="button" value="ADD INFO"/></p> <p>➡ Related Careplans</p> <p><input type="button" value="SAVE CAREPLAN"/> <input type="button" value="SAVE AS TEMPLATE"/></p> <p><input type="button" value="IMPORT / MERGE"/> <input type="button" value="CANCEL"/> <input type="button" value="Toggle chat"/></p>	<p>This powerful tool allows for the creation and editing of Careplans and Careplan templates.</p> <p>Careplans can incorporate an almost unlimited number of customizations, including date ranges, goals, nutrition plans, and educational contents / modules.</p>
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<h3>Activity Editor</h3>		<p>Each careplan element can be edited individually, or modified across all templates.</p>
<h3>Careplan viewer: Activities</h3>		<p>Overview of all of the activities included in the patient's careplan. This is especially useful for care coordinators tasked with monthly updating and monitoring.</p>
<h3>Careplan timeline</h3>		<p>Timeline to quickly identify completed and ongoing activities in a given period.</p>

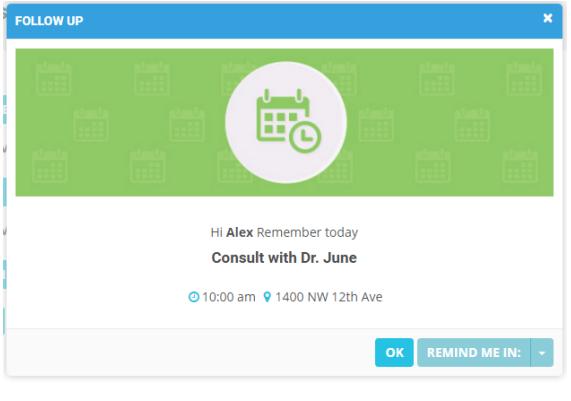
Careplan adherence		Adherence can be measured over a defined period of time
Metrics		Every patient activity creates a graphic showing the values of the latest metrics. This graphs help the doctor to be aware of the ups and downs of a patient performance
Personal Health Record		Prevvy's electronic health record stores all of a patient's health information gathered from various health providers. This information is then used by clinicians and the care team to create a personalized careplan.

Edit and Viewer FHIR resources Composition Layout	 <p>The screenshot shows a 'MEDICATION' form. At the top, there's a placeholder image of a pill and fields for 'Name' (Amoxicillin 250mg/5ml or) and 'Reason' (High blood pressure). Below this is a 'Link' field with a placeholder URL. A 'Schedule' section follows, containing a 'As needed' checkbox, date and time pickers for 'From' (May-17-2016, 04:00 PM) and 'To' (04:00 PM), a dropdown for 'When' (Select), duration fields (Duration: S), frequency fields (Frequency: 1, Duration: 1 d), and a dropdown for 'Duration' (S, d, h, m). A 'Dosage' section is partially visible below. At the bottom are 'CANCEL' and 'SAVE' buttons.</p>	<p>Prevvy's EHR allows the user to add or update health information not acquired via an electronic transfer (paper records update).</p> <p>The patient can also create their own “blocks” of information where relevant information is stored</p>
Sharing Options	 <p>The screenshot shows a 'SHARED WITH' interface. It displays a photo of a woman named Maria Jimenez and a dropdown menu with the following options: 'Share Non Restricted' (selected), 'Share Non Restricted', 'Share All', and 'No Sharing'.</p>	<p>Patient's EHR information can be shared completely or partially with any careteam or family member.</p> <p>The person with whom the information is shared can see only that information to which the patient had granted access.</p>

Related Persons		<p>In addition to the careteam, patients can add relatives or other care givers to their prevvy account, and define, by person, the information the patient wants to share.</p> <p>Prevvy includes video conferencing capabilities for easy communication, and it can be used for remote patient visits.</p>
Navigation for PHI of related Person		<p>Authorized users, based on permissions, can monitor a patient's careplan and activities.</p>
Health Calendar		<p>Prevvy contains a calendar function where medical appointments and other health-related reminders can be stored.</p>

Journal	 <p>The screenshot shows a 'EDIT CAREPLAN' page with a section titled 'Why is it important for people with diabetes to be physically active?'. It includes text, images of people exercising, and a sidebar with user profiles.</p>	<p>Prevvy offers thousands of articles geared for patient education which can be added to the patient's careplan with simple drag and drop functionality.</p>
Patient Social Network	 <p>The screenshot shows a social network feed with posts from users like Dr. Maurice White and Daily Mile West Kendall, discussing topics like weight loss and heart health.</p>	<p>Condition focused social networks where users can share their experiences with treatment, medications, and lifestyle with other patients that share the same conditions and concerns.</p>
Secure Messaging		<p>Patients and clinicians can receive and send encrypted health information through Prevvy just as they would send an email, complying fully with HIPAA regulations</p>

Mobile and Desktop Notifications

Layout	Mockup	Comments
Mobile and desktop Notifications	 <p>The mockup shows a 'FOLLOW UP' notification with a green background and a large calendar icon. It displays a message to 'Hi Alex Remember today Consult with Dr. June' and a timestamp '10:00 am 1400 NW 12th Ave'. There are 'OK' and 'REMIND ME IN:' buttons at the bottom.</p>	<p>Prevvy can be configured to provide reminders across all range of activities in the Careplan. Reminders can be sent based on user preferences.</p>

4 Technology

4.1 FHIR DSTU2 Resources used on Prevvy

The FHIR server implementation for Prevvy supports all FHIR resources defined in the FHIR DSTU2 specification. Our front-end layer (Prevvy Portal and Prevvy Mobile Apps) and our business logic layer (Prevvy Services) are built **exclusively** using FHIR DSTU2 resources. The resources highlighted in **Green** below are currently built into our front end and business logic layers. Our current implementation represents over 80% of those resources.

Clinical

General:	Care Provision:	Medication & Immunization:	Diagnostics:
AllergyIntolerance	CarePlan	Medication	Observation
Condition	Goal	MedicationOrder	DiagnosticReport
Procedure	ReferralRequest	MedicationAdministration	DiagnosticOrder
ClinicalImpression	ProcedureRequest	MedicationDispense	Specimen
FamilyMemberHistory	NutritionOrder	MedicationStatement	BodySite
RiskAssessment	VisionPrescription	Immunization	ImagingStudy
DetectedIssue		ImmunizationRecommendation	ImagingObjectSelection

Identification

Individuals:	Groups:	Entities:	Devices:
Patient	Organization	Location	Device
Practitioner	HealthcareService	Substance	DeviceComponent
RelatedPerson	Group	Person	DeviceMetric
		Contract	

Workflow

Patient Management:	Scheduling:	Workflow #1:	Workflow #2:
Encounter	Appointment	Order	ProcessRequest
EpisodeOfCare	AppointmentResponse	OrderResponse	ProcessResponse
Communication	Schedule	CommunicationRequest	SupplyRequest
Flag	Slot	DeviceUseRequest	SupplyDelivery
		DeviceUseStatement	

Infrastructure

Information Tracking:	Documents & Lists:	Structure:	Exchange:
Questionnaire	Composition	Media	MessageHeader
QuestionnaireResponse	DocumentManifest	Binary	OperationOutcome
Provenance	DocumentReference	Bundle	Parameters
AuditEvent	List	Basic	Subscription

Conformance

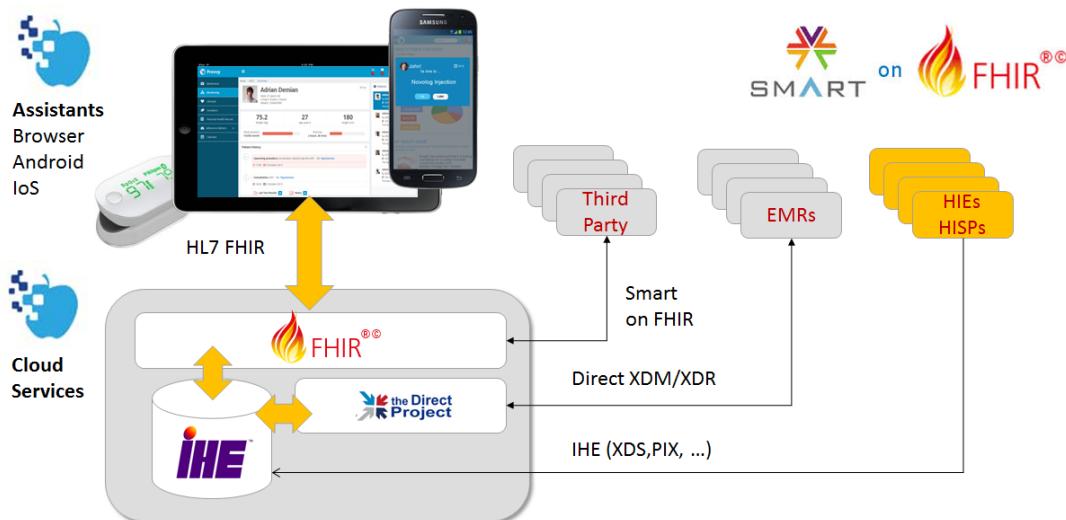
Terminology:	Content:	Operations Control:	Misc:
ValueSet	StructureDefinition	Conformance	ImplementationGuide
ConceptMap	DataElement	OperationDefinition	TestScript
NamingSystem		SearchParameter	

Financial

Support:	Billing:	Payment:	Other:
Coverage	Claim	PaymentNotice	ExplanationOfBenefit
EligibilityRequest	ClaimResponse	PaymentReconciliation	
EligibilityResponse			
EnrollmentRequest			

4.2 Health IT interoperability

Prevvy supports the latest Health IT standards such as those shown below:



PREVYY: Smart-FHIR framework for new Digital Health strategies

- Prevvy Apps (Web portal and iOS/Android mobile apps) are based on FHIR and FHIR messaging specs. Prevvy Apps could be started standalone or from SMART-FHIR containers; in this last option there will be a PHI syncing process between PHI stored in Prevvy and EMR.
- Prevvy FHIR Server is a FHIR implementation on top of IHE specs based on an IHE XDS repository which stores simultaneously CCDA documents and FHIR resources
- Prevvy microservices, which implements Prevvy business logic, are developed using [FHIR messaging specs](#)
- Prevvy IHE repository could be connected to different IHE Affinity Domains with other IHE repositories from an organization or Regional Health Information Exchanges
- Our Prevvy HISP provider, based on Direct project, is a Direct gateway between our repository and other providers using Direct Messaging and IHE XDR gateway
- Prevvy FHIR2CDA service is able to convert bidirectionally CCDA documents received from XDR/XDS/Direct protocols to FHIR Compositions composed of FHIR resources
- Third Party Apps could use Prevvy FHIR and Prevvy microservices based on SMART-FHIR authorization

4.3 SW architecture

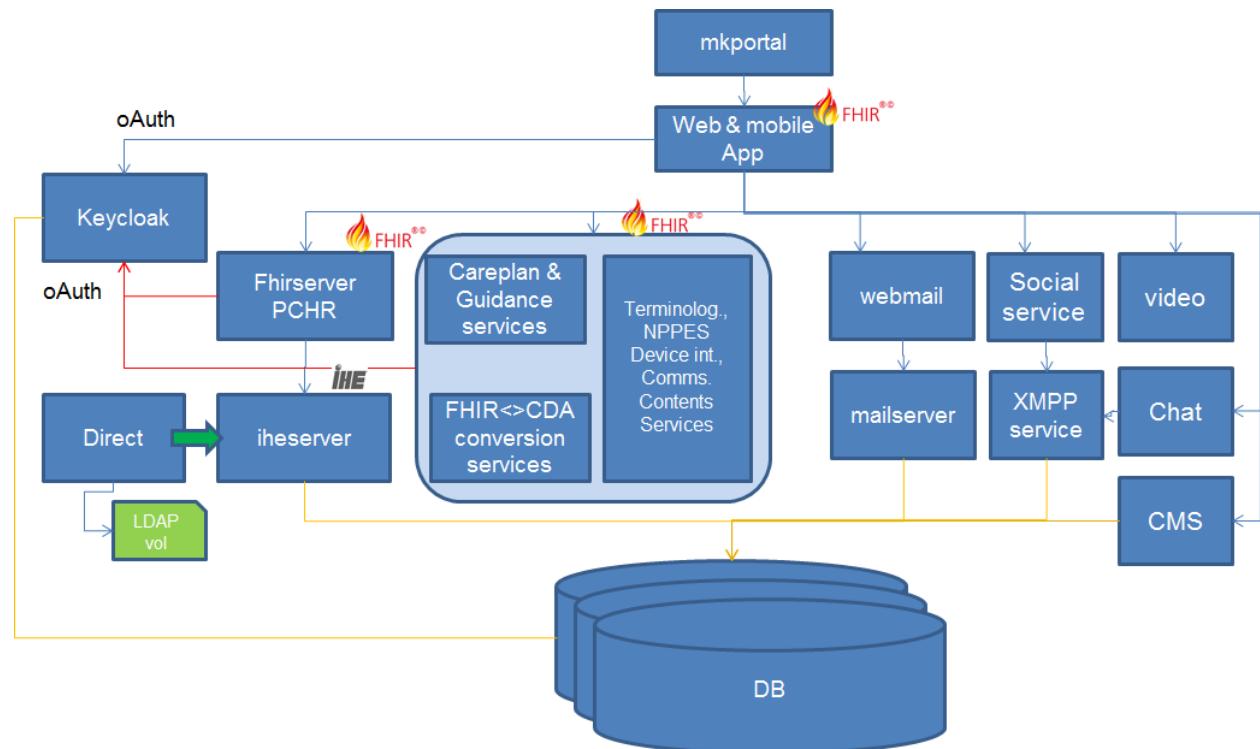
4.3.1 Prevyy Web and mobile apps

Patients, families, and providers have access to Prevyy through the **Prevyy Web portal** and **Prevyy mobile apps (Android & iOS)**. Web and mobile apps are one unique development project where web responsive design and hybrid mobile apps technologies are used for getting this unique development.

Web and mobile app are developed with these technologies:

- Google Web Toolkit
- Javascript/Jquery/Bootstrap
- Phonegap for Android and IOS
- Mobile notifications based on AWS SNS, Google GCM, and Apple APNs

4.3.2 Prevyy Services:



Service	Description
FHIR service	<p>Prevvy FHIR services is a FHIR DSTU2 implementation on top of IHE XDS repositories. Prevvy Apps are able to access to FHIR resources and additionally to CCDA documents through FHIR DocumentReference interface.</p> <p>FHIR service security is based on:</p> <ul style="list-style-type: none"> • oAuth Token authorization • Patients Consents for connected users to requested PHI in FHIR server • Restrictions based FHIR Resources Security Labels
Authorization Service	<p>Prevvy Authorization services is based on oAuth/OpenID services implemented in Keycloak project. Prevvy Apps, Prevvy FHIR and Prevvy microservices are using Prevvy Authorization Service to restrict access to apps and services from apps and users</p>
IHE XD* Repository service	<p>Prevvy IHE Repository is an IHE XD* implementation based on a light modification of HIEOS open source project. IHE Repository could be setup to connect to other HIE repositories.</p>
HISP service	<p>Prevvy HISP service is based on Direct Project open source project. Each Prevvy user will have a personal Prevvy Direct Address; any Direct messaging to a provisioned Prevvy Direct address will be redirected through XDM/XDR interface of our IHE repository. Prevvy will use Organization Certificate signed by DigiCertMed CA and published in a public LDAP for discovery.</p>
Prevvy FHIR microservices	<p>Prevvy business logic based on microservices development. Each Prevvy microservice is based on FHIR messaging specification invoking operations based on Messages. Each message is a FHIR bundle with FHIR Resources like parameters and a MessageHeader like operation.</p> <p>Prevvy microservices security is based on oAuth Token authorization.</p>
FHIR<>CDA Conversion Service	<p>Prevvy Fhir2CDA converter is a microservice which is able to convert bidirectionally a CDA document to a bundle of FHIR resources. Any new received CDA document, from Direct or from other IHE repository in an Affinity Domain, will be transformed to FHIR resources; these new FHIR resources will be available for Prevvy Apps and Services.</p>
Careplan based Guidance Service	<p>Set of microservices which offer creation of careplans and careplan templates to support different type of activities like fitness, routine, monitoring, medication, assessments, patient education, diets, communications, orders and other activities.</p> <p>A guidance system based on mobile or desktop notifications provides timely reminders to users for anything from activities (e.g., walking, taking medicine) or entering data (e.g., distance walked, weight). These reminders, combined with reinforcement from physicians and support from family</p>

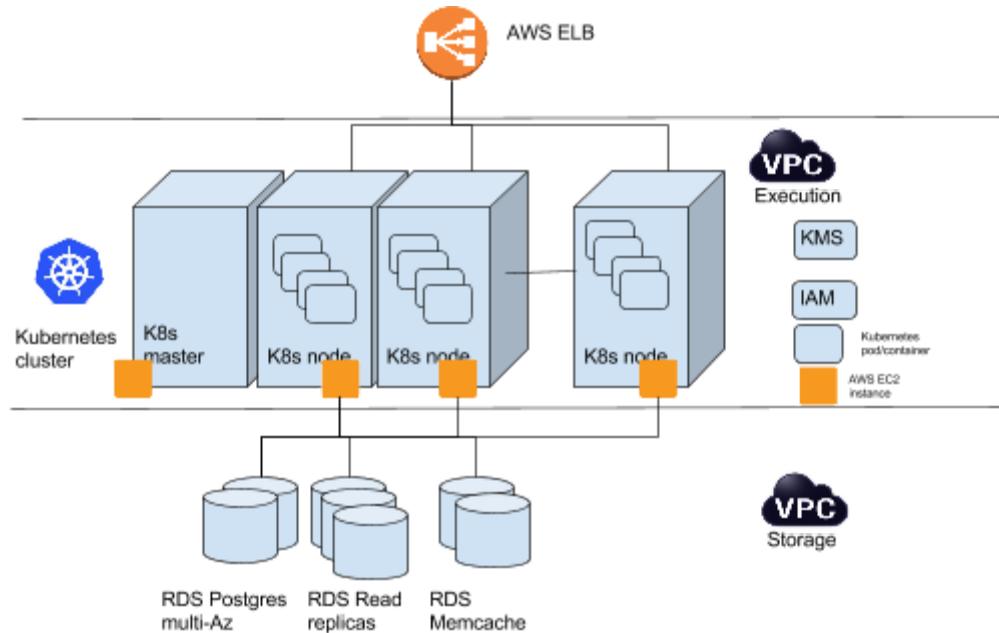
	members, can be a powerful behavioral change tool.
Terminology services:	Prevvy Terminology Services offers translation for all supported vocabularies in NLM UMLS and CTS2 REST services. Prevvy FHIR TS implementation is based on these 2 API services.
Monitoring Service - Biomedical devices integration	Prevvy Monitoring Service acquires Vital Signs and measures from different biomedical devices such as glucometers, scales, pedometers, and other devices. Monitoring Service integrates the FHIR Device concept with different Device Data aggregator platforms like Validic, iHealth, and Qualcomm Life.
Drug Interaction Service	Prevvy Drug Interaction Service is a microservice which detects Drug interactions for the set of medications for a patient. Service creates FHIR DetectedIssues for each of them. The service is developed based on NLM Drug Interaction API.
Secure Messaging Service	Prevvy users have a secure internal messaging service based on Apache James and Apache HUPA open source project.
Videoconference and sharing PHI	Prevvy users have multi video conference support based on the WebRTC platform. Prevvy users can discuss and share PHI in that session. Each user in the session just have access to authorized PHI based on their Consents and FHIR Resources Security Labels .
Secure Social and Instant Messaging service	Careplan participants can communicate with each other through Careplan social channel and Careplan Instant Messaging channel. This is based on Buddycloud and Prosody open source projects.
Content Management System	Patient education for any Careplan activity is managed through Hippo Content Management system leveraging CMS and CDC content platforms.
NPPES service	FHIR interface to CMS NPPES database.

4.3.3 External services

Services	Description
Medline REST services	Information about medications and diseases
CDC Syndication API	Health topics from CDC syndication platform
NLM UMLS Service	ICD9, ICD10, SNOMED, RXnorm
Validic API /health API	Data aggregator platforms which acquire data from biomedical devices
Edamam API	Diet Recipes and Recommendation API
Chargebee services	Billing services to manage subscriptions to Prevvy Connected Health Services
Authorize.net	Payments Platform

4.4 Systems Architecture

The following figure shows the containerized Prevyy architecture:



The main Prevyy architecture features are:

- Orchestration of containerized modules based on Kubernetes cluster and Docker containers
 - Horizontal replication and distribution of containers in distributed cluster
 - Discovery services
 - Internal load balancing
- Security:
 - Different levels of Key/Credential/Secrets
 - Kubernetes Secrets
 - Vault Management System
 - AWS KMS
 - Any communication between containers, layers, cloud system is based on SSL/TLS
 - Encryption of databases, system files with PHI
 - Audit IHE, FHIR AuditEvent
- Cloud Services
 - AWS EC2 instances
 - AWS Secure RDS Postgres multi-AZ and read replicas. Encryption of communications and storage.
 - AWS Secure ElastiCache for caching DB access
 - AWS Secure S3/EBS for storage
 - AWS KMS for Key management
 - AWS SQS for provisioning management
 - AWS SNS/ GCE GCM/ Apple APNs for desktop and mobile notifications
 - AWS SMS for outbound mailing
 - AWS Route53 for DNS Management

5 Privacy Model

5.1 Overview

Healthcentrix will sign HIPAA Business Associate Agreements (BAAs) with all of our provider partners, and a BAA with our cloud service provider. We want our physician partners and individual users to be confident that their data is transmitted and stored securely. Healthcentrix will therefore follow all applicable state and federal MPN PHR privacy guidelines. We will be fully transparent with all of our partners and users with regard to how we store, transmit, and use data in the Prevvy system. Our model and approach on disclosures, storage, and security is outlined in the table below:

5.2 Disclosures, Data Storage, Security and Encryption

Issue / Question	Personal Data	Statistical Data	Comments
Do we release your PHR Data for these purposes? (Yes / No)			
• For marketing and advertising	No	No	
• For pharmaceutical research	Yes*	Yes	* Personal data may be shared with specific consent
• Allowing researchers at academic and non-profit institutions to access either identifiable or de-identified data	Yes*	Yes	* Personal data may be shared with specific consent
• For reporting about our company and our customer activity	No	Yes	
• For your insurer and employer	No	No	
• For developing software applications	No	No	
Sale of anonymized or de-identified data, with restrictions on re-identification	No*	Yes	* Personal data may be shared with specific consent
Sale of statistics aggregated from identifiable data	N/A	Yes	

Use of data by the original collector to market products to the consumer	No*	Yes	* Personal data may be shared with specific consent
Allowing third parties to use the data for marketing purposes	No	Yes	
Allowing government agencies to access the data, and for what purposes (such as law enforcement or public health)	Yes	Yes	Healthcentrix will follow all state and federal guidelines
Access to the data by employers, schools, insurance companies or financial institutions with or without the consumer's consent;	No	No	
Health technology developer stores information in the cloud or on the consumer's device	No	No	

5.3 Data Storage and Destruction

Issue / Question	Personal Data	Statistical Data	Comments
Is information stored by the company in the cloud (either the only copy of the information or a backup of the information)	Yes	Yes	Data is stored on a multi-cluster cloud database with backups for disaster recovery
In what country is the information stored?			All data generated in the US will be stored in the US.
Does the consumer have the ability to download a copy of their information at any point in time?	Yes	No	The consumer has the ability to download a copy of their information at any time. Once the relationship between the user and Healthcentrix is terminated, however, all data from that consumer will be destroyed and will be no longer accessible either by Healthcentrix or the consumer.
Retention or destruction of consumer data when the			All data will be destroyed.

relationship between the health technology developer and consumer terminates			
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5.3 Security and Encryption

Issue / Question	Personal Data	Statistical Data	Comments
Is consumer information encrypted when transmitted and what level of encryption is used?	Yes	No	Web and mobile apps access: TLS/256 Direct Messaging HISP: X.509 Organization digital certificate Digicert. In progress for belonging to NATE and Directtrust bundles
Is information encrypted when stored and what level of encryption is used?	YES	Yes	AWS RDS 256b encryption
Does Healthcentrix have access to the unencrypted information?	No*	Yes	* Access to unencrypted PHI will be granted by the Privacy officer based on specific operational needs based on HIPAA guidelines.
Will any third parties (e.g., a cloud provider) have access to unencrypted information?	No	No	
Does the company subscribes to any particular information security framework (e.g., ISO 27001) and, if so, the identification of such a framework?			In progress

6 Business Model

6.1 Overview

Prevvy is a cloud-based, connected health ecosystem that provides patients and providers 24/7 access to their medical records and personal healthcare information from any connected device. This, combined with the sharing capabilities built into the Prevvy system, opens a world (literally) of opportunity for Prevvy to enter new service areas where both providers and patients can be paid subscribers.

The basic Prevvy business model is a Software as a Service (SaaS) model. Our go-to-market is simple and can be divided into two parts. The first is to offer this SaaS service to physicians to allow them to bill CMS for care coordination services (work they had been doing without reimbursement to improve their patient's care) under the Chronic Care Management (CCM) program. Under this program, a primary care physician (PCP) with a typical patient panel size and makeup (about 2100 patients, 29% Medicare eligible) can augment their base income by 50% or more (when compared to average PCP salaries) with only average enrollment in the program. In this way Prevvy has mutually aligned incentives with our physician partners - we earn our fees as they are able to bill for CCM services. The second part of our strategy is to offer Prevvy free to patients through which patients could opt for higher level premium services (e.g., emergency notification services).

6.2 Free Connected Health Services for patients

Service	Description	Pricing
Basic Patient	Family PHI management Family Care and Wellness Management	Free

6.3 Premium Services for Patients

Service	Description	Provider	Pricing
Prevvy Premium patient with Emergency Services & Remote Monitoring	Txt911 with PHI, location, and phone Device Management	Prevvy	5\$ PPM
Telehealth Services	Videoconference with Doctors for convenience	Doctor	\$\$ from provider

Wellness & Careplans made by MDs, nutritionists,	Disease, Diets, Concierge Careplans from different providers	Doctor	\$\$ from provider
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6.4 Premium Services for Providers

Service	Description	Pricing	Billing
CMS Chronic Care management for Medicare FFS patients with 2+ chronic conditions (70% of Medicare population)	<p>Shared PHI with careteam (provider, family, Assessment, Drug Interaction, Adherence, Time Tracking, Async communication, Billing)</p> <p>A doctor could earn up \$200,000 new revenues per year with this new CMS revenue lines. Our revenues will be 15% of doctor's revenues.</p>	\$6 PPM \$35 patient setup fee	\$42.5 PPM from Medicare
Remote monitoring services	Device management	\$8 PPM \$35 patient setup fee	\$52PPM from Medicare
Transition of Care services	Share PHI with careteam Care Coordination and Careplan Management	\$25 PP (hospital)	Reduction of penalties
Telehealth Services	Video conference, PHI from patient Screen sharing Careplan Management	\$8 per visit	Can work on a self-pay or insurance model.
Wellness Services	Wellness plans	\$2 PPM	From employees
Concierge Services	Shared PHI with careteam (provider, family, Assessment, Drug Interaction, Adherence, Time Tracking, Async communication, Billing)	\$5 PPM	From patients

6.5 Premium Services for Pharma Companies

Service	Description	Pricing
Medication as a service	Pharma companies could utilize Prevvy to offer Careplans (in coordination with physicians) for a range of biotech, oncology, and other high-priced therapies	To be determined.

7 Providers Committed to the Project and a list of the EMRs Currently Utilized

7.1 Participants

Provider	EMR	Comments
Medicine on Call	Care360, Aprima, Carecloud, ADS, Chronos	Medicine On Call is hospitalist group with 8 internists that contract with hospital and health system groups in South Florida.
Tenet South Florida Hialeah Hospital	Cerner	Medical and Hospital groups in South Florida
Baroma Health Partners	More than 20 different EMRs	Baroma is a NextGen ACO with over 1,400 associated physicians.

We currently have one letter of intent signed (scanned into the next section), that with Medicine on Call. We anticipate getting two additional such letters from Tenet and Baroma Health Partners. We will submit these when they are received.

7.2 Letter of Intent

Javier Perez MD
Medicine on Call Inc
651 East 25th Street
Hialeah, Florida 33013

Re: Letter of Intent to participate in the Provider User Experience Challenge Grant

Dear Mr. Olmo

Please allow the following to serve as a Letter of Intent as requested by Jose Maria Olmo, CEO of Healthcentrix.

This letter of intent, between Healthcentrix, a Florida company based in Miami (Healthcentrix) and Medicine On call Inc, a medical group based in Miami (Organization), and together referred to as the Parties, are entering into this letter of intent for joint participation in the grant proposal entitled Provider User-Experience (UX) Challenge (the Challenge), issued by Challenge.gov. Challenge.gov is an official U.S. government website, administered by the U.S. General Services. Details of the challenge can be found here: <http://www.challenge.gov/challenge/provider-user-experience-challenge>

Objective of the Challenge Grant. The Provider User-Experience (UX) Challenge incents the development of applications that use open, standardized APIs to enable innovative ways for providers to interact with patient health data. This challenge will focus on demonstrating how data made accessible to apps through APIs can positively impact providers' experience with EHRs by making clinical workflows more intuitive, specific to clinical specialty, and actionable.

Overview of Prevvy. Prevvy is a connected-health ecosystem that was built using HL7 FHIR specifications. It is built to interface directly with any physician (or hospital) EMR system that has been certified as Meaningful Use Stage 2 (MU2) or later. The Prevvy system provides patients (and other individuals identified by the patient, e.g., other physicians, social care agencies, caregivers, relatives) access to their medical histories. Prevvy is cloud-based and when commercialized will be sold on a Software as a Service (SaaS) basis. Patients will be able to access their data 24/7 from any connected device.

Actions to Be Undertaken by the Parties. In furtherance of their participation in the Consumer Health Data Aggregator Challenge, and to support this Letter of Intent, the Parties agree to engage in the following actions, and to perform such actions as follows:

1. Healthcentrix will provide its Prevvy software solution (Prevvy) free of charge to medical group, and to physicians working with, for, or on behalf of organizations that are participating in the challenge for the duration of the project (such dates to be defined by and agreed to the Parties), provided that neither organization nor the physicians participating in the project do not bill for services that are based on use of the Prevvy platform, either directly or indirectly.
2. It is the goal of the Parties that physician and other users utilize Prevvy to bill for services, for example, to bill for services provided under the Medicare Chronic Care Management (CCM) Program. This provides a sustainable business model for Healthcentrix,

generates additional revenue for physicians, and results in better care and outcomes for patients. When services are billed under the CCM Program utilizing the Prevvy system (in whole or in part), the Parties, along with the physician participants and other users in the project, agree to pay to Healthcentrix the following:

- A one-time per patient setup fee of \$35
- A fee of \$6 per enrolled patient per month

If physicians or other users utilize Prevvy to bill for other services, the Parties will work together to determine the fees to be paid to Healthcentrix based on the reimbursement of that particular service.

2. Physicians participating in the challenge agree to work with Healthcentrix in completing the transmission of data between the physician EMR systems and Prevvy. To this end, physicians will direct their internal staff to establish secure transmission / exchange of credentials between the physician EMR system and Prevvy. The following table describes Organizations and EMRs systems will be integrated in this pilot jointly with Medicine On Call:

Organization	Role	EMRs (HISPs)	Interoperability
Medicine On Call Inc	Medical group	Care360 Carecloud (Updox) Aprima (Nitor) ADS (Updox) Chronos PracticeFusion (Updox)	Direct messaging, CDA
Baroma Health Partners ACO	ACO	Care360 PracticeFusion	Direct messaging, CDA
Tenet Hialeah Hospital, Inc	Hospital	Cerner	Direct messaging, CDA, Smart FHIR

5. Initial data feeds will utilize non-identifiable patient data, and testing will be done to confirm the proper ingestion of data into the Prevvy system.

6. Any patient identifiable data received by Healthcentrix will be stored in accordance with all applicable federal and state privacy regulations (specifically HIPAA). Medical Group, and its physicians will be responsible for obtaining any patient-specific required permissions, as organization or the participating physicians believe is necessary.

7. Once tests are completed, the Parties may mutually decide to expand the pilot to include PHI and patient access to the Prevvy system through their own individual accounts so that patients can view their medical records and any other information available to the patient on the Prevvy system (e.g., a Care Plan).

This document and Letter of Intent represents the entire Agreement between the Parties. By signing below, the Parties acknowledge their receipt and acceptance of the contents and terms

of this Letter of Intent. Each Party shall sign this Letter of Intent (below). Upon execution of the Letter of Intent, please return a copy to HealthCentrix, Inc. A fully executed Letter of Intent will be provided to all Parties.

MEDICINE ON CALL INC

Signed

JAVIER PEREZ, CEO

Name and Title

04/25/2015

Date**HEALTHCENTRIX, INC.**

Signed

JOSE MARIA OLMO, CEO

Name and Title

04/25/2015

Date