

Implementation Guide

Patient Outreach CodeExchange App

This guide is intended to provide an overview to Healthcare and Life Sciences organizations that are exploring the Patient Outreach CodeExchange App, of the intent of the application, how it works, and initial installation steps for getting the application deployed as a prototype into a private environment. Implementation steps can also be found in the app's [README file](#).

This app is intended for prototyping and testing purposes only. Not for use in production environments!

Application Overview

The Patient Outreach app packages together the core components of a deployable prototype for SMS-based outreach. This app aims to support healthcare providers, payors, and life sciences organizations that are interested in building their own outreach solution to understand what is possible using Twilio, and to accelerate the path to success by providing core building blocks and workflows for a working prototype.

This application is not intended to be a production-ready app, but rather will allow the installation of a functioning prototype into a test environment for exploration of how Twilio components and functions can be leveraged to meet various business needs.

With this blueprint, we aim to spotlight the flexibility and diverse applicability of an outreach solution built using Twilio by providing multiple examples of how we can help your organization make connections with patients through different engagement scenarios. To showcase how Twilio can support your needs whether you're a healthcare provider, payor or part of a life sciences organization, the Patient Outreach app bakes in three example use cases, each tailored to a unique point of view:

- **Healthcare Providers:** post-procedure outreach to patients, checking in on how they're feeling and on scheduling a follow-up appointment with a specialist
- **Healthcare Payors:** new member outreach, sharing information on available resources and engagement content
- **Life Sciences/Pharma:** outreach to potential research study participants, administering an eligibility questionnaire

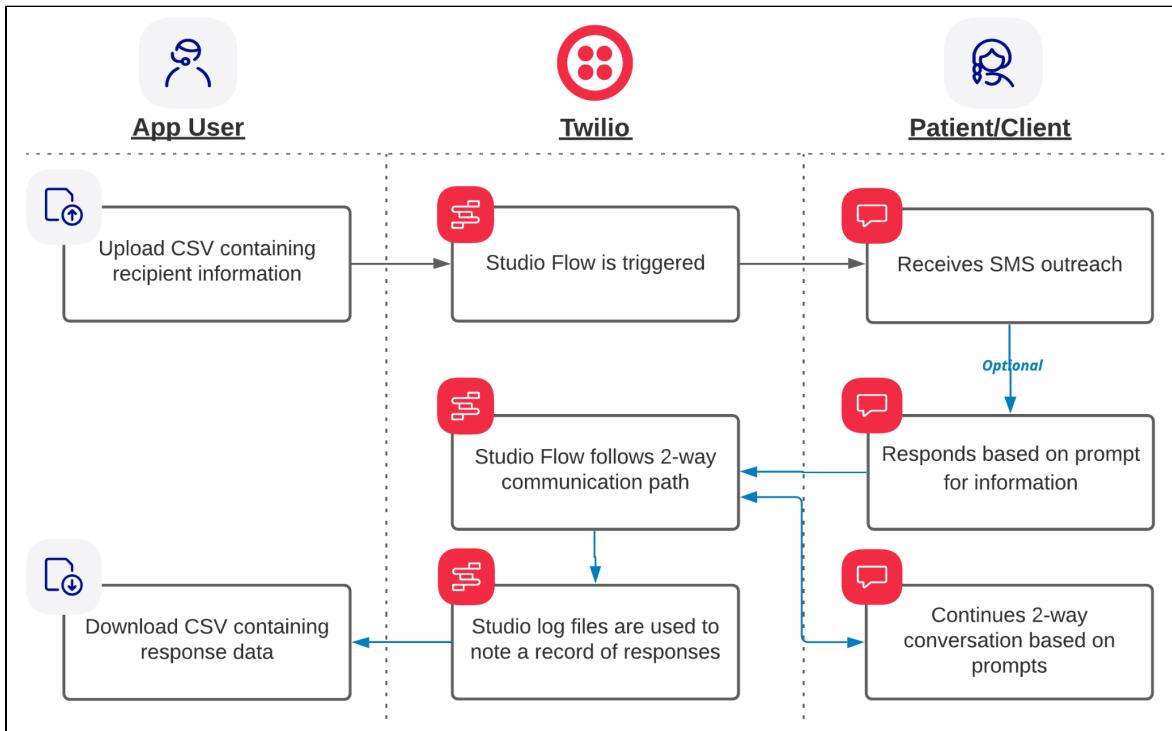
The architecture of the Patient Outreach app is aimed at getting you up and running as quickly as possible: there are no third party cloud-services requirements, SMS is the sole communication channel leveraged, and EHR integration is not a requirement for a fully-functioning app. Although we had simpler implementations in mind as we designed the blueprint's prototype application, the solution could be matured to fully integrate with your EHR or to leverage an omni-channel engagement approach.

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Customers with that are subject to the Health Insurance Portability and Accountability Act (HIPAA) and intend to utilize Twilio's products and services to develop communication workflows containing protected health information (PHI) must execute a Business Associate Addendum (BAA) to [Twilio's Terms of Service](#). Twilio considers HIPAA compliance as a shared responsibility between the customer and Twilio. To learn more about how to build a HIPAA compliant workflow using Twilio's offerings, please refer to our guide on [Architecting for HIPAA on Twilio](#).

The Patient Outreach application includes the necessary Twilio components, plus the ability to upload a CSV file to trigger the appropriate SMS outreach, pre-configured for the deployment of a working prototype for demonstration of the possibilities. Specifically, the application implements the following capabilities:



- The ability to deploy multiple flows to Twilio Studio, each highlighting an example scenario for healthcare providers, payors and research organizations (each deployed use case will have its own Studio [Flow](#))
- Ability to upload a CSV file containing the name and phone number of intended recipients, and to specify which of the three example use cases it should be applied towards
- 1 or 2-way, automated SMS exchange with the specified recipients (the included example use cases highlight a mix of 1-way and 2-way exchanges, depending on the scenario)
- Ability to download a CSV file containing all recipients' responses (in the 2-way exchange scenarios)

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Architecture Highlights

This section provides an overview of the application's architecture, including a discussion of the baked-in Twilio components (which orchestrate the automated SMS conversation with the recipient), how the CSV file is used to trigger the appropriate messages, and a Reference Architecture.

Application Components

The application's architecture consists of Twilio components, plus file upload functionality used to specify recipient details. Although the application can be modified to incorporate more complex integrations or capabilities, this prototype solution has intentionally been designed with project simplicity in mind and does not require complex 3rd party components (like cloud service provider capabilities) or integration with an electronic health record in order to function.

Twilio Studio implements the SMS outreach flow to the recipient by taking configured parameters (from the uploaded CSV file and from your preferred message details configured in the Studio Flow) and sending appropriate messages.

In order to highlight the flexible nature of an outreach solution, the application includes three distinct use-case examples, each driven by a unique Studio Flow. You can inspect (and manipulate) these Flows in your Twilio Console after successful application deployment.

Twilio Functions are used to execute the SMS flow for each recipient and to collect the outreach responses for download.

CSV upload is available on the application page and is used as the primary data source specifying the recipient details (first name and phone number). The application page will allow you to choose the use-case example you would like your specific CSV file to apply to.

By having the Twilio Studio flow trigger from a CSV upload (versus an event from an integrated EHR, for example), this application reduces the required implementation complexity and allows for simple and fast enablement that can meet the needs of projects that do not necessitate a more complex integration. We imagine that in many of your production scenarios the contents of the file will come from some source repository (like a CRM system or EHR) filtered down to meet the specific needs of the particular outreach scenario, and exported. There are many ways in which you can manipulate this application to fit your specific project needs, including the type of source data that is used to trigger the Twilio workflow.

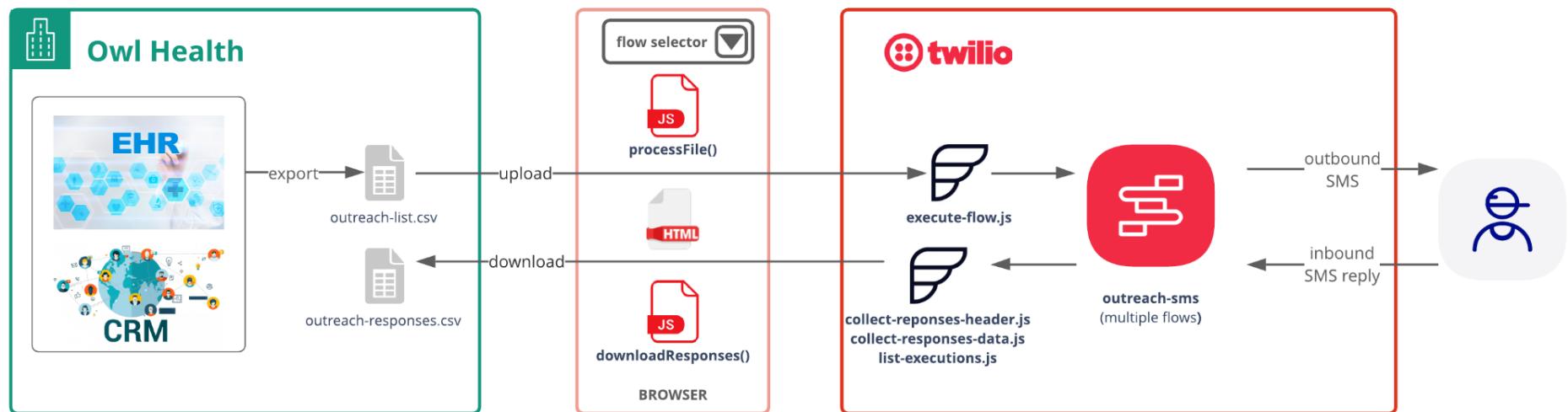
CSV Download is also available on the application page and can be used to review and take any necessary next steps on recipient responses (e.g. to call patients that requested a follow-up discussion about their pain level).

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Reference Architecture

The Reference Architecture diagram below shows a more detailed description of the process and data flow between the application components.



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Installation and Testing

This section details the requirements for a successful deployment and installation of the prototype application, including the necessary prerequisite requirements, and the installation and configuration steps.

This app is intended for prototyping and testing purposes only. Not for use in production environments!

This CodeExchange App is not a generally available product and should not be fully deployed in a production environment. The CodeExchange App (including all code and related documentation) is provided “AS IS.” Twilio disclaims all express or implied warranties of any kind with respect to the CodeExchange App, including but not limited to any implied warranties of merchantability or fitness for a particular purpose. Twilio shall have no liability or obligation to you or any other individual or entity for any damages of any kind or nature whatsoever arising out of or relating to the use of or inability to use the CodeExchange App, including but not limited to any direct, indirect, incidental, consequential, or special damages, even if Twilio has been advised of the possibility of such damages. Twilio has no obligation to support or maintain the CodeExchange App. Use of the CodeExchange App is subject to all of the terms and conditions of the applicable [license agreement](#).

Prerequisites

The following prerequisites must be satisfied prior to installing the application:

1. **Provision Twilio Assets** - you will need the following Twilio resources ready prior to installation:
 - **Twilio account**
 - Create a Twilio account by signing up [here](#)
 - Once the Twilio account is created, please note the “ACCOUNT SID” and “AUTH TOKEN” from the [Twilio Console](#) for use below
 - If you have multiple Twilio accounts, make sure that you are logged into the account where you want the application to be deployed
 - **Twilio phone number**
 - After provisioning your Twilio account, you will need to [purchase a phone number](#) to use in the application
 - Make sure the phone number is SMS enabled
 - (*This will be the phone number patients receive texts from*)

***Note:** authentication is required in order to complete deployment via the application page, which will generate a nominal SMS charge to your connected Twilio account. Each authentication SMS sent will cost \$0.0075, plus an additional \$0.05 per successful authentication (multi-factor authentication leverages [Twilio Verify](#)). See [Twilio SMS pricing](#) and [Twilio Verify pricing](#) for more information).

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2. **Ensure unique application name** - in order to deploy correctly, it is important that you **do not** have an existing Twilio Functions Service called '**hls-outreach-sms**'. If you do, you will need to delete (or appropriately update the existing name of) the existing functions service to ensure a conflict doesn't occur during installation (you can delete the existing Functions service via executing `make delete` in the application directory `hls-outreach-sms` using a terminal or a command prompt).
3. **Install Twilio CLI and Serverless Toolkit** - the Twilio CLI and Serverless Toolkit will allow you to deploy the Twilio functions/service needed for the application. The Twilio CLI allows you to manage your Twilio resources from your terminal or command prompt. The Serverless Toolkit is CLI tooling to help you develop locally and deploy to Twilio Runtime.
 - [Install Twilio CLI](#)
 - [Install Twilio Serverless Toolkit](#)
4. **Install Make Command** - we provide a '[Makefile](#)' to facilitate easier installation. Check if you have 'make' installed by executing `make --version` and examining the output. If 'make' is not installed, please install it. On Mac computers, you can execute `xcode-select --install` to install.
 - [Install Make](#)
5. **Install GitHub CLI** - GitHub CLI will be used during installation to pull necessary GitHub project components to your machine so that you can install the project.
 - [Install GitHub CLI](#)

Installation Steps

***Note:** Installation of this application is supported on the latest versions of Chrome, Firefox, and Safari. Installation via Internet Explorer has not been officially tested and although issues are not expected, unforeseen problems may occur

Installation of the Patient Outreach application should be completed through Terminal. We provide a 'Makefile' to simplify the deployment and management of the application. Your Twilio account credentials (ACCOUNT_SID and AUTH_TOKEN) are required to properly access Twilio resources on your behalf. While the credentials can be re-entered every time you execute the Makefile, you can also avoid re-entering the credentials by saving them as environment variables by executing the following with your Twilio credentials:

```
export ACCOUNT_SID=your-twilio-account-sid  
export AUTH_TOKEN=your-twilio-auth-token
```

1. **Ensure completed prerequisites** - ensure that you have completed all prerequisite steps listed above
2. **Clone the GitHub project** - in Terminal, cd to the directory where you would like to download the application. Clone the application from Twilio GitHub by running the following command:
`git clone https://github.com/twilio/hls-outreach-sms.git`
 - **Note:** The Patient Outreach app will deploy as 'hls-outreach-sms'

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3. **Navigate to the app** - change directory to the application directory by `cd hls-outreach-sms`
4. **Configure the application variables**- to configure the app, execute `make configure`. You'll be asked to enter the following configuration parameters. Alternatively, you can directly edit the .env file found in the application directory.
 - o **CUSTOMER_NAME** - set the customer name of your choice; will be used as the name of the Twilio Verify service that is created automatically
 - o **TWILIO_PHONE_NUMBER** - set the phone number you purchased in the prerequisite steps; format as +1xxxxxxxxxx; this will be used as the SMS sender phone number and also used to receive inbound SMS
 - o **APPLICATION_PASSWORD** - set the application password of your choice; this will be used for MFA in the application page to protect the application from unauthorized access
 - o **ADMINISTRATOR_PHONE** - set the phone number that should be used to receive MFA verification for access application
5. **Deploy Twilio Functions service via Serverless** - to deploy the app's functions and assets, run `make deploy`
 - o After successful deployment, you should now see the 'hls-outreach-sms' functions service in your Twilio Console under Functions.
6. **Navigate to the application page** - in order to complete app setup, navigate to the application's page. You can find your unique app page URL in the list of Assets created during application deployment in Terminal (look for the URL that ends in `index.html`)
7. **Access the application** - from the application page, you will be prompted to enter your application password prior to further setup and validation of successful deployment. This is the APPLICATION_PASSWORD which you set in step 4 above. When you enter the correct password, a verification message with a code will be sent to the number configured as the ADMINISTRATOR_PHONE (set in step 4 above). Enter the code into the prompt and you will be authenticated successfully.
 - o If you refresh the application page at any point in the following steps you will need to re-authenticate your application password in order to proceed.
 - o In order to ensure authorized access to the application (the app's multi-factor authentication uses [Twilio Verify](#)).
 - o Authentication will generate a nominal SMS charge to your connected Twilio account. Each authentication SMS sent will cost \$0.0075, plus an additional \$0.05 per successful authentication. See [Twilio SMS pricing](#) and [Twilio Verify pricing](#) for more information).

The image shows a screenshot of a web-based application interface. At the top, there is a text input field with the label "Password:" followed by five dots. Below this is a purple rectangular button with the white text "AUTHENTICATE". The entire form is contained within a thin black border.

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Your password was accepted. For additional security, please enter the security code we sent to your phone.

VERIFY SECURITY CODE

✓ Authenticated successfully

8. **Deploy Studio Flow(s)** - from the application page, choose from the “Selected Studio Flow” dropdown the studio flow example that best matches your use case and select “Deploy Studio Flow”
 - You can deploy and test multiple flows if you would like; as you switch the selected Studio Flow, the page will let you know whether or not the selected flow has been deployed

Selected Studio Flow: Outreach-Provider ▾

Your Studio Flow is not yet deployed

DEPLOY STUDIO FLOW

✓ Your Studio Flow is deployed

OPEN STUDIO FLOW

Congratulations! At this point you have successfully completed the installation of the Patient Outreach application. From here you can either continue on to the next step of testing, or deploy additional Studio Flow(s) to try out the other example use cases as well.

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Application Testing

As mentioned in the [Application Components](#) section of this doc, the app's architecture includes file upload functionality which can be used to specify recipient details. You will find a sample csv file in your application's assets folder which can be modified to input your own test parameters and uploaded to the application page.

1. **Create your own recipient csv file** - using Excel or some other text editor, modify the included sample.csv file (or create a copy), edit the provided fields to the values you want to use for your recipient details, and save.
 - *patient_id* - must be a unique number of your choosing
 - *patient_first_name* - will be used in the text message as the recipient's name
 - *patient_phone* - the phone number of the recipient that will receive the outreach

	A	B	C
1	patient_id	patient_first_name	patient_phone
2	1000	Peter	(440) 644-3709
3	1001	Mary	(314) 794-5569
4	1002	Damarea	(314) 804-2141
5	1003	Christine	(615) 709-6400
6	1004	Chris	(314) 804-0607
7	1005	Ezekiel	(314) 804-1042
8	1006	Alan	(615) 709-5123
9	1007	Keke	(314) 804-1566
10	1008	Ben	(314) 804-0312
11	1009	Tara	(314) 804-1902
12	1010	Shannon	(615) 709-6052
13	1011	Wyatt	(314) 794-5364
14	1012	Dominique	(314) 804-0981

Other important notes:

- The columns and order within the sample.csv file are important. Do not remove, add or rename the existing columns
- Phone numbers should be formatted as [E.164, per best practices](#)
- Make sure the text editor you are using is not replacing the commas for some other delimiter

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2. **Upload your recipient csv file** - from the application page, with the appropriate Studio Flow selected (the scenario you want to test), select the csv file you created or modified in the previous step and then select “Upload and Process File”. This will trigger the SMS outreach.
 - o If you want to test more than one scenario/flow, you will need to refresh your application page in between each file upload and process (even if you’re using the same file to test multiple flows)

Selected Studio Flow: Outreach-Provider ▾

SELECT CSV FILE TO UPLOAD

selected file: test.csv (68 bytes)

UPLOAD & PROCESS FILE

3. **Download outreach responses** - (for the two-way outreach use-case examples) once the SMS exchange is complete, you can download all recipient responses (as a CSV) from the application page

Download

DOWNLOAD RESPONSES

Application Customization

From here you can adjust and manipulate the app to meet your own specific business needs! Remember, this is a prototype app only and not meant to be used in a production environment.

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CHANGE LOG

11/01/2021	Minor wording adjustments
10/27/2021	First Release: Patient Outreach_Implementation Guide

Twilio powers the future of business communications, enabling phones, VoIP, and messaging to be embedded into web, desktop, and mobile software. We take care of the messy telecom hardware and expose a globally available cloud API that developers can interact with to build intelligent and complex communications systems.