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# SMART Apps with MPages Integration

CHC code Learning Lab 2019

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# Agenda

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# MPages Overview

- MPages provides a consolidated view of information contained throughout the electronic medical record and is accessible from within *PowerChart*, *FirstNet*, and *SurgiNet*.

The image displays three separate windows of the MPages interface:

- Allergies (11)**: Shows a list of allergies with columns for Substance, Severity, Reactions, Category, Status, Reaction Type, Source, and Comments. A note indicates "Outside Records. Allergies reconciliation has not been completed for this encounter." An "Add allergy" button and a search bar are at the top.
- Problems**: Shows a list of problems with medication reconciliation notes. Examples include acetaminophen, acyclovir, albuterol, amLODipine-atorvastatin, and Rxc:amLODipine-atorvastatin. A "Medication Reconciliation" section is visible on the right.
- Labs**: Shows a list of laboratory results grouped by category: Primary Labs (10), Chemistry (17), and Histories. Results include Creatinine, WBC, Calcium, Glucose, Hct, Hgb, Hgb A1c, Platelet, Potassium, Sodium, and CO2 levels, along with various clinical parameters like blood glucose and vital signs.

## MPages Workflow

## MPages Summary

# MPages Features

- *MPages provides the following features:*
  - Interactive, visually rich views of real-time clinical information
  - A standard library of components that are included as part of many Cerner Millennium solutions' licenses and are available to configure and organize into localized views and viewpoints
  - Supports both multi- and single-patient views and can be set up to meet the varied needs of specific roles, venues, and conditions at your location
  - An MPages Development Toolkit is available for an additional license which allows you to develop your own content for use in customized components and views

# MPages Features (Continued)

- ***MPages improves clinicians' efficiency and satisfaction in the following ways:***
- The information a clinician needs to understand the patient's story is available in a single view, providing important context that can otherwise be missed when having to navigate to various portions of the electronic medical record
- Many of the actions a clinician must take to deliver care may be initiated directly from the view, decreasing clicks and reducing navigation barriers
- Clinicians can personalize their views so they are presented with the information at the point they need it during their natural workflow

# SMART Apps with MPages Integration Overview

- Securely embed SMART apps in any Workflow/Summary MPages component
- Leverage Cerner open source cross frame container [xfc library](#)
- Leverage Cerner Embedded Server (cloud hosted)
- Require [cerner-smart-embeddable-lib](#) open source lib for host whitelisting, and initialization

# Benefits

- Embed an (existing) SMART app into an existing clinicians' MPages workflow
- Cloud deployment model, easy to update existing SMART apps
- SMART apps, and native MPages components share the same view
- Use same tooling as native MPages components for configuration

# Examples

PETERS, TIMOTHY  
PCP:Schneider, Chuck  
Allergies: Acetaminophen, Caffeine, Nutraderm 30, peni... Phone:(816) 822-9122  
IQHealth: No  
Age:58 years

DOB:4/30/1961  
Wt:55 kg  
Sex:Male

Pref. Labs/Diagnostics:  
MRN:10000883  
Inpatient FIN: 20001720 [Admit Dt: <No - Inpatient admit date>] Loc: 1S, Baseline West

Menu

SMART in MPage

[Full screen](#) [Print](#) [6 minutes ago](#)

MPages View

MPages View

MPages View

MPages View

MPages View



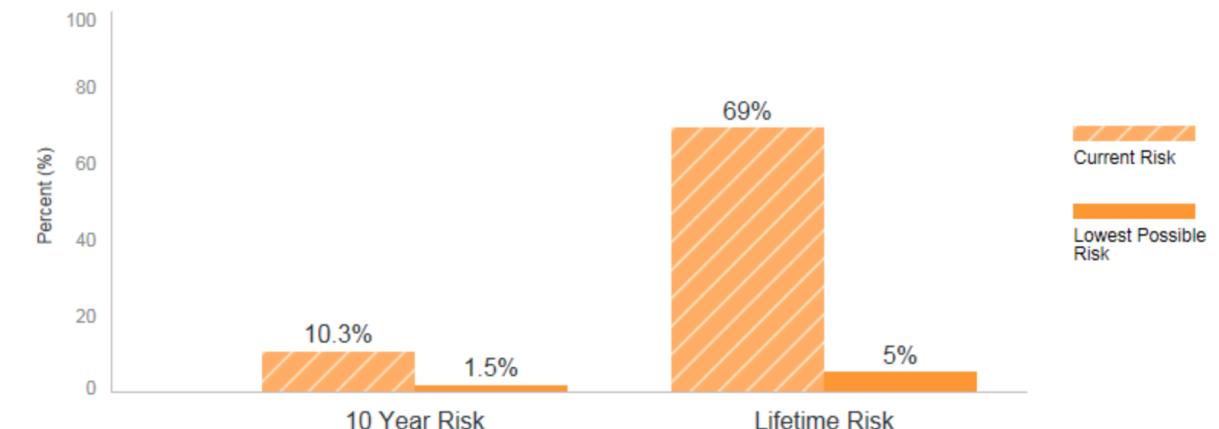
## ASCVD Risk App



## ASCVD Risk Calculator

[Results](#) [Risk Factors](#) [Recommendations](#)

## Chance of heart attack or stroke



Simulated 10 Year Risk

SMART in MPage

Full screen Print 9 minutes ago

MPages View MPages View MPages View MPages View

### SMART ASCVD Risk App

#### ASCVD Risk Calculator

Results Risk Factors Recommendations

#### Chance of heart attack or stroke

Risk Type	Current Risk (%)	Lowest Possible Risk (%)	Total (%)
10 Year Risk	10.3%	1.5%	11.8%
Lifetime Risk	69%	5%	74%

#### Simulated 10 Year Risk

Current Risk

### SMART App Validator

#### SMART App Validator

Tenant : 0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca

Resources Version Supported : [DSTU2](#)

#### Browser Info

- ✓ Browser: {"msie":true,"version":"7.0"}
- ✓ User Agent: mozilla/4.0 (compatible; msie 7.0; windows nt 6.1; wow64; trident/7.0; slcc2; .net clr 2.0.50727; .net clr 3.5.30729; .net clr 3.0.30729; .net4.0c; .net4.0e)

#### Health Checks

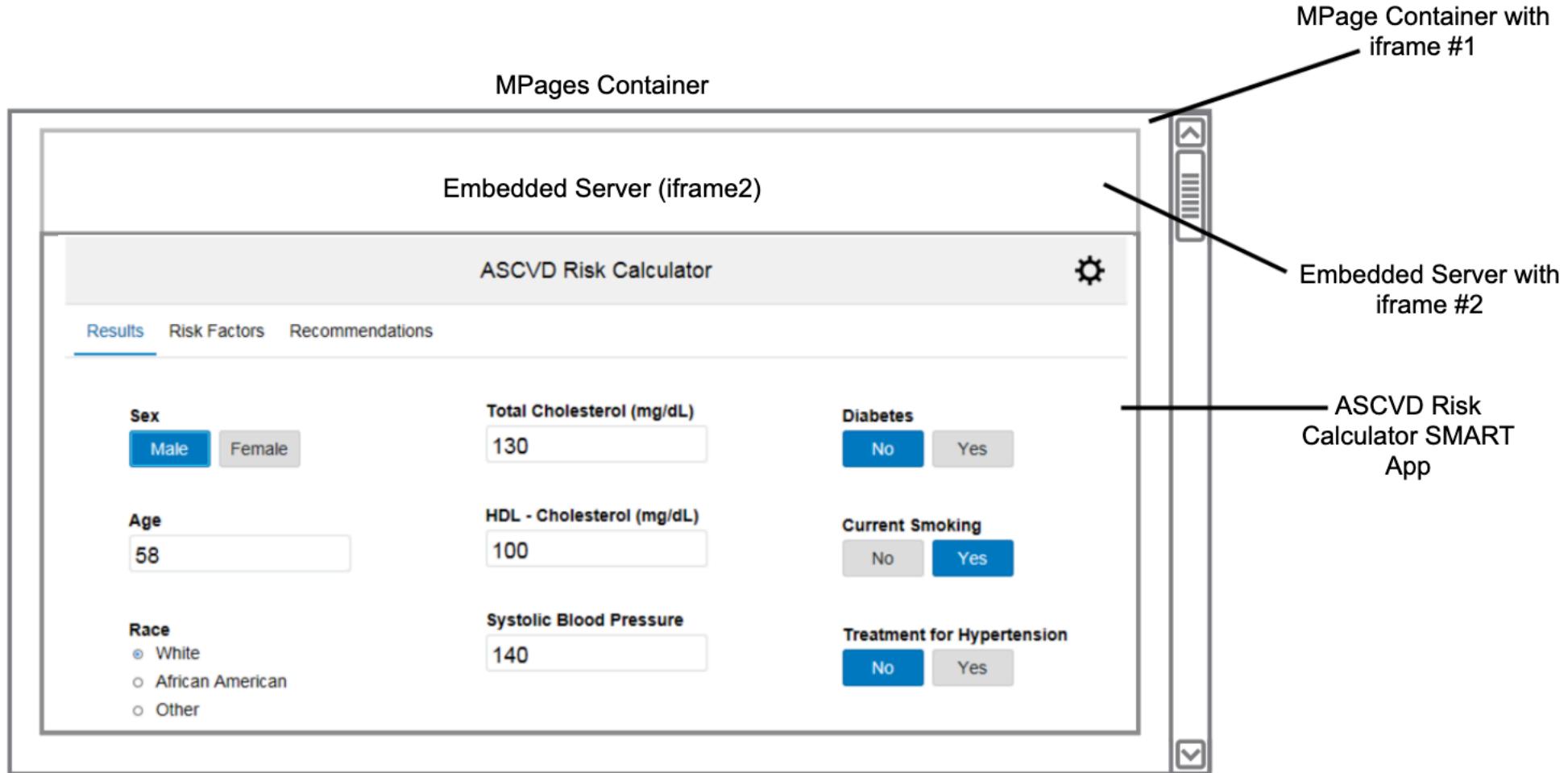
- ✓ SMART App Service Health Check: success - 200
- ✓ Authorization (OAuth2): success - 200
- ✓ FHIR Service Health Check: success - 200

#### Resources

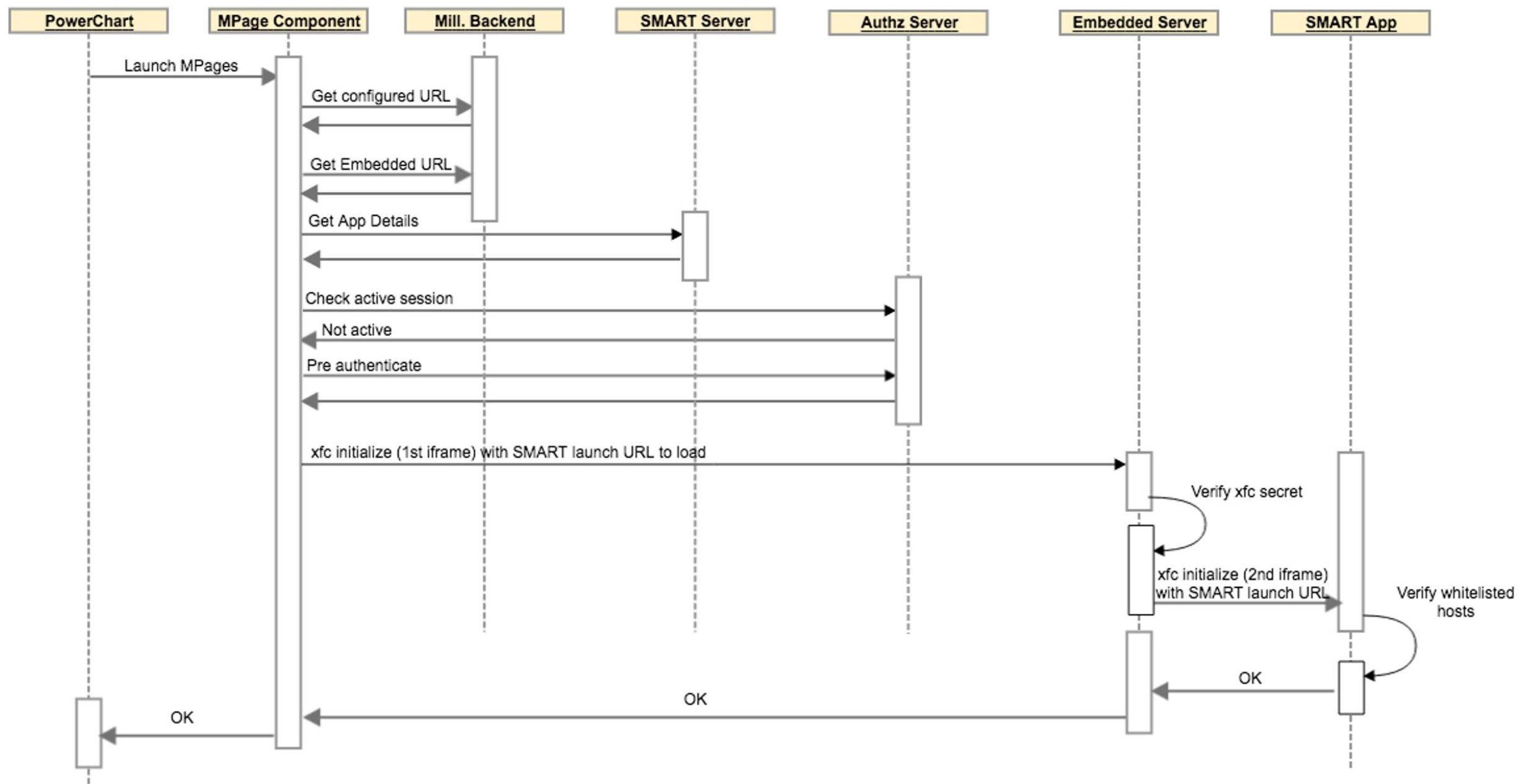
Expand All

- ✓ Conformance: success - 200 [Show/Hide details](#) [Copy](#)
- ✓ Patient: success - 200 - Result count: 1 [Show/Hide details](#) [Copy](#)
- ✓ Observation: success - 200 - Result count: 61 [Show/Hide details](#) [Copy](#)
- ✓ Observation-laboratory: success - 200 - Result count: 48 [Show/Hide details](#) [Copy](#)
- ✓ Observation-vital-signs: success - 200 - Result count: 40 [Show/Hide details](#) [Copy](#)

# iFrames Diagram



## SMART apps in MPages Sequence Diagram



# Embedded Server

- It acts as a middleman between MPages and the SMART app
- Allow for easy configuration of any apps using cerner-smart-embeddable-lib and URLs whitelisting
- Consumes cross frame container (xfc) library
- It's a content provider and a consumer
  - Uses secret for authentication between MPage and Embedded Server
  - Uses URL whitelisting between Embedded Server and SMART app

# cerner-smart-embeddable-lib

- JavaScript library to allow SMART apps to be embeddable in Cerner's MPages Workflow/Summary view
- Wrapper project, leverages cross frame container (xfc) library to prevent Clickjacking (UI redress) attack
- Contains whitelisted Embedded Server hosts
- Iframe resizer event listener/trigger to resize app to full size
  - Listens for changes in app and trigger an event to the Embedded Server

# Example Page Setup

```
<!DOCTYPE html>

<html lang="en" hidden>

  <head>

    <meta http-equiv="X-UA-Compatible" content="IE=edge" />

    <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />

    <title>Example SMART Application</title>

    <link rel='stylesheet' type='text/css' href='cerner-smart-embeddable-lib-1.2.0.min.css'>

  </head>

  <body>

    <!-- app's code here -->

    <script src='path/to/babel-polyfill.js'></script>
    <script src='cerner-smart-embeddable-lib-1.2.0.min.js'></script>

    <!-- Optional. Override when the default height calculation does not fit your need. -->
    <script src='path/to/override-height-calculation.js'></script>

  </body>

</html>
```

# Dependencies

- [\*\*babel-polyfill\*\*](#)
  - Max of 1 instance

OR

- [es6-shim](#) polyfill
- Array [includes\(\)](#) polyfill

# Frequent Issues

- Application code not compatible with IE 10
  - MPages renders using IE10 compatibility document mode
- X-Frame-Options header is still set
  - This header cannot be set
- Content-Security-Policy (CSP) frame-ancestors is set
  - This header cannot be set
- 3<sup>rd</sup> party cookies not accepted by the browser in iframe for IE
  - Make sure that P3P header is set

# Frequently Asked Questions

- **What happen when my app is not framed but has the library included?**
  - App should work like normal launch flow
- **Do I need to include the JavaScript/css files in all of the pages?**
  - Yes
- **What happen when another site frame my app without the required library?**
  - App will be hidden to prevent [Clickjacking](#) (UI redress) attack
- **What happen when Cerner MPages frame my app?**
  - App only displays when all required dependencies are included, and the whitelisted hosts matched the Cerner Embedded Servers
- **Why is my app showing a blank screen?**
  - Multiple reasons:
    - Is X-Frame-Options header still set?
    - Is the app server capable of accepting large URI string?
    - Is the app server logs providing any clue for troubleshooting?

# Troubleshooting Tools

- Microsoft Modern.IE VMs with various Internet Explorer versions
- Blackbird console in MPages. Bring up the console with:
  - Mac: CMD + \
  - Windows: CTRL + \
- IEChooser – full console for debugging (available in Windows Server 2016 and later)
- F-Twelve – Cerner open source JavaScript console
  - Demo @ <https://engineering.cerner.com/f-twelve/demo/>
  - Currently F-Twelve is not working when included in a SMART app that is embedded in MPages.

# Support Resources

Documentation: <https://fhir.cerner.com>

Google Groups: <https://bit.ly/cerner-smart-on-fhir-developers>

uCern Community: <https://bit.ly/ignite-apis-community>

GitHub: <https://github.com/cerner>

# References

- [Configure the Workflow/Summary SMART component](#)
- [Configure Component or Column Settings for MPages Views](#)
- [Configure MPages Views](#)
- [Cerner SMART Embeddable Library](#)

# Demo

# Q & A

# Thanks!