

StayHome

A FHIR-Native Mobile
COVID-19 Symptom Tracker and
Public Health Reporting Tool

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UNIVERSITY *of* WASHINGTON



Hannah Burkhardt is a **3rd year Ph.D. student** in Biomedical and Health Informatics at the University of Washington, Seattle. A former software engineer, she is interested in standards-based technologies for **health data interoperability** as well as **data science and machine learning** for **mental health informatics**. Her current research with CIRG focuses on the use of FHIR for patient reported outcomes.

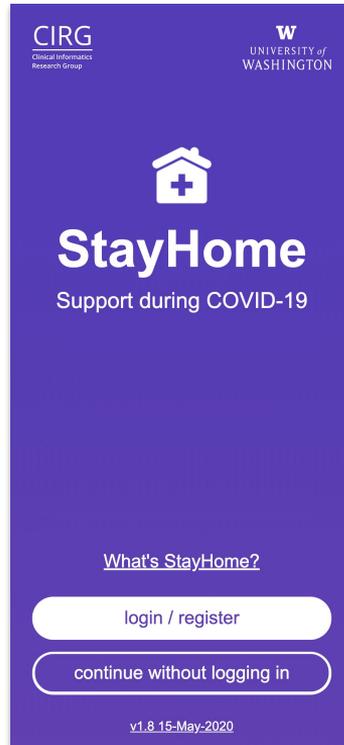


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A **reusable, mobile-friendly, FHIR-native** consumer health application for collecting *patient-reported outcomes (PROs)* and experiences to support the need for COVID-19 symptom self-monitoring and *data sharing with appropriate public health agencies*.



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StayHome

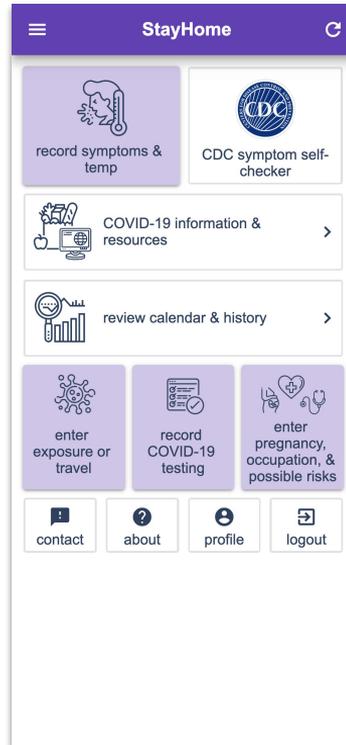
Support during COVID-19

[What's StayHome?](#)

login / register

continue without logging in

v1.8.15-May-2020



StayHome

record symptoms & temp

CDC symptom self-checker

COVID-19 information & resources

review calendar & history

enter exposure or travel

record COVID-19 testing

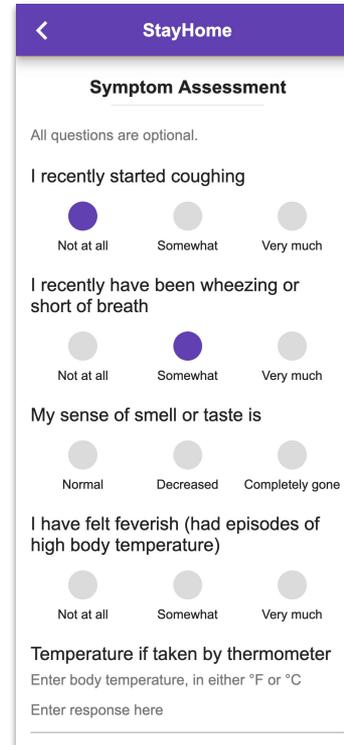
enter pregnancy, occupation, & possible risks

contact

about

profile

logout



StayHome

Symptom Assessment

All questions are optional.

I recently started coughing

Not at all Somewhat Very much

I recently have been wheezing or short of breath

Not at all Somewhat Very much

My sense of smell or taste is

Normal Decreased Completely gone

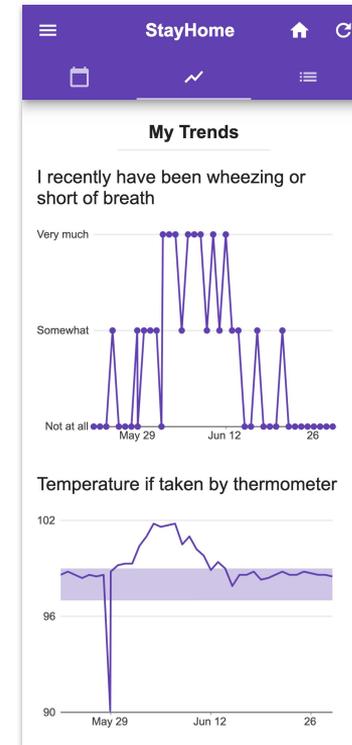
I have felt feverish (had episodes of high body temperature)

Not at all Somewhat Very much

Temperature if taken by thermometer

Enter body temperature, in either °F or °C

Enter response here



StayHome

My Trends

I recently have been wheezing or short of breath

Very much

Somewhat

Not at all

May 29 Jun 12 26

Temperature if taken by thermometer

102

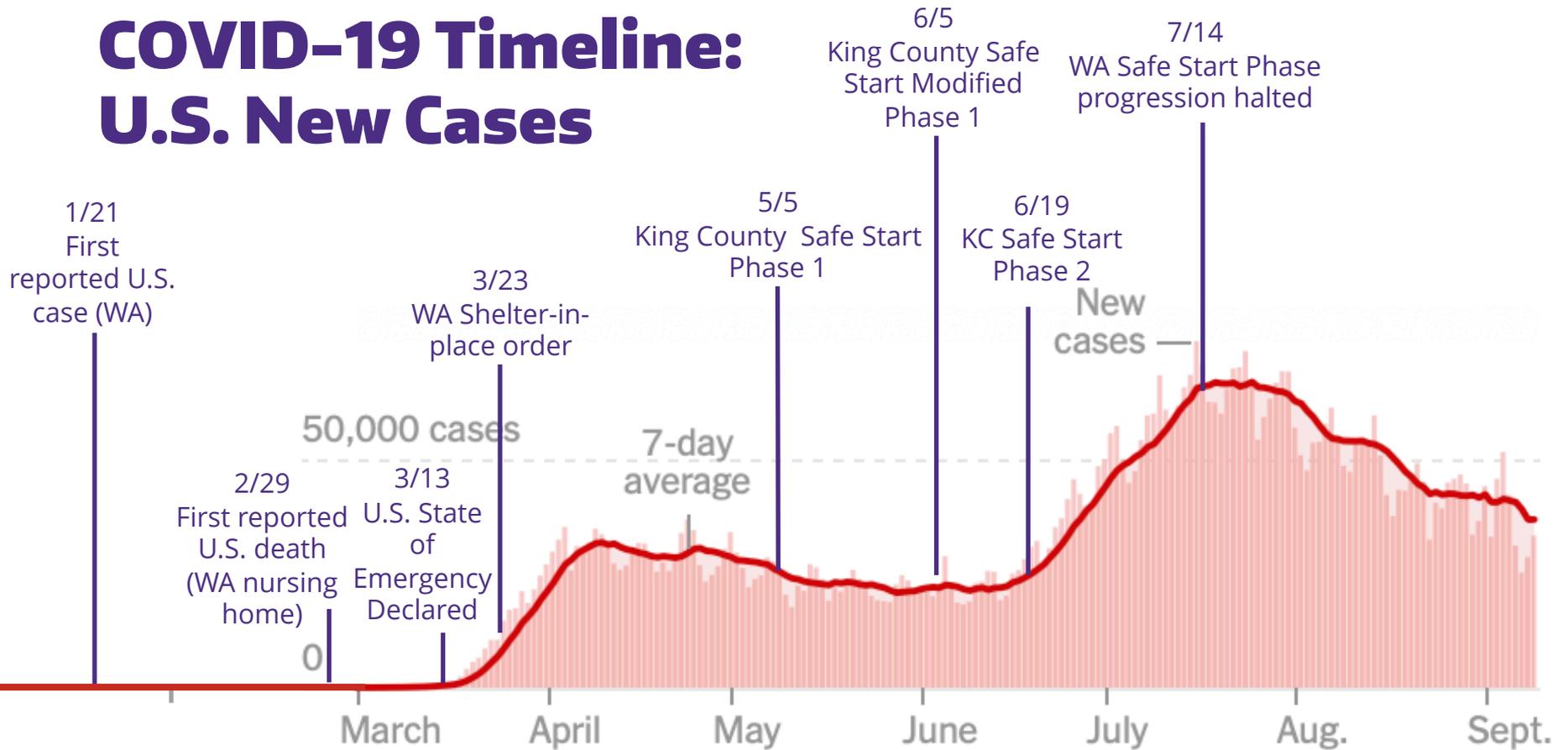
96

90

May 29 Jun 12 26

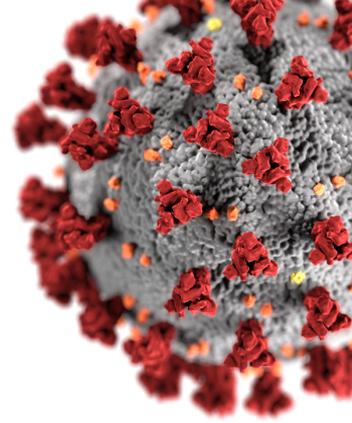


COVID-19 Timeline: U.S. New Cases



>190,000 deaths in the U.S.

The challenge: **Flatten the curve**



- > safe behaviors: wash hands, wear masks, and **monitor for symptoms**
- > widespread testing
- > contact tracing
 - manual, labor-intensive process; workforce is stretched thin!

How to help?

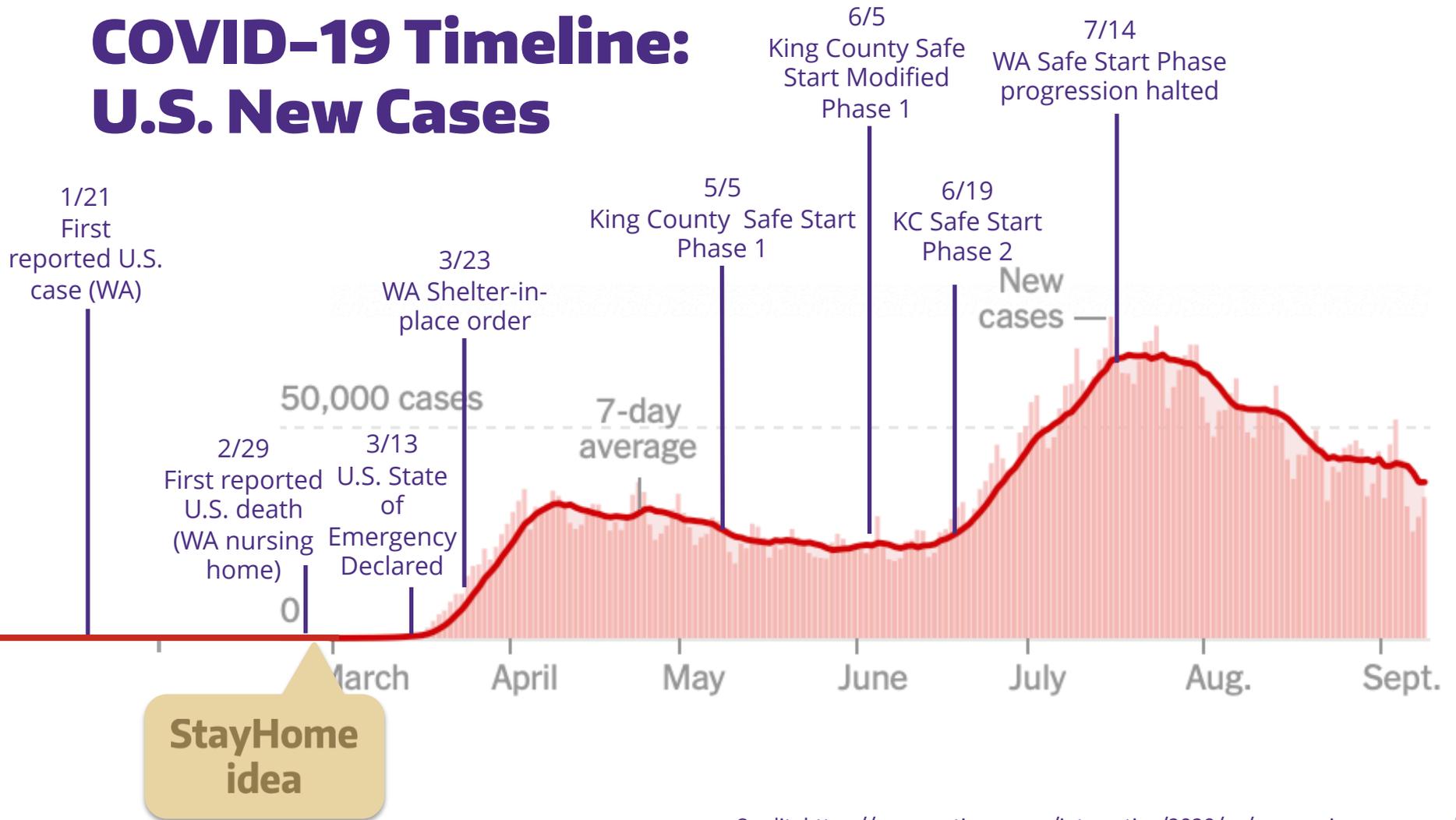
- > A diary to record symptoms, risk factors, possible exposures as **patient-reported outcomes** (PROs)
- > simple, easy to use, and accessible to everyone
- > Allow users to directly and easily share data to **support public health processes**



**Informatics intervention idea:
Mobile PROs on FHIR**



COVID-19 Timeline: U.S. New Cases



Design

- > Undergraduate students:
 - “Should I wear a mask?”
 - “How do I know if I have the virus?”
 - “How do I protect myself?”
 - “I take my temperature daily”





Development



HAPI FHIR



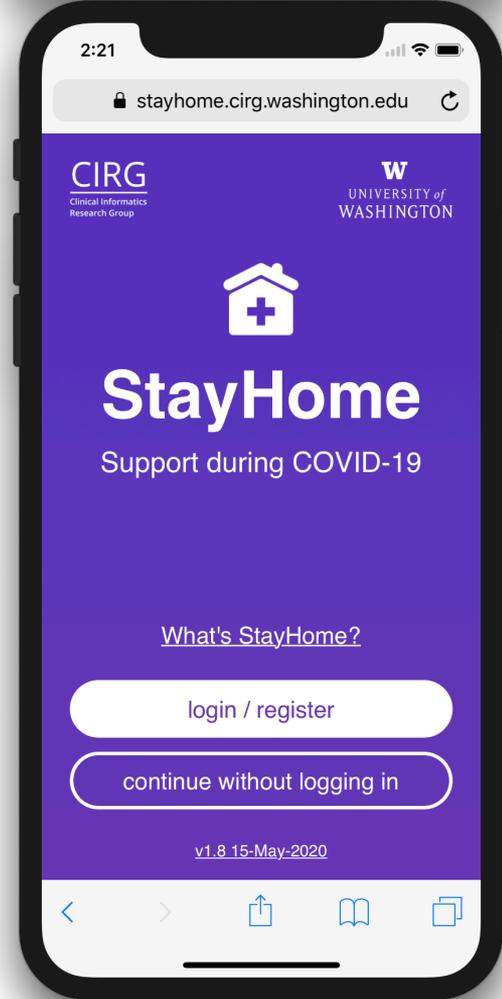
Mobile



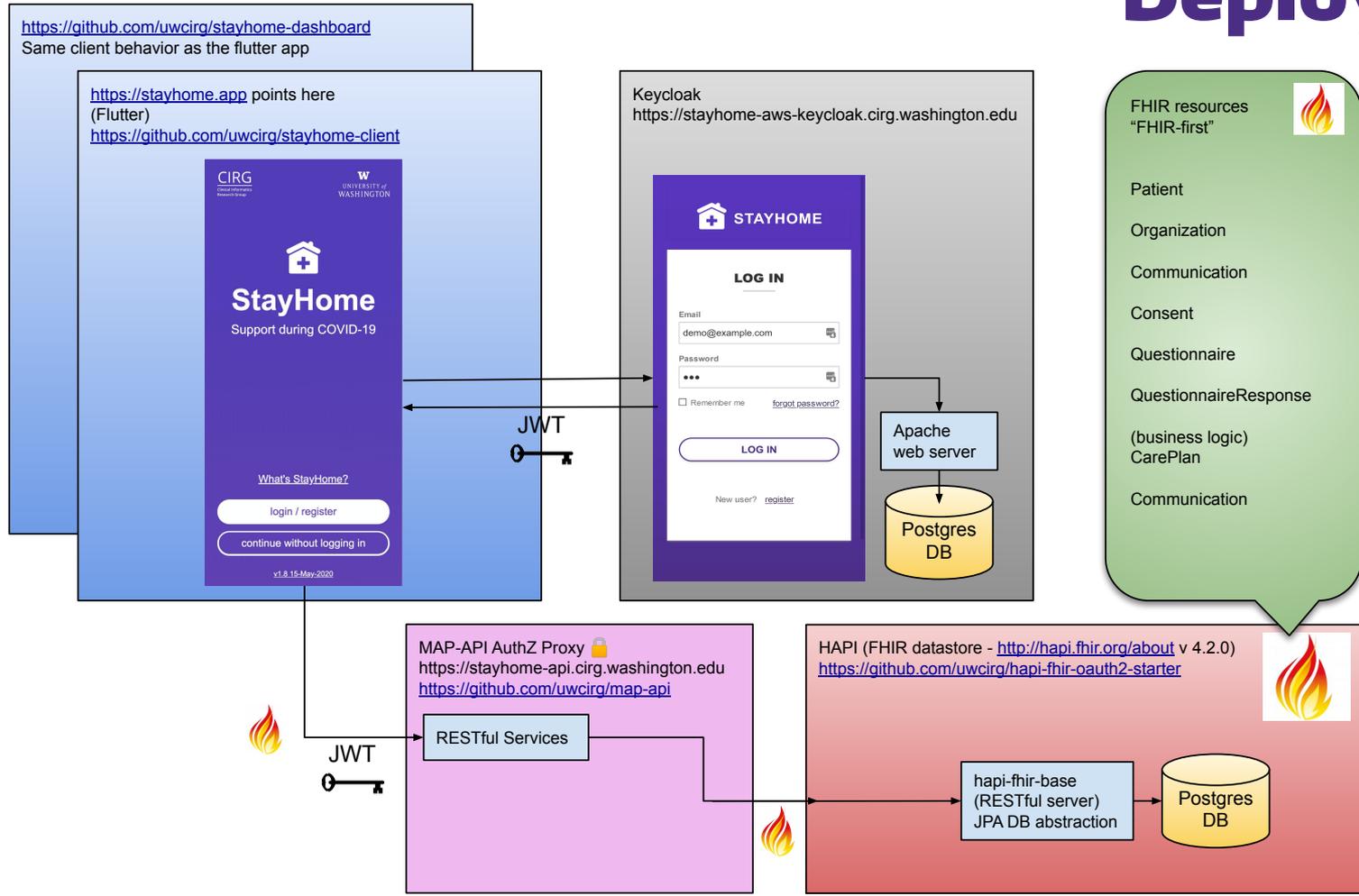
Web



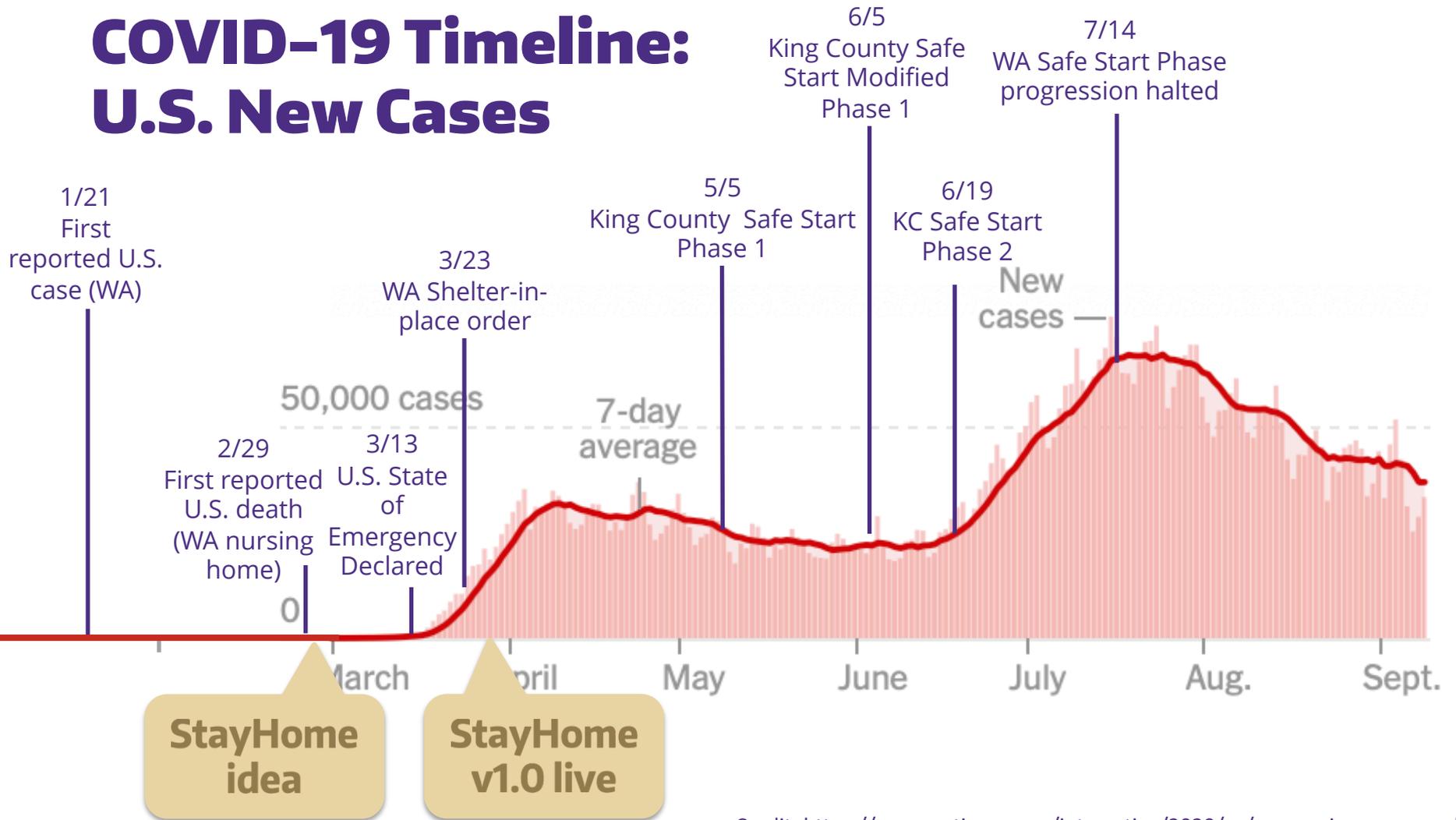
Desktop



Deployment



COVID-19 Timeline: U.S. New Cases



Project and code availability



StayHome went live on March 27, 2020 and is available to the public at
<https://stayhome.app>



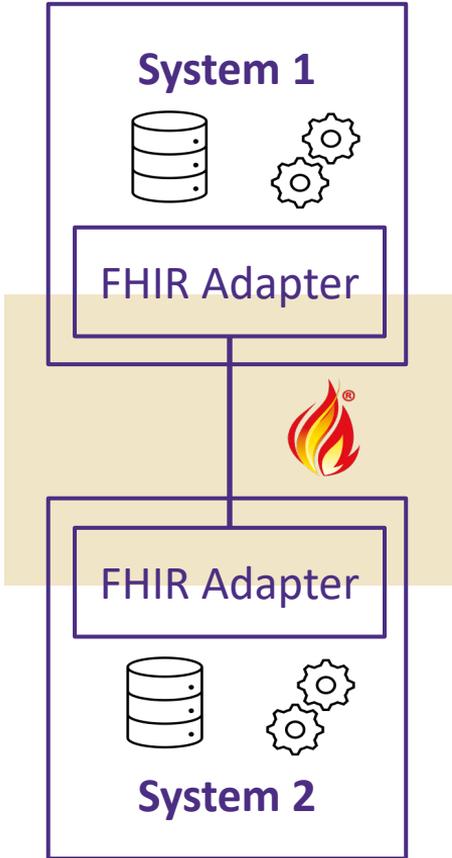
Project info is available at
<https://project.stayhome.app>



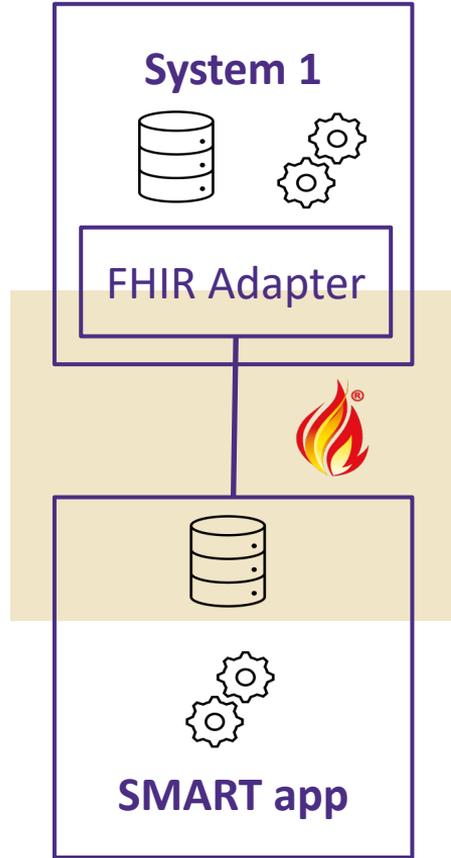
Find all StayHome code and resources at
<https://github.com/uwcirg/stayhome-project>

 **HL7[®] FHIR[®] &  StayHome:**
The FHIR-Native approach

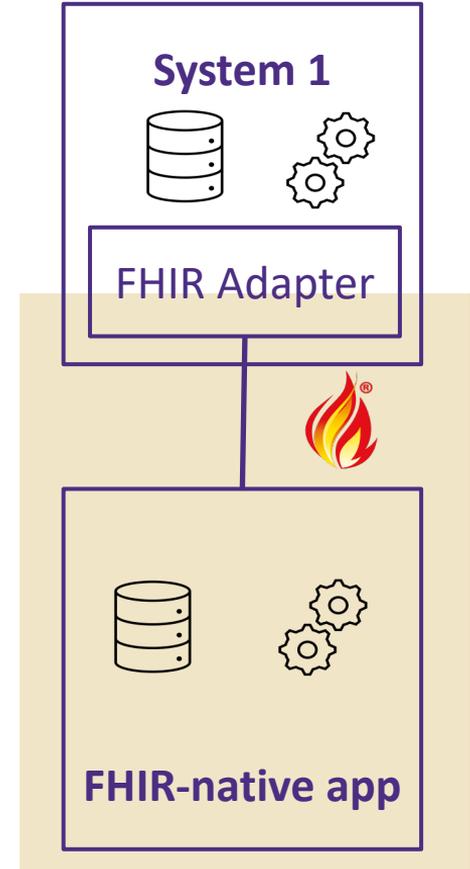
FHIR for health data exchange (messaging/interface only)



Purpose-built SMART on FHIR apps



Reusable, FHIR-native app

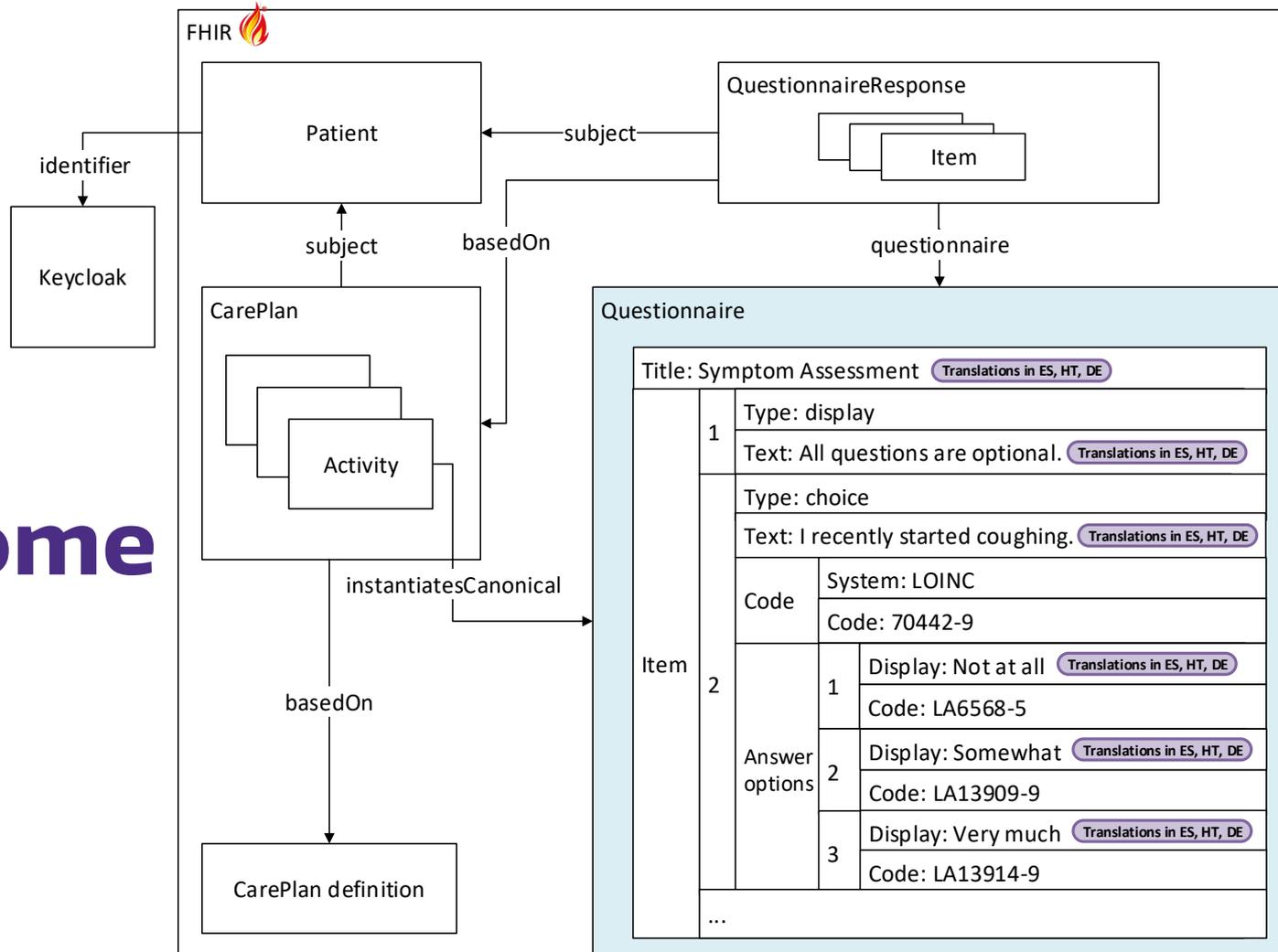


FHIR-native means that:

- > There is **no custom server code**
- > There is **minimal custom client code**
- > *Content and behavior* are defined in FHIR resources
- > **Client is independent of server**
 - Can operate out of any FHIR-compliant server, e.g. EHR, standalone HAPI, public health system

StayHome is a **generic PRO administration tool** which can easily be **repurposed** for different PRO use cases and health problems simply by modifying the FHIR resources.

FHIR in StayHome



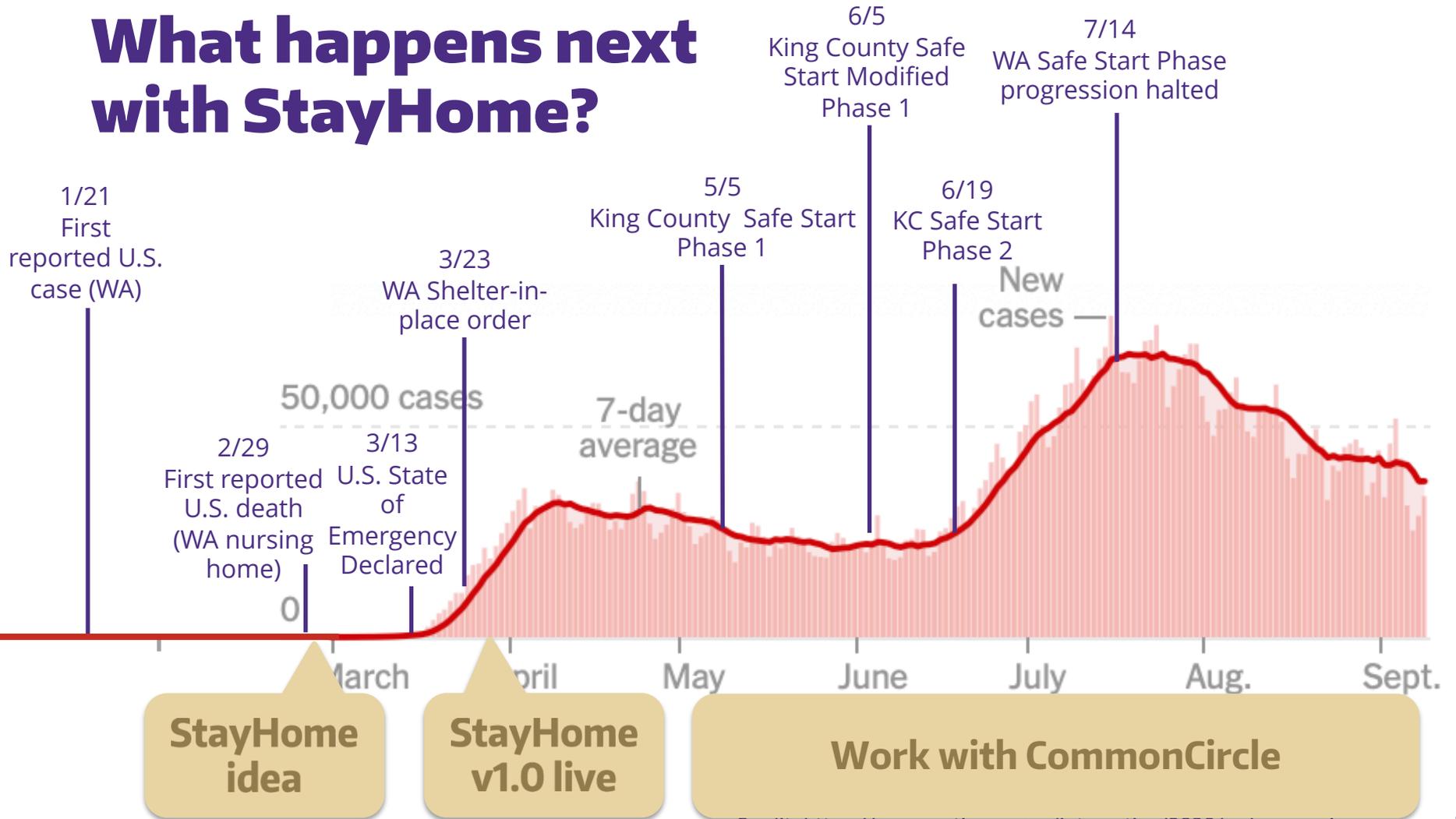
Advantages of FHIR & FHIR-native

- > **Ready to use, domain-appropriate data model** developed over years by many experts
- > Basic and advanced **functionality is available out of the box** with freely available FHIR implementations
 - Storage, queries, CRUD, versioning, localization, bulk export, terminology services, subscriptions, CQL
 - FHIR **implementations are interchangeable!** HAPI, Azure and Google Cloud FHIR servers, EHR with FHIR APIs, public health system with FHIR APIs
- > **Implementation guides** are available to help solve common problems
- > Out-of-the-box **interoperability** & EHR integration

Disadvantages of FHIR & FHIR-native

- > FHIR spec is **large and complex**
- > Does not cover everything: e.g. auth
- > Is so flexible that it can be **tempting to use it in unintended ways**
 - Resources and resource elements should make sense outside of the application context
 - Follow recommendations and observe common constraints
- > **May not be well adopted** in some circles, e.g. consumer health applications
 - Smaller value of “interoperability-readiness”

What happens next with StayHome?



What happens next with StayHome?

- > UW still working out details of “Back to School” – 2 weeks away
- > **Commoncircle.us** is the UW effort
 - **Exposures:** Google Apple BT Exposure notification part of the strategy
 - **Assist:** support for Contact Tracing, Case Investigation, Patients
 - > patient- and public health-centered functions overlap
 - > **Sx assessment, reporting, health diary**
 - > Assessment and support for Quarantine, Isolation
 - > Personalized, privacy preserving risk-messaging
 - > Patient-centered decision support – can we go beyond Sx Checking, in a world where infectious people are asymptomatic
 - > Would we do better if we knew more about **people’s experience...?**



Get StayHome at

<https://stayhome.app>



Project info is available at

<https://project.stayhome.app>



Find all StayHome code and resources at

<https://github.com/uwcirg/stayhome-project>

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