

Experiences in Mobile Survey Technology: Technological and Practical Issues



Flu surveillance has been crowd-sourced

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Population
Health
Sciences



School of Medicine
and Public Health
UNIVERSITY OF WISCONSIN-MADISON



School of Journalism
and Mass Communication
UNIVERSITY OF WISCONSIN-MADISON



University Health Services



SURVEY ANALYTICS
Enterprise Research Platform



Robert Wood Johnson Foundation



Broad Research Questions



During the 2013-14 flu season...

- Can a smartphone application be used to detect a flu epidemic among students at a university campus?
- Do aggregated near-real time flu incidence and flu prevention messaging change flu prevention behaviors?

This presentation will only summarize logistics and some preliminary results



Influenza-like Illness (ILI) Surveillance in the U.S.

U.S. Outpatient ILI Surveillance Network (CDC ILINet).

- 2,900 outpatient healthcare providers in U.S. report weekly the total number of patients seen and the number with ILI.
- ILI defined as fever ($\geq 100^{\circ}\text{F}$) and a cough and/or a sore throat without a known cause other than influenza.
- Aggregated data are made public 1-2 weeks after they are collected and 1 week after they are received.

Crowd-sourced data

- Google Flu Trends: Search engine query data (*Nature* 2010)
- Flu Near You/HealthMap: email-based query for ILI symptoms
- Others



Rationale for OutSmart Flu

Rationale for a smartphone application

- Similar to other crowd-sourcing approaches, there is the potential to detect flu epidemics earlier than CDC ILINet
- Unique opportunity to provide feedback to and engage with application users.

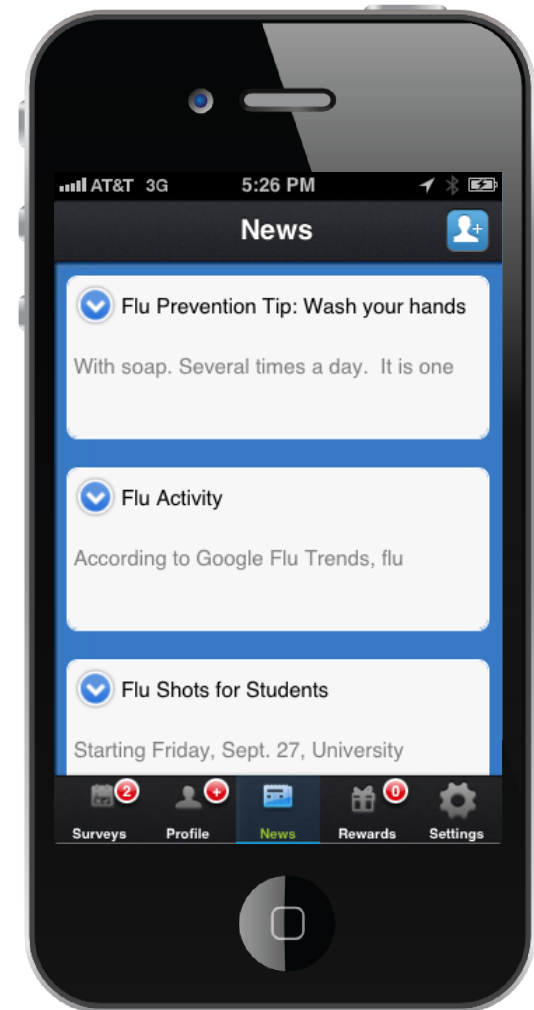
Rationale for carrying out OutSmart Flu on a university campus

- College students are at risk for flu because they share personal space with each other (dormitories, classrooms, restrooms, sporting events, crowded bars).
- Younger adults are less likely to get the flu vaccine and most will self-treat ILI.
- College students own and use smartphones



Some Key Elements of OutSmart Flu and the App

- Customized SurveySwipe platform (Survey Analytics LLC)
- Restriction to @wisc.edu addresses
- Email invitation to friends to join OutSmart Flu
- Points for engagement with app and three \$500 raffles
- RSS Newsfeed



Joining OutSmart Flu

Recruitment & Social Marketing

Study Website

Download App

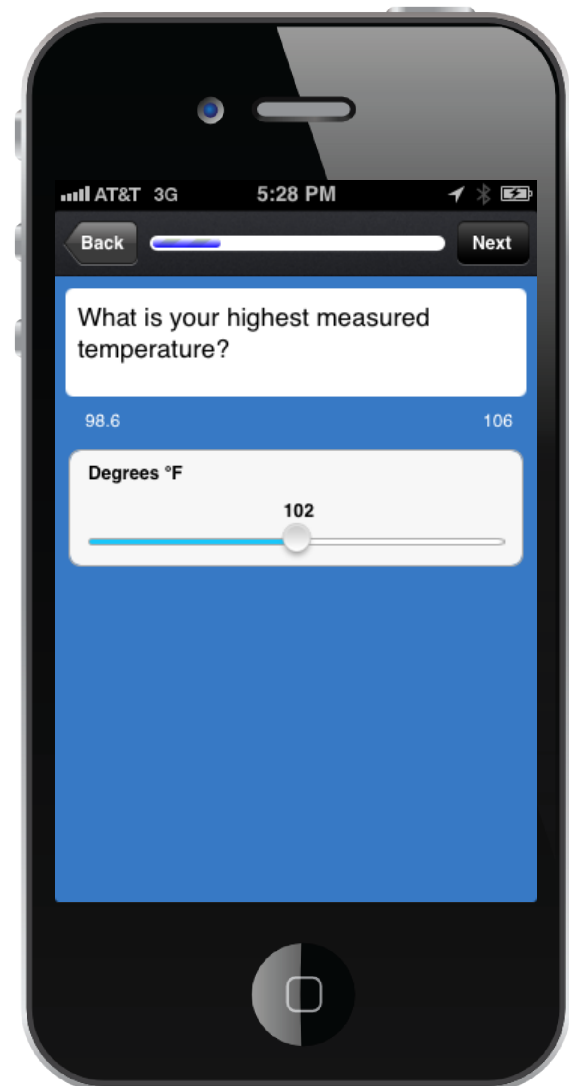
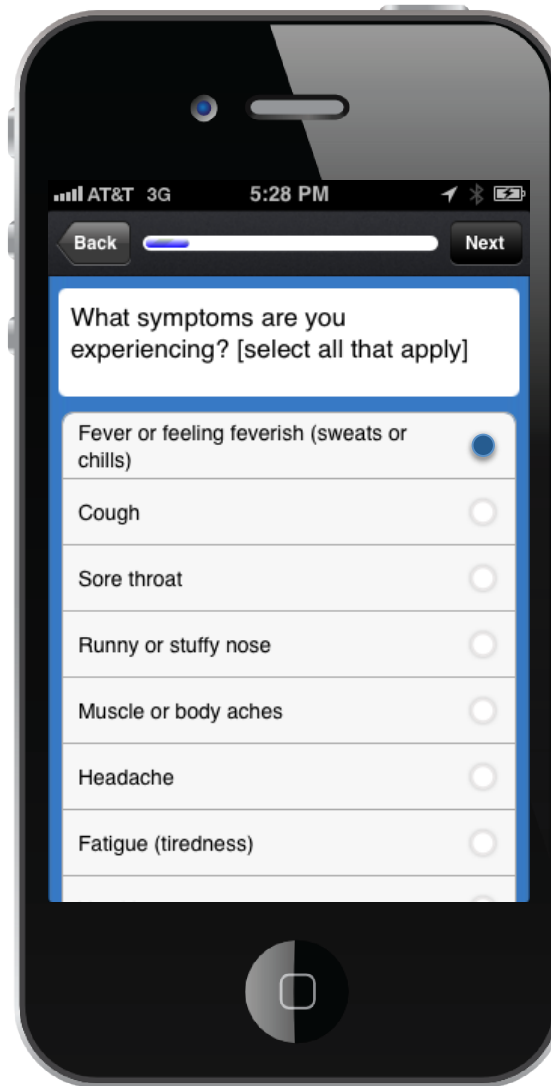
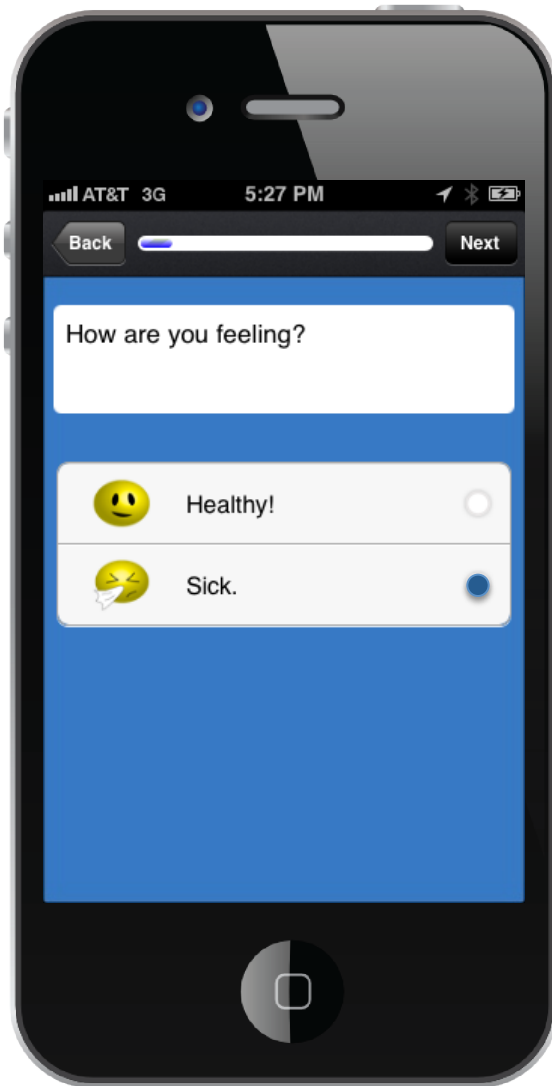
Create an Account



IRB-approved Study Information Sheet



Ascertaining ILL using OutSmart Flu

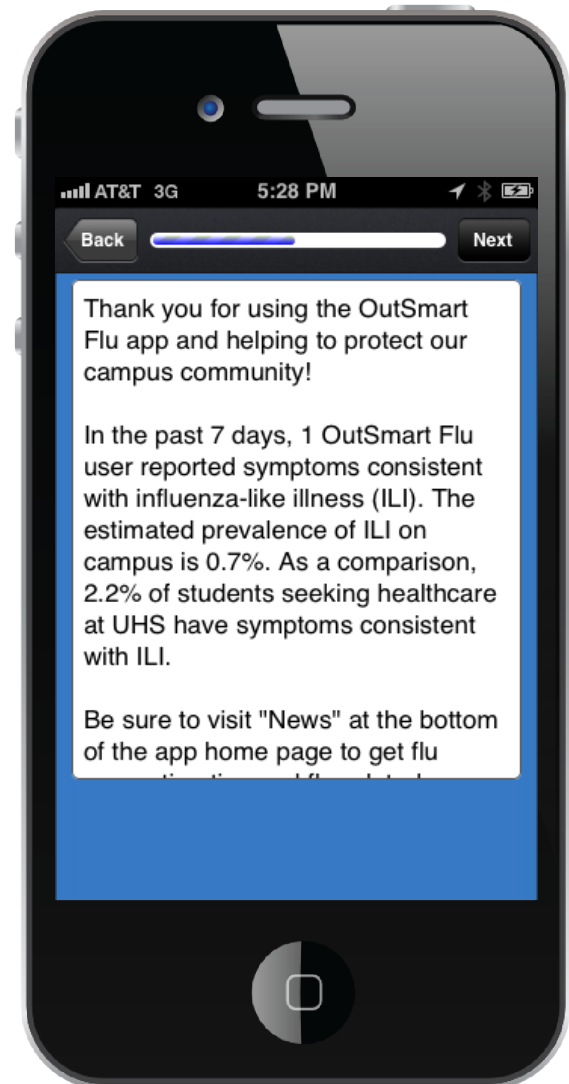
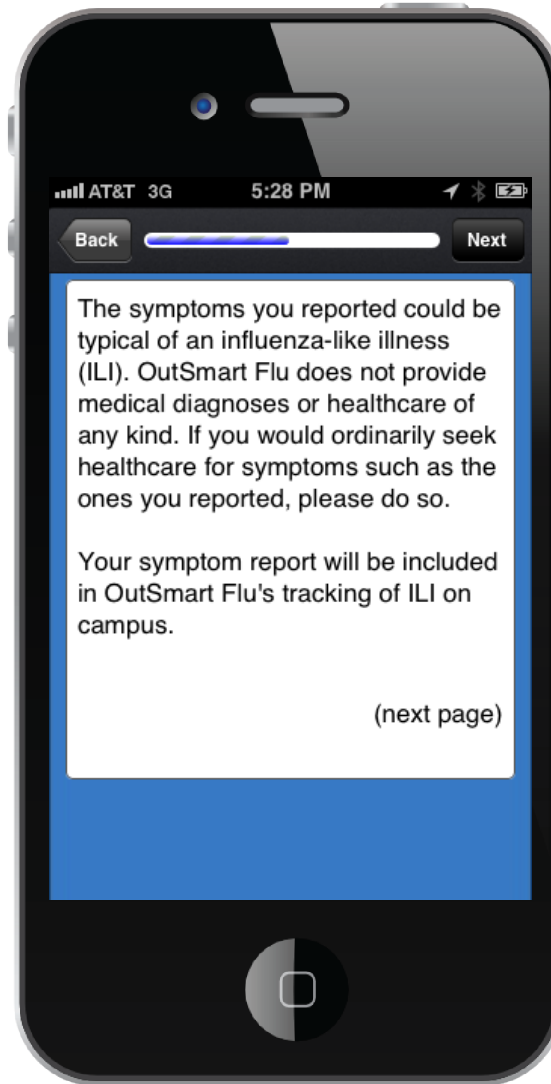
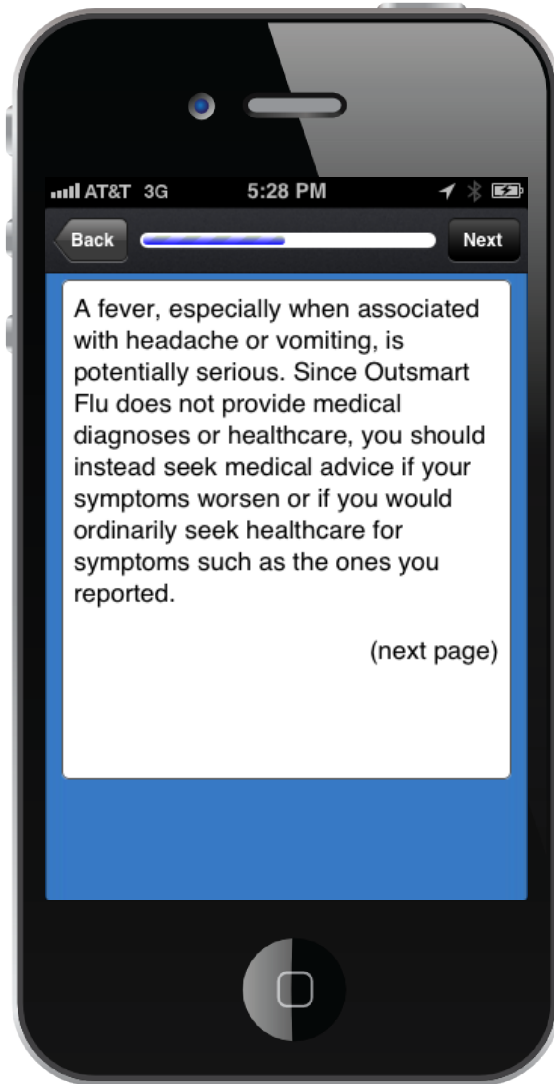


Daily Processing of Symptom Reports

- MS Excel worksheets containing survey responses exported daily via email
- Some processing using MS Excel
- StatTransfer to convert to STATA dataset
- Run STATA code to determine 7-day ILI incidence
- Login to SurveyAnalytics dashboard
- Update “How are you feeling?” with latest aggregated ILI numbers among OSF users
- Close last and push updated “How are you feeling?” survey to users



Feedback to OutSmart Flu Users

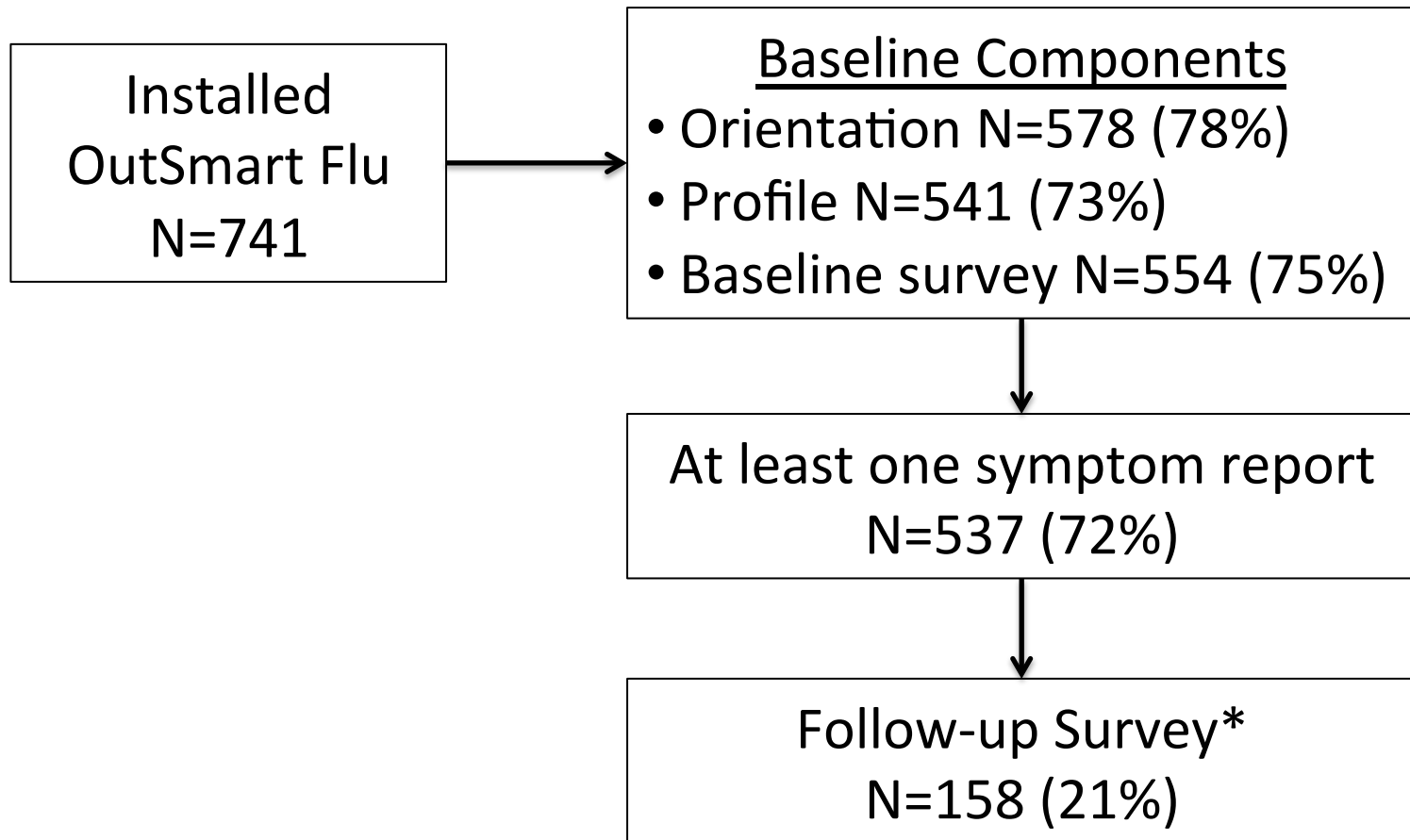


Surveys and Other Pushed Content

- Welcome to OutSmart Flu! (orientation; 10 pts)
- Baseline research survey (50 pts)
- How are you feeling? (“sticky”; 1 pt/day)
- How are you preventing the flu? (every two weeks; 10 pts)
- Periodic newsletters (0 points)
- Follow-up research survey (50 pts)



Response Rates (as of 3/14/14)



*Launched 3/7/14



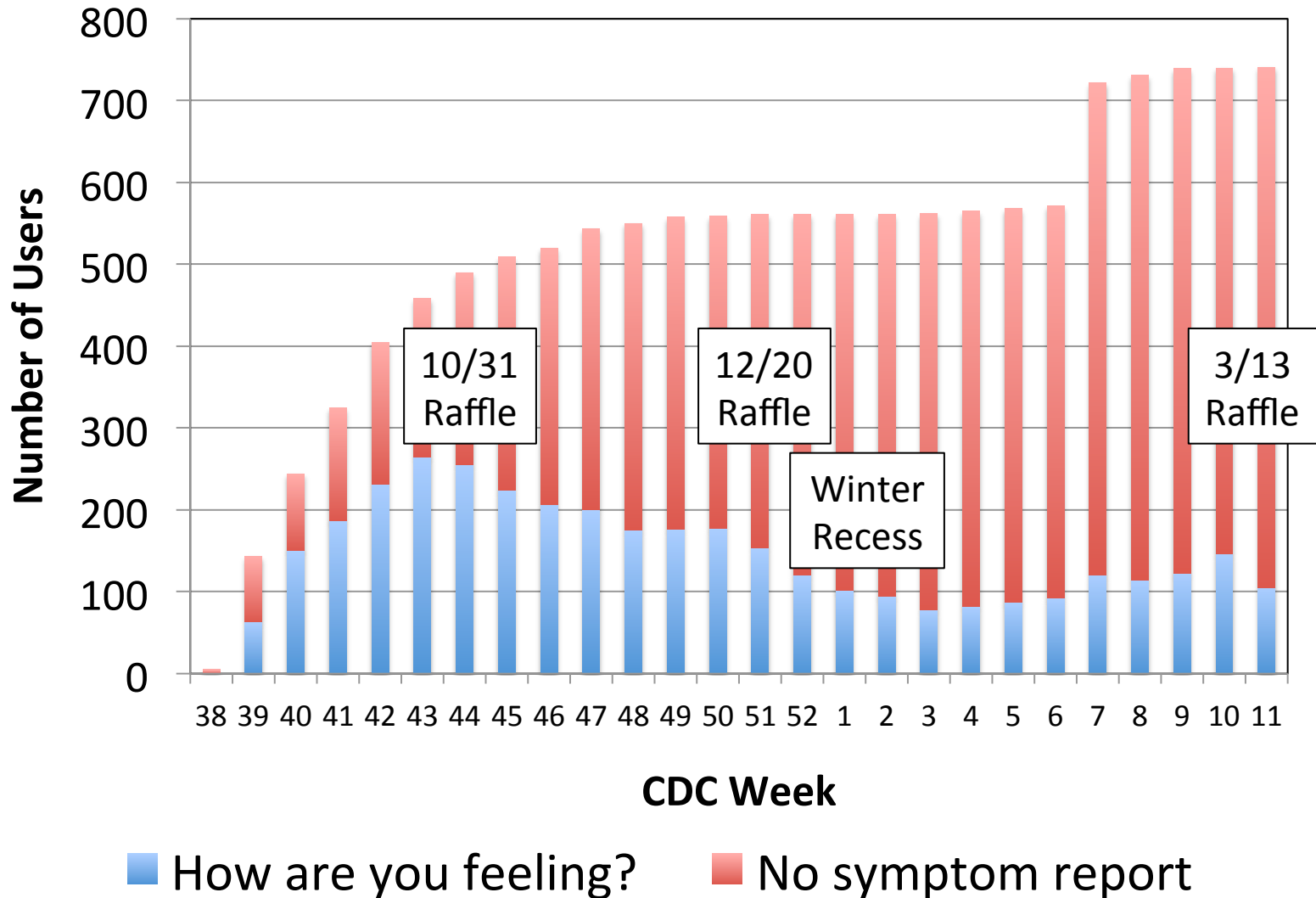
Characteristics of OutSmart Flu Users (as of 3/14/14)

Characteristic		OutSmart Flu users		p-value*
		UW students N (%)	(N=741) N (%)	
Sex	Male	21,259 (49.1)	195 (26.3)	<0.001
	Female	22,016 (50.9)	372 (50.2)	
	Unreported		174 (23.5)	
Class Standing	Undergraduate	28,604 (73.9)	435 (58.7)	0.321
	Freshman	5,208 (18.2)	89 (20.5)	
	Sophomore	6,276 (21.9)	83 (19.1)	
	Junior	7,590 (26.5)	117 (26.9)	
	Senior	10,430 (36.5)	146 (33.6)	
	Graduate	8,278 (26.1)	94 (12.7)	
	Non-student	--	38 (5.1)	
	Unreported	--	174 (23.5)	
Device	Android	--	265 (35.7)	
	iPhone	--	476 (64.3)	

*among those who reported information and in overlapping strata



“How are you feeling?” Survey Participation

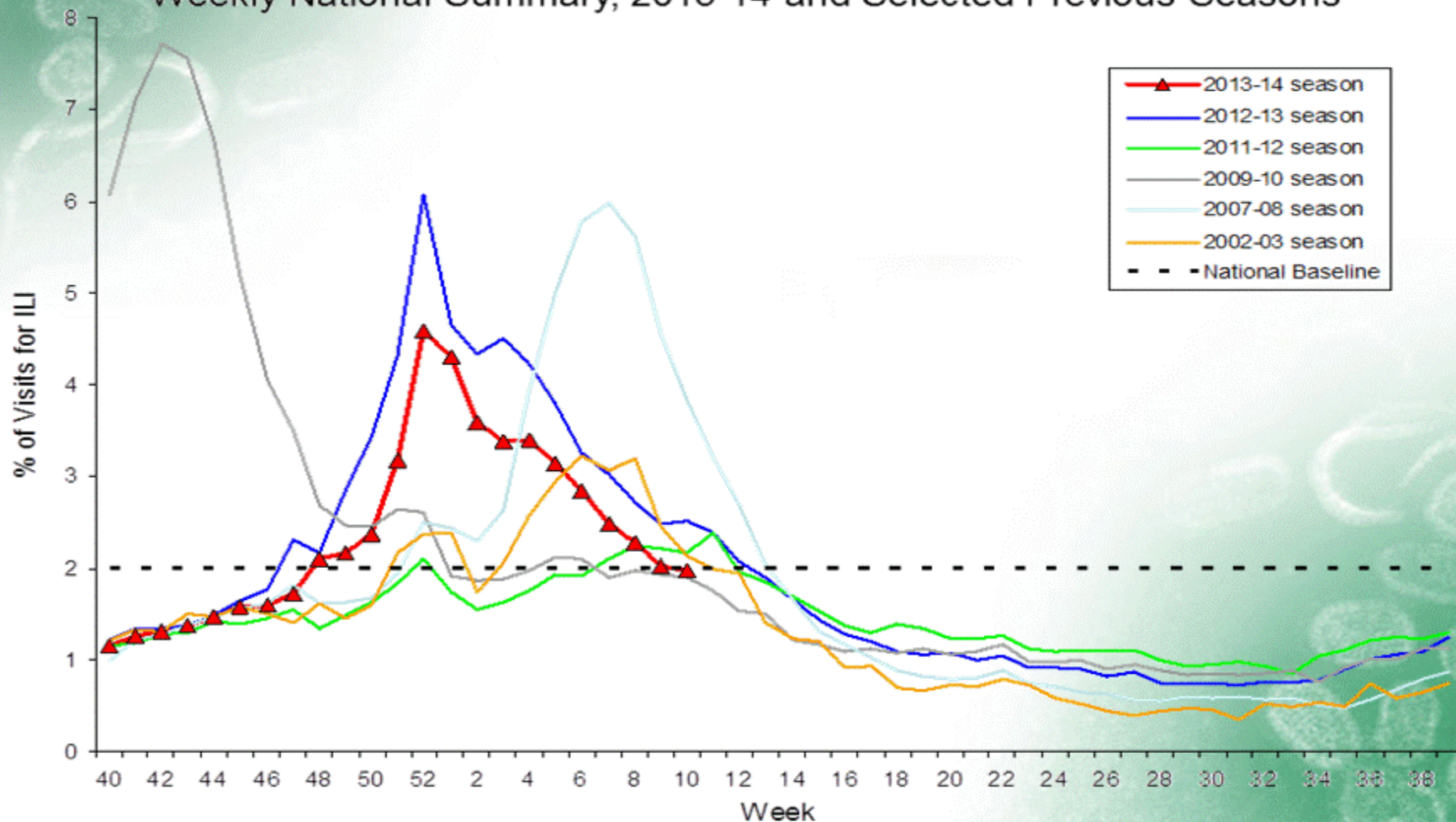


FLUVIEW



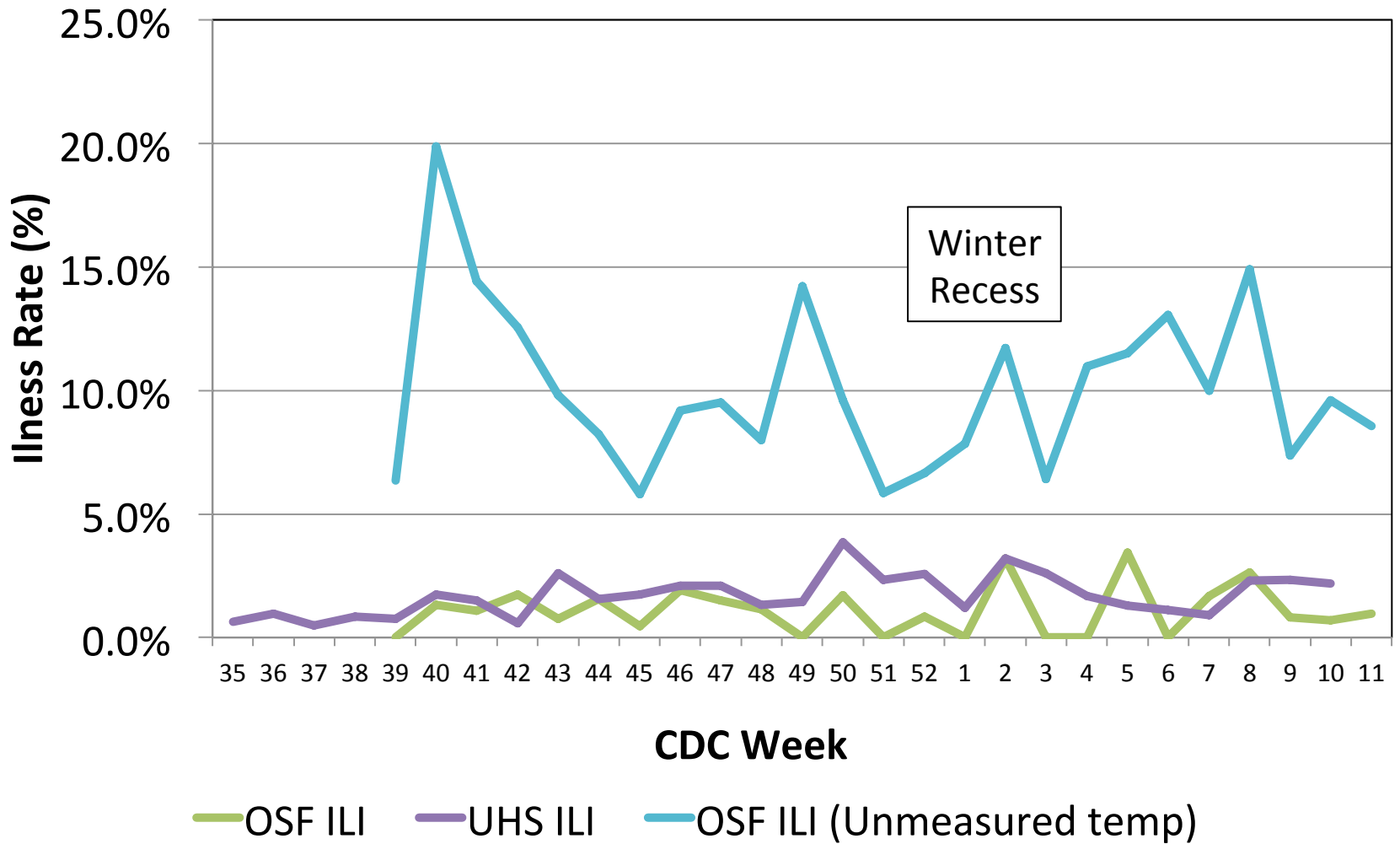
A Weekly Influenza Surveillance Report Prepared by the Influenza Division

Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2013-14 and Selected Previous Seasons



UHS and OSF Influenza-like Illness Rates

(as of 3/14/2014)



Areas of Discussion

- Recruitment and engagement
 - Making OutSmart Flu “go viral”
 - Self-selected nature of OutSmart Flu users
- Flu vaccine status among OutSmart Flu users and likelihood to develop ILI and report symptoms
- Illness status of non-reporters
- Intervention effect of engaging with the app
- “Hyper-engaged” symptom reporters
- App maintenance over time



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Thank you!
Any comments or questions?

