InDEx

Social: Managing Alcohol Misuse by Automation
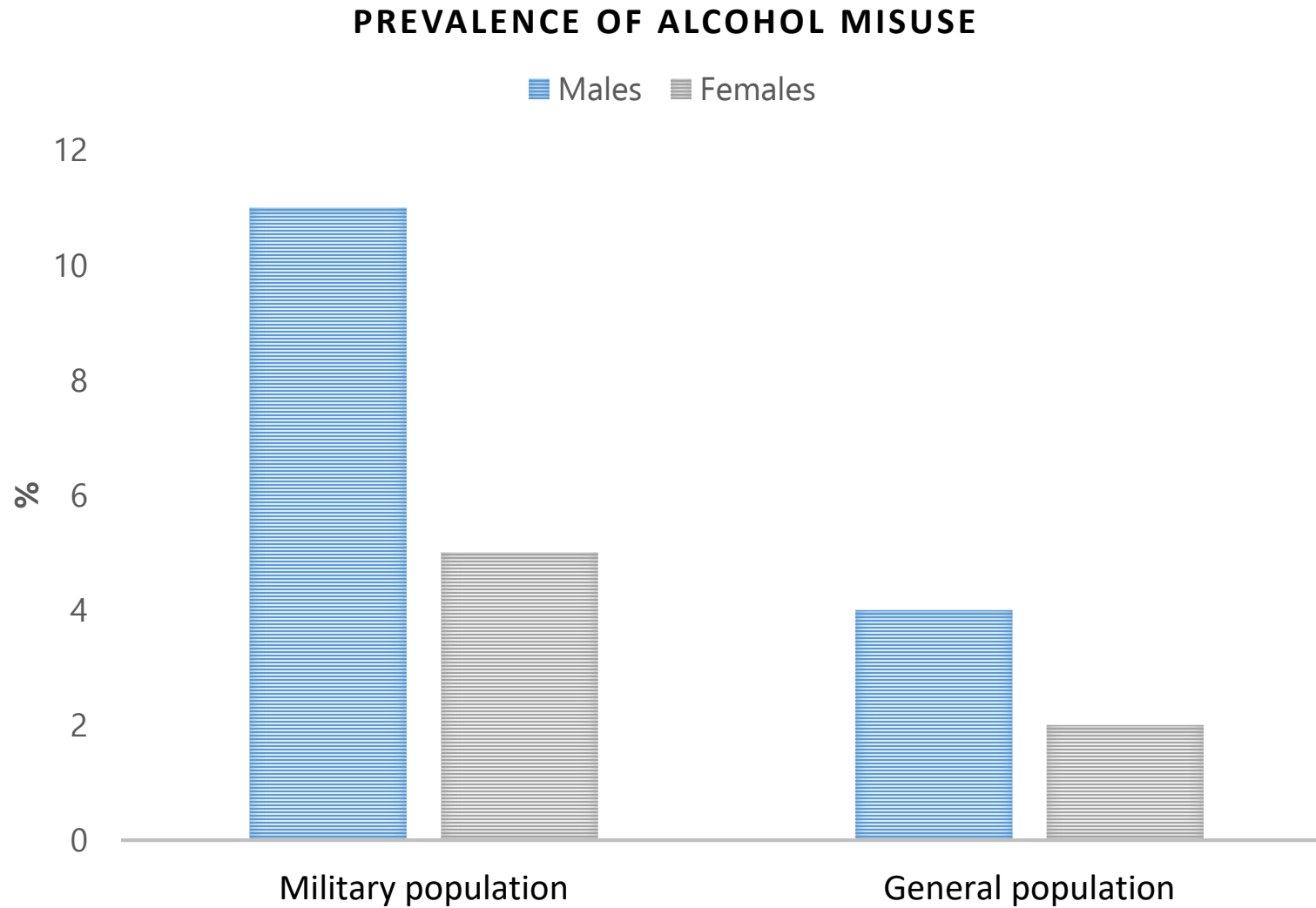
Dan Leightley PhD
King's Centre for Military Health Research
King's College London

@_Dr_Daniel

PREVALENCE OF ALCOHOL MISUSE

Is there a problem with drinking in the UK military?

KCMHR cohort study phase 3; Adult Psychiatric Morbidity Survey 2014

Ministry of Defence

Alcohol Usage in the UK Armed Forces 1 June 2016 – 31 May 2017

Published 20 July 2017

This one-off report provides statistics on a Defence initiative to introduce an alcohol screening tool (the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C)) and brief advice (an Alcohol Brief Intervention) for all UK Armed Forces Personnel attending routine dental inspections from 1 June 2016. This report includes data collected between 1 June 2016 and 31 May 2017.

Key Findings

ALCOHOL USAGE IN THE UK ARMED FORCES
1 June 2016 - 31 May 2017

ALCOHOL SCREENING TOOL

74% (n = 109,459) of Regular UK Armed Forces personnel had completed a questionnaire (AUDIT-C). (1% declined)

This is the first large scale use of the AUDIT-C questionnaire in a military population

RISK CATEGORIES

61% scored 5+ indicating that they may potentially be at increasing risk or above of alcohol related harm

(ranging from poor mood, accidents and reduced fitness, to possible long-term illness)

You would score in this category if you drank:

3 glasses of wine twice a week

OR

4 pints of beer on one occasion in the month

2% scored 10+ indicating that they may potentially be at increasing or higher risk and should be advised to see their GP

You would score in this category if you drank:
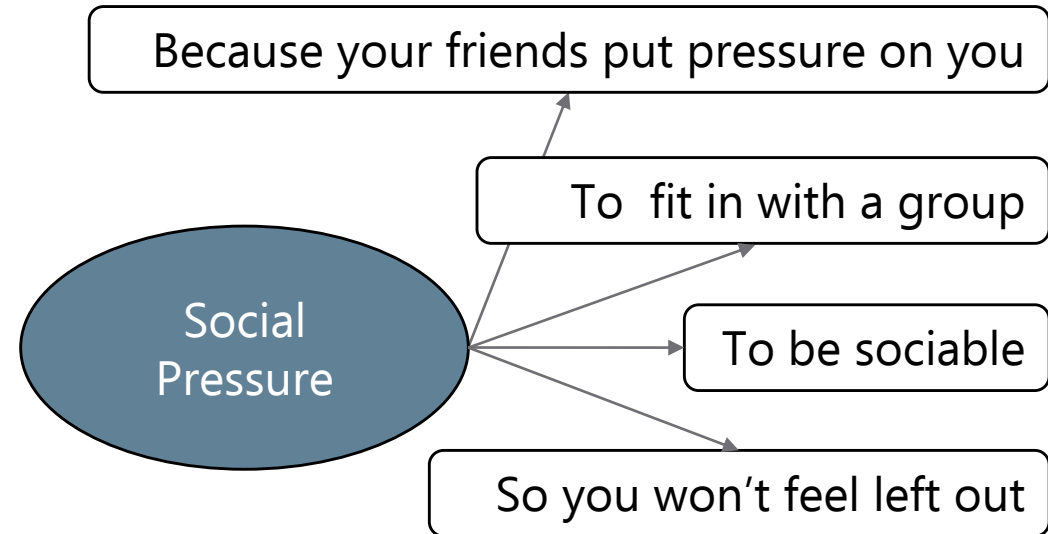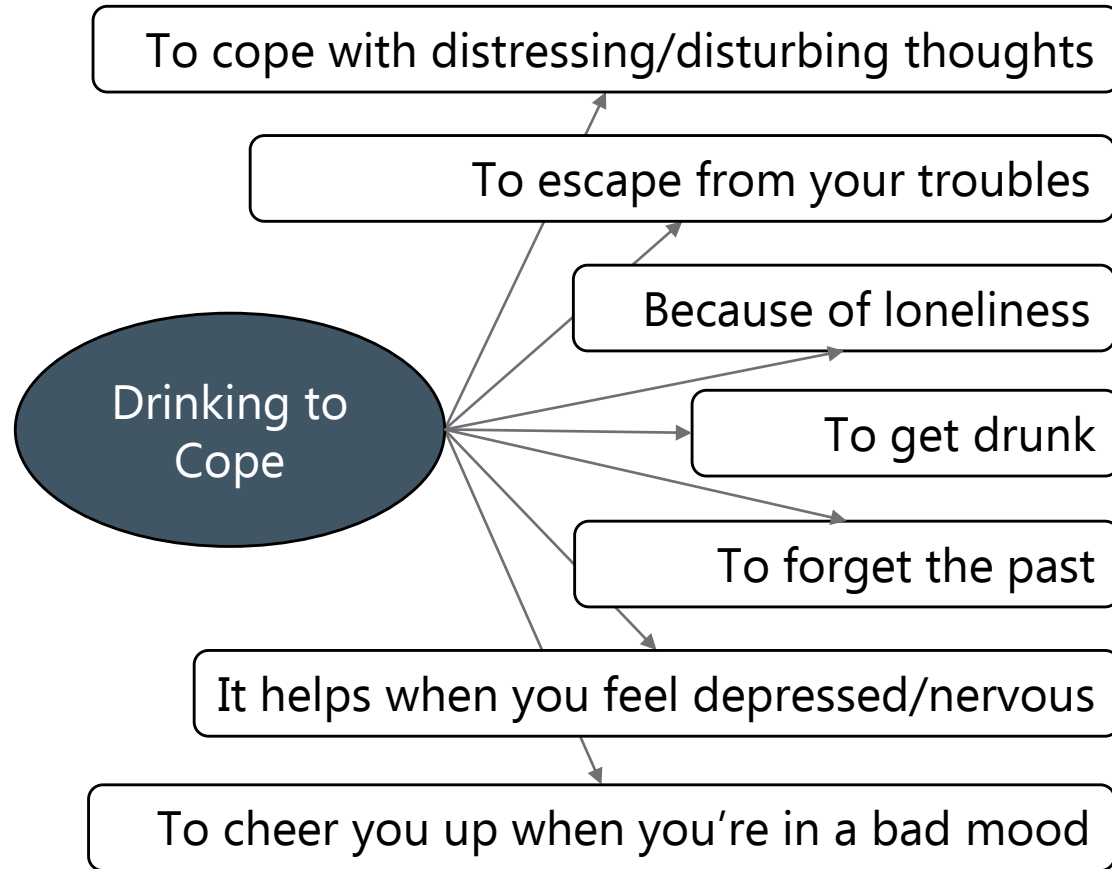
ALCOHOL ADVICE

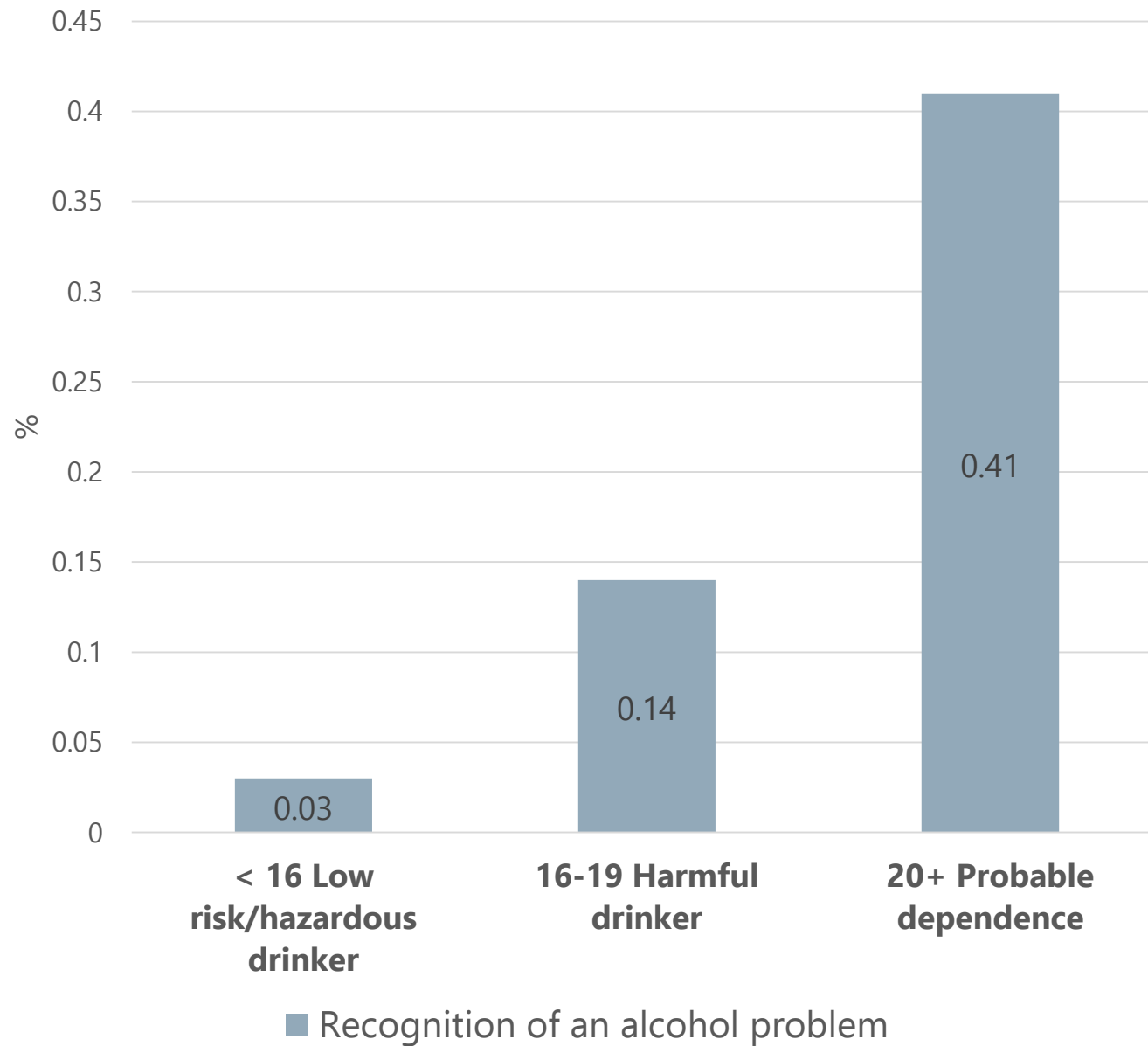80% of personnel who scored 1+ had been given an alcohol advice leaflet

63% of personnel who scored 5+ had been given advice about reducing their drinking (alcohol brief

---

Alcohol Usage According to the Ministry of Defence

Why do military personnel drink?

To cope with distressing/disturbing thoughts

To escape from your troubles

Because of loneliness

Drinking to Cope

To get drunk

To forget the past

It helps when you feel depressed/nervous

To cheer you up when you're in a bad mood

Because your friends put pressure on you

To fit in with a group

Social Pressure

To be sociable

So you won't feel left out

Irizar et al. (2019), under review

Hines et al., 2014, Psychiatric Services, 65, 98-105

The changing picture of drinking in the UK – a good time to cut down?

Why mobile health?

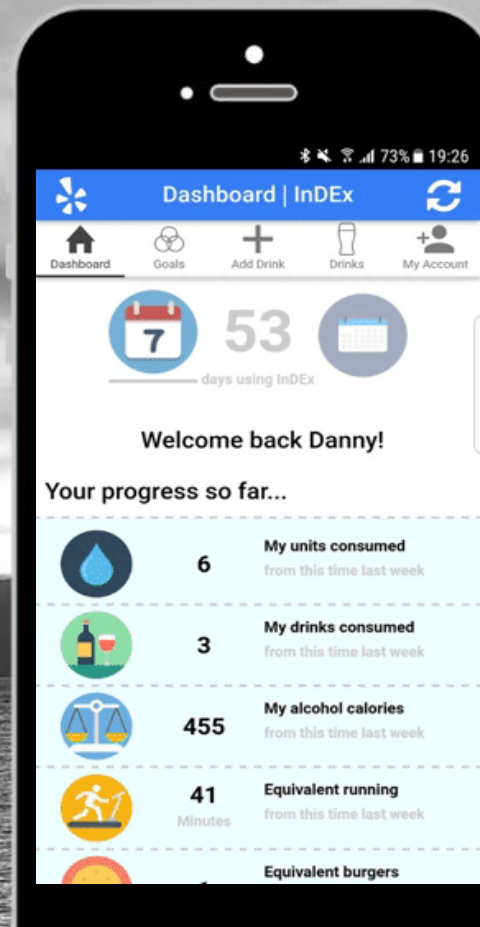- **Traditional treatment pathways;**
  - Face-to-face;
  - Identification and brief advice;
  - Costly to NHS and issues of underreporting;

- **Strong evidence-base** that computer delivered alcohol interventions are effective (general population);

- **Personalised content** (e.g. text messages, push notifications) can be effective in altering behaviours.

Kaner et al., 2017, Cochrane Systematic Review

InDEx

Feel better and save money by drinking less alcohol

Dashboard | InDEx

Dashboard · Goals · Add Drink · Drinks · My Account

7 **53** days using InDEx

Welcome back Danny!

Your progress so far...

	6	**My units consumed**	from this time last week
	3	**My drinks consumed**	from this time last week
	455	**My alcohol calories**	from this time last week
	41 Minutes	**Equivalent running**	from this time last week
		Equivalent burgers	

How is *InDEx* different to others?

Content tailored to military personnel

Focused on shorter term outcomes e.g. impact on relationship

Content driven by user feedback and interaction

Daily *personalised* text messages and/or push notifications

Weekly assessments of mood and drinking behaviours to inform personalisation

App split into stages using HAPA model

Behavioural Change Theory underpins all of *InDEx* components

How is *InDEx* different to others?

|		
Content tailored to military personnel	Focused on shorter term outcomes e.g. impact on relationship	Content driven by user feedback and interaction
Daily *personalised* text messages and/or push notifications	Weekly assessments of mood and drinking behaviours to inform personalisation	App split into stages using HAPA model

Behavioural Change Theory underpins all of *InDEx* components

**Machine Learning (Regression/Classification [semi-supervised])**

InDEx Overview
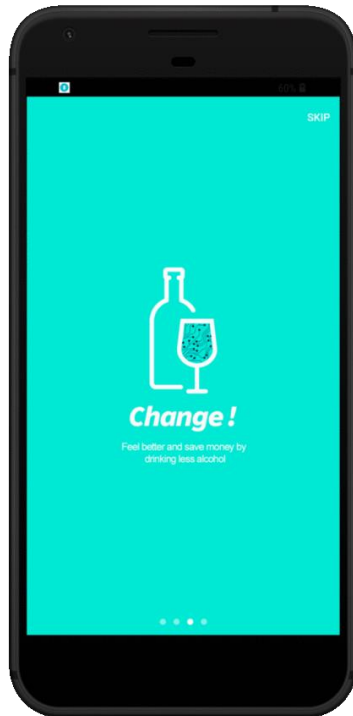
- **Designed as a [minimum] 1-month intervention using a staged approach**
  - *Stage 1:* Normative feedback, promote self-efficacy and self-monitoring;
  - *Stage 2:* Maintenance of self-efficacy and introduce goal/action planning;
  - *Stage 3*: Managing self-efficacy and coping development;

- Codesigned alongside the armed forces community
  - Military specific language/terms;

- Info-graphics – avoids large text blocks!

- User interaction **required**
  - Log alcohol and drink free days;
  - Log mood and mental health state.

Core modules of *InDEx*

- **Self-monitoring** (drinks, mood, behaviours);

- **Feedback** (visual indicators of drinking behaviours);

- **Goal setting and review;**

- **Notifications** (personalised to drinking habits).
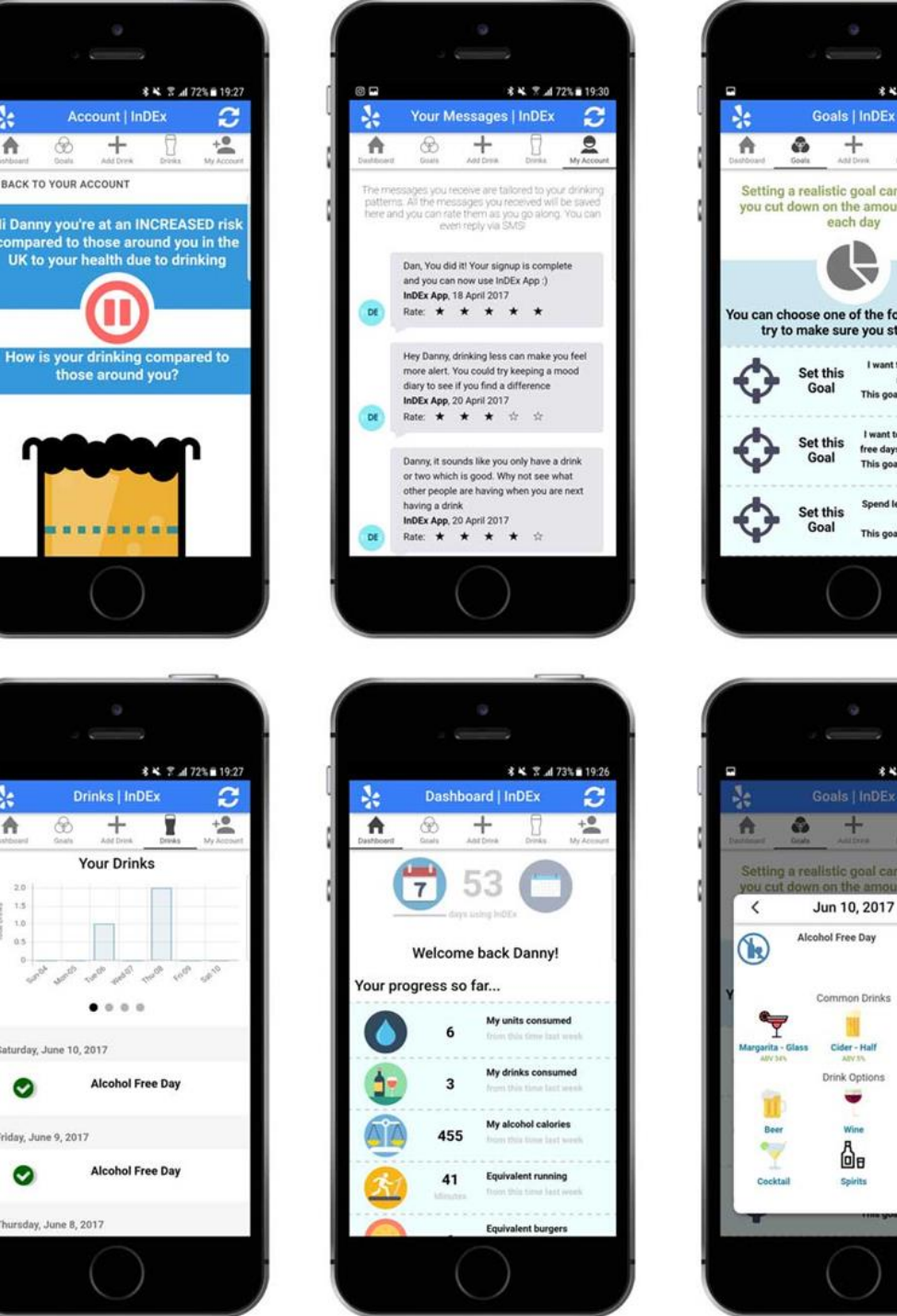
InDEx Ecosystem

Deployment

Deployment is automated using GitHub and IONIC build processes to maximise efficiency

Code goes into GitHub "dev" branch. The "master" branch remains production ready and development branch are merged when required.
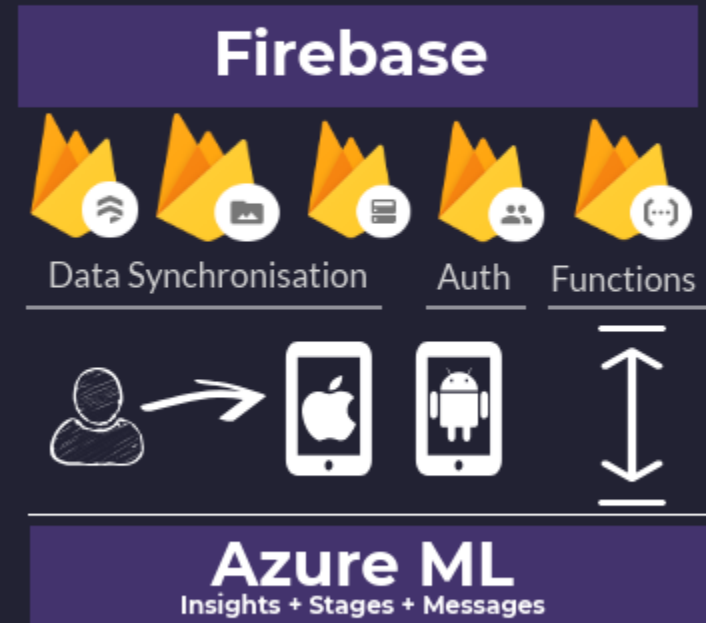
If required, new app builds are generated and submitted automatically to the relevant app store.

Custom build tools to verify code integrity.

Firebase (BaaS) + MLaaS

Handles API calls, data storage, authentication and predictions (via cloud functions).

Firebase

Data Synchronisation | Auth | Functions

Azure ML
Insights + Stages + Messages

Notifications

A scheduled daily job generates the daily batch of applicable SMS/email message. Interface MLaaS.

User analytics assess the 'best time' of day to send text, email and push notifications.

Push notifications are sent based on MLaaS predictions. Push notifications sent based on user interaction with InDEx.

Twilio SMS

Facility to send SMS messages to users based on the mobile number provided. Users are able to reply to any message they receive.
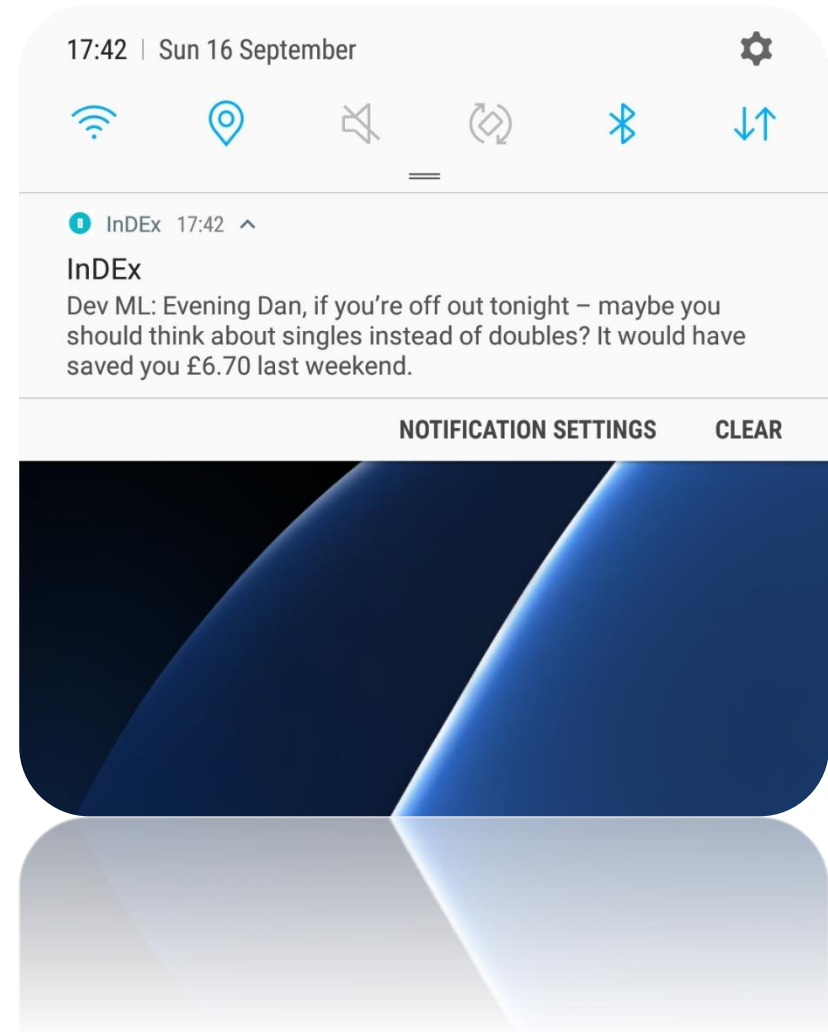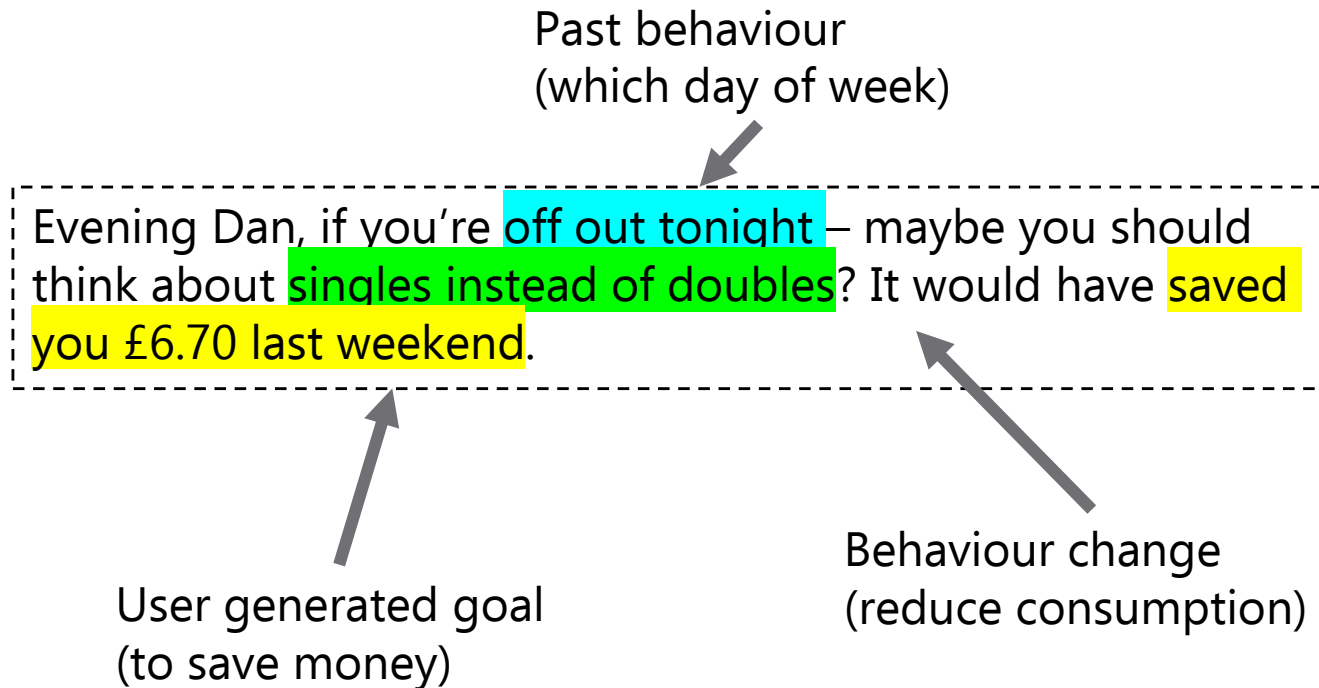
Authy

Two-factor authentication facility to validate user mobile telephone number. Unique one-time passcodes are generated by the system.

SendGrid

Email can be used to authenticate the user, provide notifications and provide a digital copy of personalised messages.

Personalising the 'message' - Example

Past behaviour
(which day of week)

Evening Dan, if you're <mark>off out tonight</mark> – maybe you should think about <mark>singles instead of doubles</mark>? It would have <mark>saved you £6.70 last weekend</mark>.

User generated goal
(to save money)

Behaviour change
(reduce consumption)

17:42 | Sun 16 September

InDEx 17:42

InDEx

Dev ML: Evening Dan, if you're off out tonight – maybe you should think about singles instead of doubles? It would have saved you £6.70 last weekend.

NOTIFICATION SETTINGS   CLEAR
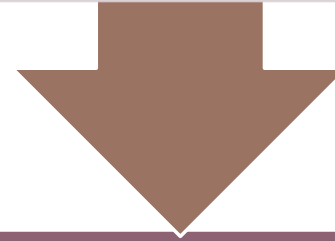
Feasibility Study Sample

Recruited from the King's Centre for Military Health Research Health & Well-being Cohort

Only those drinking hazardously were invited (AUDIT scores 8-19);

137 individuals were contacted via email, 23% (31/137) registered for *InDEx*

87% male and 13% female;

16% were aged 25-39 years, 19% were aged 40-44, 19% were aged 45-49, 19% were aged 50-54, and 26% were aged 55-64;

84% reported serving in the military for 12 years or more.

The feasibility study – Engagement

Engagement Measure	Median	Interquartile range
No of sessions	29.0	20.0 – 40.5
Session duration (seconds)	48.8	35.1-73.1
Weeks active	4.0	3.0– 4.0

71.2% of participants used the app every week (maximum 4 weeks), with 87.1% using the app in the final week

Did users change their behaviour?

Reported alcohol consumption	Week 1	Week 2	Week 3	Week 4
Drinking days	4.0	3.0	3.0	3.0
Drink free days	3.0	4.0	4.0	4.0
Units per drinking day	5.6	6.5	4.54	4.7
Units consumed	22.9	20.4	18.1	15.9
Alcoholic drinks per drinking day	2.0	3.0	2.0	2.0
Binge drinking days per week	2.0	2.0	1.0	2.0

Qualitative feedback on the messaging

"...the texts were quite a good way of kind of reminding myself a little bit. You know if you forget then you get a text and you think ok well maybe I'll try and implement it into your evening or into your day. I found that was quite useful." (Participant 16, male)

"I think when you're doing really well...or you're curbing your drinking and the text message is being positive, it kind of spurs you on you know. So like when I was getting text messages during my goal setting, that was really good. And it's just good to be positive then." (Participant 8, female)

Conclusions and implications

- Measures of engagement were encouraging across a 4-week period

- Most personnel used the app primarily for self-monitoring
  - Use of goal setting was limited
  - Related to perceived need to change drinking

- Potential to deliver *InDEx* on a larger scale to UK serving personnel

- Next steps: Randomised Controlled Trial, public release and further development.

Thank You

daniel.leightey@kcl.ac.uk

www.index-app.org