

Good Boost Data Report: March 2020

User Demographic

Total number of unique user IDs – **457**

Method – Count of total number of unique user IDs



Total number of sessions completed – **2,463**

Method – Session count completed

Primary reason for attending - **Arthritis / Osteoarthritis**

Duration of primary complaint – 0-6 weeks: **5%**, 6-12 weeks: **5%**, 12-24 weeks: **7%**, 24-52 weeks: **10%**, More than 1 year: **74%**

Method – Percentage of users who select 0-6 week, 6-12 weeks, 24-24 weeks, 24-52 weeks, more than 1 year after selecting a diagnosis.

11.4% of participants registered with complaint as recent surgery

Method – Percentage of total users who selected surgery

Average of 1.9 other health conditions (multimorbidity)

Method – Total number of additional health conditions count, divided by total number of unique user IDs

30% of participants are from the most deprived home postcodes in the UK

Method – postcodes of all unique users saved to CSV file. The CSV file was uploaded to English Indices of deprivation 2019 service (<http://imd-by-postcode.opendatacommunities.org/imd/2019>) The output CSV was organised and a COUNTIF rule included for each of the 10 deciles of deprivation. All household postcodes that are within the 1-4 decile (40% most deprived households) were included in the total number. This number was then calculated as a percentage of total users.

Outcome measures are collected when users log-in. They are collected if a user logs in at 4/6/8/12/24 weeks from their registration date (0 week) +/- 2 days. – If a user does not log-in within this date range, no measure is collected.

Pain Outcome

User are asked to submit pain outcomes (VAS) at registration (0 week) and at follow-up dates (4, 6, 8, 12 weeks)

Method – The measures submitted by users were calculated as a mean and plotted at each week with number of users included in the mean calculation.

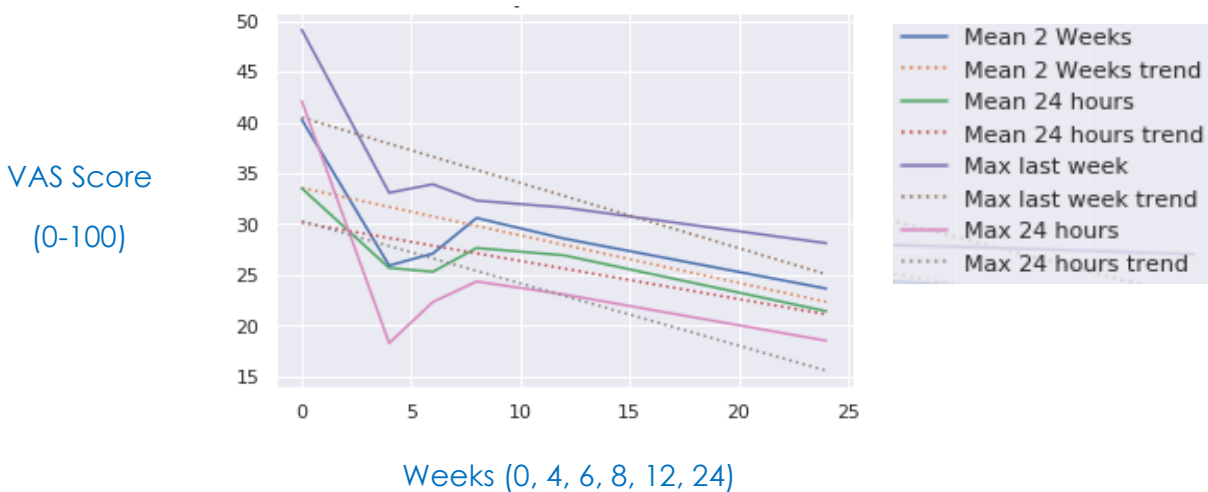
Average pain over last 2 weeks - 0wk: **40.2**, 4wk: **25.9**, 6wk: **27.0**, 8wk: **30.5**, 12wk: **28.5**, 24wk: **23.6**

Max pain over last week - 0wk: **49.1**, 4wk: **33.0**, 6wk: **33.9**, 8wk: **32.3**, 12wk: **31.6**, 24wk: **28.1**

Average pain over last 24 hrs - 0wk: **33.5**, 4wk: **25.6**, 6wk: **25.2**, 8wk: **27.6**, 12wk: **26.9**, 24wk: **21.4**

Max pain over last 24 hrs - 0wk: **42.1**, 4wk: **18.2**, 6wk: **22.3**, 8wk: **24.3**, 12wk: **23.0**, 24wk: **18.5**

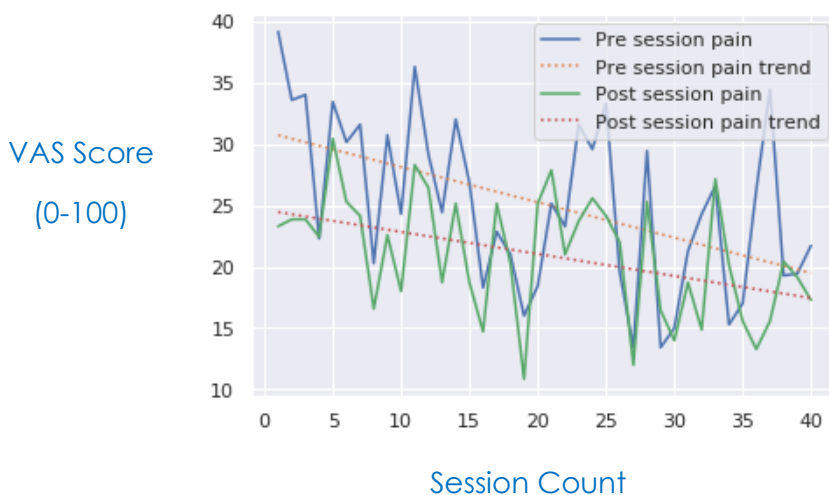
Users included in mean - 0wk: **n=81**, 4wk: **n=42**, 6wk: **n=58**, 8wk: **n=63**, 12wk: **n=66**, 24wk: **n=81**



Session Outcome

Users are asked to provide an average pain score (VAS) pre exercise and post exercise before and after each session.

Method – The measures submitted by users were calculated as a mean and plotted at over each session.

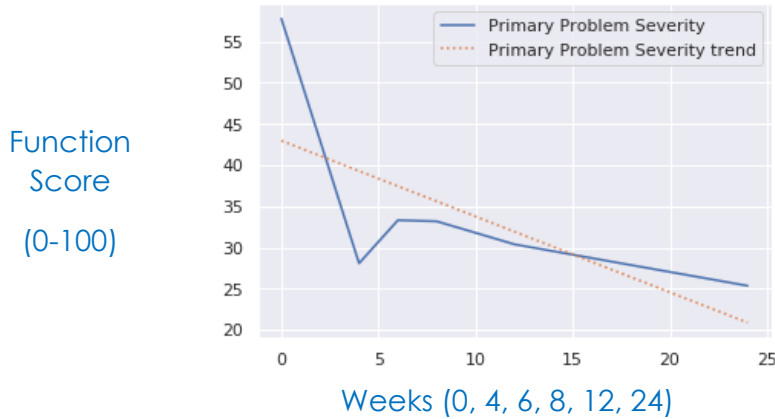


Function Outcome

Users input their primary functional challenge with their primary complaint (e.g. walking up stairs, work, prolonged sitting...) This is captured on a sliding scale as the patient functional score.

Patient Reported Function Score - 0wk: **57.8 (5.7)**, 4wk: **28.0 (2.8)**, 6wk: **33.3 (3.3)**, 8wk: **33.1 (3.3)**, 12wk: **30.3 (3.0)**, 24wk: **25.3 (2.5)**

Users included in mean - 0wk: **n=81**, 4wk: **n=42**, 6wk: **n=58**, 8wk: **n=63**, 12wk: **n=66**, 24wk: **n=81**



EQ5D Outcome

Users input their EQ5D outcomes at registration (0 week) at follow-up dates (4, 6, 8, 12 weeks).

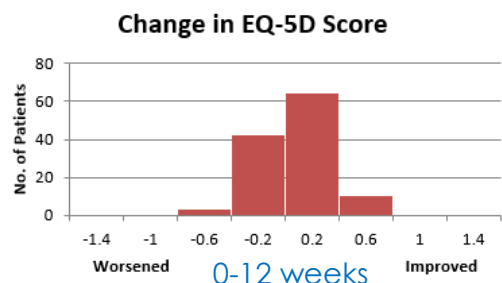
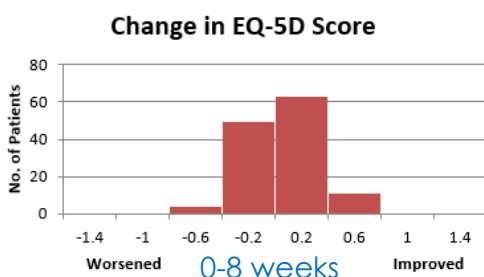
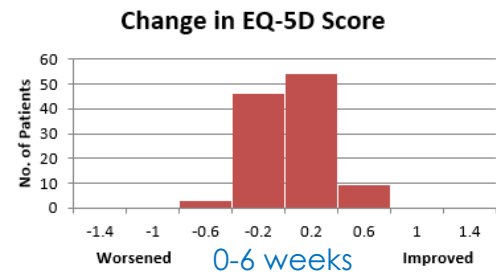
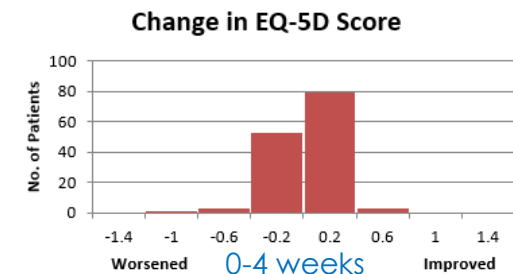
Method – the measures for the five domains of the EQ5D metric were separated in to week 0 and week 4, 6, 8, 12. Any measures that indicate an extreme improvement/worsening were removed from the total data set (red lines in the Full Set EQ5D organised spreadsheet). These numbers were inputted in to the CSP (Chartered Society of Physiotherapy) EQ5D calculator spreadsheet.

0 – 4 weeks: 59% of user improved mild/moderate ($n = 137$)

0 – 6 weeks: 56% of users improved mild/moderate ($n = 110$)

0 – 8 weeks: 58% of user improved mild/moderate ($n = 125$)

0 – 12 weeks 62% of users proved mild/moderate ($n = 117$)



Key MSK Health Outcomes

Average Pain last 2 weeks (VAS)



0-4 weeks : **35.5%** reduction
 0-24 weeks : **41.3%** reduction

Max Pain last 24 hours (VAS)



0-4 weeks : **56.8%** reduction
 0-24 weeks : **56.0%** reduction

Patient Specific Functional Scale

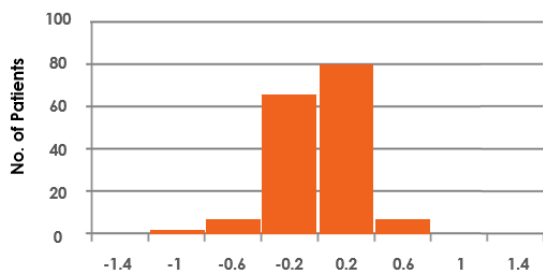


0-4 weeks : **51.0%** improvement
 0-24 weeks : **56.2%** improvement

(n = 81 @ 0 & 24 weeks)

Key MSK Health Outcomes

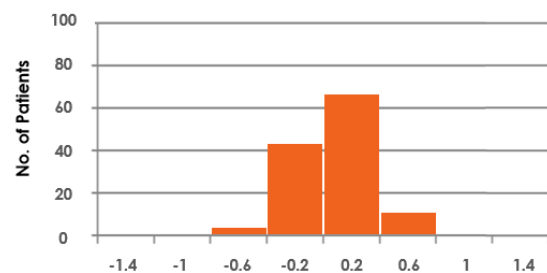
EQ5D - Quality of Life @ 4 weeks



59% improve @ **4 weeks**
 96% mild : 4% moderate

(n = 137)

EQ5D - Quality of Life @ 12 weeks



62% improve @ **12 weeks**
 89% mild : 11% moderate

(n = 117)

METHODOLOGY REPORT

USER DEMOGRAPHIC

TOTAL NUMBER OF UNIQUE USERS

The **P**articipants **R**ecord (PR) table was analysed using matching to exclude any additional user accounts, ie (users who made a new account because they forgot their password). The matching can be described as assigning a numeric value to each entry then measuring the distance between the values.

For the purpose of explaining the process the method is described as generating a confusion matrix and any sets (columns within a row) with near zero L2 proximity values are combined by picking the ID with the highest session count.

The output record table will be referred to as **C**leaned **P**articipant **R**ecord (CPR).

To derive the Total Number of unique users the number records in the CPR is counted.

TOTAL NUMBER OF SESSIONS COMPLETED

We start with a **N**umber of **S**ession **C**ompleted **S**um **A**ccumulator (NSCSA)

An id list is generated from the CPR, the number of sessions for each id is counted and added to NSCSA.

The total number of sessions completed is the value of NSCSA after iteration over all the ids.

PRIMARY REASON FOR ATTENDING

A histogram is calculated from the CPR for the variable corresponding with primary reason of attending.

The histogram is calculated using the python Counter object from the High-performance container datatypes section in the collections library provided as part of the python3 standard library.

The value is derived by picking the entry with the highest value from the histogram.

DURATION OF PRIMARY COMPLAINT

A histogram is calculated from the CPR for the variable corresponding with Duration of primary complaint.

The histogram is calculated using the python Counter object from the High-performance container datatypes section in the collections library provided as part of the python3 standard library.

The values are derived by outputting all the values within the counter.

PARTICIPANTS REGISTERED WITH COMPLAINT AS RECENT SURGERY

A histogram is calculated from the CPR for the variable corresponding with Primary and secondary complaint.

The percentage value is derived using $\frac{n_{problem}}{n_{totalusers}} * 100$ where $n_{problem}$ is number of users who selected surgery and $n_{totalusers}$ is the count of total number of entries in CPR.

This method assumes the constrain being that a primary and secondary complaint cannot be duplicated for one entry.

MULTIMORBIDITY

A histogram is calculated from the CPR for the variable corresponding with secondary complaint.

The percentage value is derived using $\frac{n_{problem}}{n_{totalusers}} * 100$ where $n_{problem}$ is number of users who selected not None as their secondary problem and $n_{totalusers}$ is the count of total number of entries in CPR.

This method assumes the constrain being that a primary complaint cannot be None and secondary complaint cannot be the same as the primary complaint.

PARTICIPANTS ARE FROM THE MOST DEPRIVED HOME POSTCODES IN THE UK

using the postcodes from the CPR a csv file was generated with just the Postcodes. file. The CSV file was uploaded to English Indices of deprivation 2019 service (<http://imd-by-postcode.opendatacommunities.org/imd/2019>) The output CSV was organised and a COUNTIF rule included for each of the 10 deciles of deprivation. All household postcodes that are within the 1-4 decile (40% most deprived households) were included in the total number. This number was then calculated as a percentage of total users.

OUTCOMES

PAIN OUTCOME

User are asked to submit pain outcomes (VAS) at registration (0 week) and at follow-up dates (4, 6, 8, 12 weeks)

Using the user ids from the CPR all users with an outcome measures at 24 weeks is put in a new table **Outcome Clean Patient Record (OCPR)**,

The mean for each measure [Average pain over last 2 weeks, Max pain over last week, Average pain over last 24 hrs, Max pain over last 24 hrs] at each week is recorded and stored in individual dictionaries corresponding to each measure with the key being the week. The values are aggregated into a plot and a trend line is generated.

SESSION OUTCOME

Users are asked to provide an average pain score (VAS) pre exercise and post exercise before and after each session.

Using the user ids from the CPR all users with an outcome measures at 24 weeks is put in a new table **Session Clean Patient Record (SCPR)**,

Users from the SCPR table are used to calculate the means of each session outcome Pre session pain and post session pain.

At each session iteration the metrics mean is recorded and stored in individual dictionaries corresponding to each metrics with the key being the iteration. The values are aggregated into a plot and a trend line is generated.

FUNCTION OUTCOME

Users input their primary functional challenge with their primary complaint (e.g. walking upstairs, work, prolonged sitting...) This is captured on a sliding scale as the patient functional score.

Using the user ids from the OCPR.

The mean for primary problem severity is calculated, recorded and stored in a dictionary with the key being the week. The values are aggregated into a plot and a trend line is generated.

EQ5D OUTCOME

Users input their EQ5D outcomes at registration (0 week) at follow-up dates (4, 6, 8, 12 weeks).

postcodes of all unique users saved to CSV file. The CSV file was uploaded to English Indices of deprivation 2019 service (<http://imd-by-postcode.opendatacommunities.org/imd/2019>) The output CSV was organised and a COUNTIF rule included for each of the 10 deciles of deprivation. All household postcodes that are within the 1-4 decile (40% most deprived households) were included in the total number. This number was then calculated as a percentage of total users. Key MSK Health Outcomes

Metrics from the OCPR set [Average pain last 2 weeks, max pain last 24 hours patient specific functional scale] are collected and the mean at each week for each metric is calculated and stored and graphed.

Further 4 weeks improvement and 24 weeks improvement percentage is calculated. This is done by $\frac{\text{mean@weekT}}{\text{mean@week0}} * 100$ where T is 4 and 24 weeks respectively.