***Supplementary Material***

**Use of consumer wearables to monitor and predict pain of patients with sickle cell disease**

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# Supplementary Table 1

| **Metric** | **Mathematical formula** |
| --- | --- |
| Accuracy  | $A= \frac{tp+tn }{tp+tn+fp+fn}$Tp = true positiveTn = true negativeFp = false positiveFn = false negative |
| Precision: Recall: F1-score  | $P= \frac{tp}{tp+fp}$$R= \frac{tp}{tp +fn }$$F1=2\* \frac{P\*R}{P+R }$Tp = true positiveFp = false positiveFn = false negative |
| Area under the receiving operating characteristic curve | $\frac{1}{2}\left(\frac{tp}{tp+fn }+\frac{tn}{tn+fp}\right)$Tp = true positive Tn = true negativeFp = false positiveFn = false negative |
| Root-mean-square error | $\sqrt{\frac{1}{n}\sum\_{i=1}^{n}(Y\_{p,i}^{}-Y\_{a, i}^{}})^{2}$Yp,i is the predicted output Ya,i is the actual output.  |

**Supplementary Table 1.** The formulas to calculate the metrics for the evaluation of the machine learning models.

# Supplementary Table 2

| **Model** | **Precision** | **Recall** |
| --- | --- | --- |
| Null model 1: Random  | 0.20 | 0.20 |
| Null model 2: Mode | 0.27 | 0.27 |
| Multinomial Regression | 0.31 | 0.31 |
| Gradient Boosting | 0.41 | 0.41 |
| Random Forest | 0.63 | 0.63 |

**Supplementary Table 2.** Precisions and recalls of the machine learning models.

# Supplementary Data 3.

The code can be requested from Northwestern University’s online repository from the following link:

<https://doi.org/10.21985/n2-js7v-q051>.