



RISK MODELING OF UNMET DENTAL NEEDS USING MACHINE LEARNING

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Background

Oral health is a gateway to a person's overall health and well-being, however unmet dental care needs remain as a global public health concern. Previous studies have suggested that social determinants might be associated with unmet dental care needs, but there is a lack of study using large national data in this area. This study seeks to identify leading factors towards unmet dental care needs through the use of machine learning tree classifiers.

Methods

Data were obtained from the household component of the 2016 Medical Expenditure Panel Survey. Sampling weights were applied to obtain demographic characteristics representative of the United States' population. Random Forest, ExtraTrees Classifier, Decision Tree Classifier, and Gradient Boosting Classifier were used to acquire the top predictors towards unmet dental care needs based on relative importance, and the results were compared with those examined using chi-square test and independent samples t-test.

Results

The top predictors obtained were consistent across the different tree classifiers, except for Random Forest. Delayed in getting necessary medical care, family having problem paying medical bills, inability to get necessary medical care, family size, and total income were consistently rated as the top predictors of unmet dental care needs. Most of the predictors are significant when chi-square test or independent samples t-test were applied.

Conclusion

Social determinants are strongly related with unmet dental care needs. The use of machine learning tree classifiers provides the ability to process hundreds of variables at once and outputs the top variables based on order. Thus, it is possible to discover top predictors that were not previously found using traditional statistics. This study provides an opportunity for healthcare professionals and policy makers alike to identify populations in need of dental care more efficiently.