

A prognostic model for priority public dental care

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Notes

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Abbreviations

A & E	Accident and Emergency
ARCPOH	Australian Research Centre for Population Oral Health
ANOVA	Analysis of variance
AUC	Area under the Curve
CATI	Computer Assisted Telephone Interview
CDHP	Commonwealth Dental Health Program
<i>cf</i>	compared with
CI	Confidence interval
CDS	Community Dental Service
DMFT	Decayed, missing, filled teeth
EDS	Emergency Dental Service
IT	Information Technology
Min	Minimum
Max	Maximum
MIS	Management Information System

ns	not significant
n	sample size
NSW	New South Wales
P	P-value
PV+	Positive Predictive Value
PV-	Negative predictive value
PAL	Primary Approach Letter
QALYS	Quality Adjusted Life Years
Ref	Reference category for odds ratio
ROC	Receiver Operator Characteristic
ROP	Relief of Pain
RNI	Relative Needs Index
SA	South Australia
SA Dental Service	South Australian Dental Service
SD	Standard deviation
Se	Sensitivity
Sp	Specificity
SRF	Supported Residential Facility

Abstract

Excess demand over the service capacity of public dental services has resulted in ad hoc rationing of access to services. As a result a significant proportion of public dental service patients receive only same-day or priority dental care. However, many such appointments are of low urgency, an outcome which is facilitated by lack of a standardised method to determine access for those seeking priority dental care.

Aim: This thesis aimed to develop, validate and trial the implementation of a prognostic model for urgent dental care.

Methods: This was a multi-phased research study. The first phase, the Parent study, collected psychosocial data on people seeking emergency dental care in SA and NSW and dentists' assessment of urgency. Two sequential prognostic models for urgency of dental care were developed as preliminary research. As further development of the models was to occur only in SA, the sequential prognostic models were examined separately in SA and NSW. The next phase involved testing the validity of the models on patients accessing urgent dental care at two new SA sites over an eight month period in 2004. This led to the development of a single model, the Composite model, and testing of its accuracy. The Composite model was then tested in a 28-week intervention trial in four SA Dental Service clinics in 2006. Both quantitative outcomes and qualitative outcomes were assessed.

Results: The Parent study included 839 people seeking urgent dental care. Two sequential logistic regression models were developed to predict dentists assessed urgency of < 48 hours vs 2+ days, and 2-7 days vs 8+ days. The models used responses to 11 psychosocial questions to predict with acceptable accuracy dentist assessed urgency. Small differences in the regression coefficients of predictor variables of urgency were evident in the models specified for SA and NSW separately. Model testing showed acceptable accuracy against clinically determined urgency of dental care when examined on a new set of 294 patients from two clinics in SA and showed greater accuracy in assessing urgency than the traditional SA method of receptionist assessment.

However, a single Composite model was preferred over the two separate models. The Composite model performed with higher sensitivity and specificity than reception staff and had higher reported AUC values indicating better fit of the model.

The implementation trial involved 728 people pre- and 1013 people post-implementation making contact with one of four SA Dental Service clinics. People reporting they had received treatment fell after implementation of the Composite model (74.8 *cf* 65.6%). Of those who received care, a lower percentage received care from the SA Dental Service (70.2% *cf* 67.9%) and subsidised private treatment (22.2% *cf* 17.4%) and more from private dentists (7.6% *cf* 14.7%). Post-implementation, a lower proportion of people receiving treatment from the SA Dental Service reported experiencing pain at first contact. Within the SA Dental Service, a decrease in the percentage of staff time spent on urgent dental care occurred (60.2% *cf* 39.8%) with a matched increase in time spent on general, preventive dental care.

Focus group discussions showed that staff liked the transparency, support and equity the prognostic model provided. Staff remained concerned about those denied urgent dental care, but concern was ameliorated by the possibility in exceptional circumstances to override the prognostic model.

Conclusions: Further development of a prognostic model for urgent dental care led to a single composite model with acceptable accuracy in the clinical setting. The single prognostic model was more accurate in predicting dentist assessed urgency and was also found to be more transparent, consistent and equitable than relying on receptionist judgement. Implementation of the prognostic model rationed urgent dental care. The allocation of SA Dental Service staff time and resources moved away from urgent and towards general preventive care.

Declaration

This thesis contains no material that has been accepted for the award of any other degree or diploma in any university. To the best of the candidate's knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis. The initial development of the Relative Needs Index (The Parent study), which has been described in this thesis, frames the rationale and provides an initial foundation for this thesis. The Parent Study was undertaken by a number of researchers in a contract research project and parts have been published, of which this candidate was a co-author. I give my consent to the thesis being made available for photocopying and loan if accepted for the award of the degree.

Signed:

Date:

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