Mandatory computer field for blood pressure measurement improves screening

AD Heymann\textsuperscript{a,b}, I Hoch\textsuperscript{a}, L Valinsky\textsuperscript{a}, V Shalev\textsuperscript{a}, H Silber\textsuperscript{a} and E Kokia\textsuperscript{a,c}


\textbf{Methods}. We evaluated the effectiveness of a compulsory data field in a computerized medical record (CMR) in improving blood pressure (BP) screening.

\textbf{Results}. The proportion of study patients who had their BP measured increased from 40.6\% to 58.5\% ($P < 0.001$) after the intervention. After adjusting for age, gender and number of visits, patients were 73\% more likely to have their BP recorded after the introduction of the compulsory field.

\textbf{Keywords}. Compulsory data field screening, computer-generated alerts, hypertension, primary care.

\section*{Introduction}

Hypertension screening varies widely between healthcare providers. In one American study screening rates of adult patients varied from 60\% to 100\% among primary care clinics.\textsuperscript{1} In the US, one third of people who suffer from hypertension are unaware of their diagnosis, and 25\% of patients with hypertension have not had their blood pressure measured within the last year.\textsuperscript{2} Computer-generated reminders to check blood pressure have been shown to increase BP screening by ten percent (from 21\% to 31\%).\textsuperscript{3} Computer alerts that require a response from the physician increased preventive health procedure orders by 12\% over simple reminders.\textsuperscript{4}

\section*{Methods}

The study was conducted in nine clinics, and included 74 physicians and 53 000 patients of a preferred provider organization. A revised version of an existing CMR modifying an existing field by making it mandatory was installed in our clinics between November 2000 and January 2001. In the new version, a reminder window appeared when the patient seen in clinic was forty years old or more and had no BP recorded by a physician in that clinic during the previous twelve months. The reminder could be ignored twice, both on the initial and again at the second patient visit. If the field was left blank on the third visit in that clinic, the computer would ‘lock up’, preventing the user from proceeding to the next record item. Physicians unable to record a blood pressure could escape the field by entering a non-realistic value such as 000/000, releasing the lock and permitting continued data entry and record closure.

All blood pressure recordings entered during 2000 and 2001 were compiled and data were analysed using SPSS v.11. Differences between proportions were tested using Chi-square tests. Changes over time were tested using one-way ANOVA. A multivariate logistic regression model was used to investigate the simultaneous effects of statistically significant variables on BP recording.

\section*{Results}

The mean monthly number of blood pressure readings in patients 40 years and older seen in the study clinics in the period 1995–2001 are shown in Figure 1. The proportion of patients with BP measured increased from 40.6\% to 58.5\% ($P < 0.001$) during the intervention year. Over 80\% of patients who saw a physician three or more times in a year during the intervention (2001) had their blood pressure documented. Although the field became compulsory at the third visit, some patients accumulated three or more visits with no valid BP documented. Reasons for this included entry of a non-realistic number to ‘escape’ the field, or the patient not having visited any single clinic three times during that year.

\textsuperscript{1}Maccabi Healthcare Services, 27 Hamered St., Tel Aviv, \textsuperscript{2}Tel Aviv University, Sackler Faculty of Medicine, Tel Aviv and \textsuperscript{3}Ben-Gurion University, Faculty of Medicine, Beer-Sheva, Israel. Correspondence to Dr Isaac Hoch; Email: hoch@saad.org.il

\textsuperscript{Received} 14 July 2004; \textsuperscript{Accepted} 30 December 2004.

\textsuperscript{a}Maccabi Healthcare Services, 27 Hamered St., Tel Aviv, \textsuperscript{b}Tel Aviv University, Sackler Faculty of Medicine, Tel Aviv and \textsuperscript{c}Ben-Gurion University, Faculty of Medicine, Beer-Sheva, Israel. Correspondence to Dr Isaac Hoch; Email: hoch@saad.org.il
Using a multivariate logistic regression model patients who had their BP documented were compared with those who did not. After adjusting for age, gender and number of visits, patients were 73% more likely to have their BP documented after the introduction of the compulsory field. During 2001 there was an increase in the proportion of patients with normal BP (from 42.4% of all measurements to 51.1%), with a concomitant decrease in hypertensive readings ($P < 0.001$).

Discussion

In 2001, BP measurement increased significantly compared with the previous year. After adjusting for visit frequency, age, and gender, the likelihood of being screened was 73% higher in 2001. The increase in BP documentation seen in year 2000 (before the mandatory field) may be a result of local organizational activity promoting awareness of cardiovascular disease prevention during that year. Since the CMR version upgrade spanned a number of weeks in late 2000, the increase in readings in 2000 may also reflect early responders to the mandatory field.

The increase in the proportion of normal BP readings reflects the change expected when increasing screening for hypertension in a population. A weakness of this study is that our relatively low baseline screening rates allow much room for improvement. It is not clear if our approach would be appropriate for practices with higher initial screening rates. In addition we are unable to assess the change in true incidence of BP measurement as we had no control group. Nonetheless, a compulsory CMR field is a more effective method than routine computer-generated reminders for improving BP measurement rates in primary care settings, and may be an effective organizational tool to change physician behaviour.

Acknowledgement

Part of this work has been presented at The Annual Israeli Medical Informatics conference in Tel Aviv March, 2004.

Declaration

Funding: none.
Ethical approval: n/a.
Conflicts of interest: none.

References