Background
Vasc-Alert was implemented at a regional dialysis organization with eight facilities late in 2007. At the same time, the provider opened up a vascular access intervention center where a majority of the dialysis patients were referred for interventions. The staff at the dialysis facilities and at the access center collaborated to improve the vascular access care of 600 patients with AV accesses.

Objective
A retrospective analysis of the treatment data was conducted to determine whether the incidence of patients with access complications changed after implementation of Vasc-Alert. Assuming that patients develop access complications primarily due to thrombotic events, over time the use of Vasc-Alert should reduce the thrombosis rate, and hence patients the incidence of patients with access complications.

In addition, the Vasc-Alert alert rate for each period was examined to see if there was a correlation between costs and changes in the alert rate.

Method
The analysis looked at patient treatment data over a 5-year period from 2008 through 2012, with each year serving as a study period. A patient was defined as having an access complication if the treatment record showed a transition from an AV access to a catheter. Patients were considered “eligible” for the analysis only if they met minimum attendance requirements i.e., they had to be present for at least 13 weeks of treatments during each analysis period, with attendance greater than 60%. In addition, patients had to be considered “AV-capable,” to be eligible, meaning that they were using a AV fistula or graft for all or part of the study period. Patients whose treatment record only indicated the use of a catheter during the study period were excluded.

Findings
During the time period from 2008 through 2012, these eight facilities experienced a 18% growth in the average eligible AV-capable access patients as determined by the analysis, (from 607 to 714). The percentage of fistula patients also increased from 42% in 2008 to 54% in 2012. The following graph compares the number of AV-capable patients for each year with the number of AV patients with complications (i.e., patients who used both an AV access as well as a catheter).
The incidence of patients with access complications expressed as a percentage of eligible AV access patients.

Costs of Access Complications
The current payment system for dialysis does not provide additional reimbursement when a catheter is used instead of an AV access. We estimate that the additional cost per treatment for catheter usage is in the range of $25 to $30 (additional drugs, catheter components, and nurses’ time).

The extra costs due to catheter use by AV access capable patients totaled $207,180 in 2008. To find a common number to compare costs across different periods, we divided the cost by the number of eligible AV capable patients, resulting in a cost of $341 per AV patient in 2008. The same process was followed for each year in the study.

If the costs incurred in 2008 ($341) were applied to the AV patient population in 2012, these groups of centers realized a savings of $168,000 in 2012 or $236 per patient.
**Change in Alert Rate over Time**

A metric used by Vasc-Alert to indicate patients who may be at risk for thrombosis is called the Alert Rate. The Alert Rate is the percentage of patients using an AV access who had at least one alert during a given month. In 2008, the Alert Rate averaged 42% for the eight facilities. This average rate was reduced to 15% in 2012, nearly a 3-fold reduction in the number of patients on alert.

![Alert Rate for Combined Facilities](chart.png)

**Conclusions**

Over the five years of Vasc-Alert use, these facilities have been able to significantly reduce the costs associated with access site complications. The prevention of thrombosis, which is the main reason an AV access capable patient has to use a catheter, is the principal objective of vascular access maintenance. The integrated team approach of the access center working with the dialysis facilities, along with the use of Vasc-Alert as a screening tool for access site issues, enabled a substantial reduction in the cost of care while improving quality.

It should be noted that the savings incurred by these centers exceeds the cost of a Vasc-Alert subscription. The yearly cost of Vasc-Alert for this group of facilities is one-third the cost of the yearly savings. This is a good example of a Value Based Medical Device: increased quality of care while reducing costs.