

INTRODUCTION

The City now known as Woodbury, Minnesota was first settled as a farming community in 1844. In 1858 the area was organized as a township and was named Red Rock. The name was changed to Woodbury the following year. It was not until 1967 that the residents of Woodbury voted to incorporate as a village. By state decree Woodbury became a city in 1969. The quiet second ring suburb of the capitol City of St. Paul was relatively small until the mid 1980's when the population began to steadily grow and new residential and retail establishment construction. Today, Woodbury has a population of over 47,000 residents and has two interstate highways passing through it.

The Woodbury Volunteer Fire Department was originally conceived out of a meeting that was held by members of the Woodbury Civic Association and residents of the Woodbury Heights area in 1960. On June 8, 1961, the Woodbury Volunteer Fire Department was incorporated. At that time, Woodbury, a township of 3,060 residents, contracted fire protection services through the East County Line Volunteer Fire Department located at Hwy 120 and Stillwater Road, Maplewood and the St. Paul Park Volunteer Fire Department located at 4th and Broadway, St. Paul Park.

In 1974 plans to construct a new City Hall included a second fire station and in 1977 the Radio Drive Fire Station opened. That year the fire department responded to 223 medical calls and served a population of approximately 7,500 residents. In 1988, a third fire station was constructed at the corner of Woodlane Drive and Thames Road. By this time the city had grown to a population of nearly 17,000 residents and the fire department's call volume had increased to 447 medical calls.

In 1993, by mutual agreement, the City of Woodbury acquired the Volunteer Fire Department and in 1995, the city introduced the Police/Paramedic Program to enhance the Basic Life Support system that was being provided by the fire department. In 1996, the city formed the Public Safety Department, which brought together Police, Fire and Emergency Medical Services under the direction of the Public Safety Director.

In Fall 2000, the City of Woodbury broke ground for the addition of a fourth fire station at the corner of Fox Run Road and Woodbury Drive and replacement of the original fire station on Afton Road with a new facility. The two fire stations will be identical. Once these projects are complete, all four fire stations will serve as Public Safety facilities, housing a satellite police office, fire apparatus and ambulances to serve the community, which has grown to a population of nearly 48,000 residents. Last year the Public Safety Department responded to 1,412 medical calls. Of these calls, 340 or nearly 25%, were related to heart problems.

Project Description/Purpose Narrative

I. Need Statement

Premise: *Through better and more thorough cardiac assessments utilizing 12-lead electrocardiograph (EKG) monitoring, we can detect and treat heart problems faster, resulting in a lower death rate and a better quality of life for victims of cardiac problems and their families.*

Emergency Medical Services (EMS) is a relatively young field. The first “modern” ambulance system incorporating personnel trained to provide care other than the load and drive service of the past was established in 1966. This was in response to the National Academy of Sciences-National Research Council’s scientific advice to the Federal government titled “Accidental Death and Disability: The Neglected Disease of Modern Society.” This advice focused on vehicle collisions, but it was soon realized that EMS was useful for response to a variety of medical emergencies including heart problems. By 1971 paramedics were using 3-lead EKGs in the prehospital environment to assist in the recognition and treatment of potentially lethal heart rhythms. This resulted in a patient survival rate that was similar to those obtained by physicians alone (National Association of EMS Physicians, 1999).

We have come a long ways in the treatment of cardiac problems. In the 1960s it was common treatment to put patients having heart attacks on bed rest alone. In the late 1960s and early 1970s defibrillators, which could administer a shock to the heart after it stopped and went into a fatal rhythm known as ventricular fibrillation or ventricular tachycardia, began to become common place on ambulances. It was recognized that medication administration and defibrillation was only a temporary fix to the problem, which was generally a hardening or plaque build up in the arteries. In the 1970s angioplasty and by-pass surgery showed promise in repairing heart damage. In the 1980s studies began to show that thrombolytic drugs were effective in reperfusing the heart by dissolving clots and plaque. Today, thrombolytics are available in most Emergency Departments and even on a select few ambulance services across the United States. One study showed that there was a 99% survival rate when heart attack patients received thrombolytics within 70 minutes of the onset of symptoms (Phalen, T., 1996). With this information, it is paramount that heart attack victims be identified as quickly as possible in order to receive this life-saving medication. Rapid identification by EMS crews is the first logical step in this effort.

The traditional 3-lead EKG is only capable of looking at the heart from three directions and is not considered to be of diagnostic quality for the identification of heart attacks. EMS providers with 3-lead only capability can only make educated guesses as to whether someone with heart attack symptoms is truly having a heart attack. The majority of providers in the Twin Cities Metropolitan Area carry only 3-lead EKG machines with defibrillation capability.

The 12-lead EKG looks at the heart from 12 different directions and is considered diagnostic quality. The 12-lead is widely used in clinics and hospitals. One of the largest EMS providers in the Twin Cities Metropolitan Area, Allina Medical Transportation, has been carrying 12-lead machines with defibrillation capability since 1999 for use in a prehospital thrombolytic study. This study would allow administration of a thrombolytic called Retaplast[™] on doctor’s orders and provided the patient was going to one of a limited number of participating hospitals. According to Michelle Sundberg, coordinator for the study, the biggest factors in reducing the time it took heart attack patients to receive thrombolytic treatment was the identification of heart attack via 12-lead EKG and the completion of an inclusion/exclusion screening sheet prior to arrival at an emergency department.

According to a 200-city survey published in the January 2001 Journal of Emergency Medical Services, 43% of the top 200 largest cities use 12-lead technology.

The American Heart Association (AHA) came out with new cardiac care guidelines in 2000 and has made the following three comments regarding 12-lead EKGs.

“Implementation of out-of-hospital 12-lead ECG diagnostic programs is recommended in urban and suburban paramedic systems.” Page I-172.

“The use of out-of-hospital ECGs and a chest pain evaluation form leads to more rapid initiation of reperfusion therapy without substantially delaying out-of-hospital time.” Page I-175.

“Evidence supports the contention that out-of-hospital 12-lead ECG diagnostic programs are cost effective and may be underused.” Page I-176.

Regions Hospital EMS, which is Woodbury Public Safety’s medical direction and headed by Dr. R.J. Frascone, has recognized the importance of 12-lead EKGs in the prehospital environment and has mandated that all providers receiving medical direction from Regions obtain 12-lead capability by the end of 2002. As our current 3-lead EKG monitor/defibrillators that the police officer/paramedics and ambulances carry are in desperate need of replacement, we would like to begin replacing them with the 12-lead EKG monitor/defibrillators as soon as possible. Originally, we had planned on distributing the 12-lead monitors to the four police officer/paramedic units only, but with financial assistance we would also be able to provide 12-lead capability in our fire department ambulances. The ambulance 12-lead monitor/defibrillators would be equipped with an automatic external defibrillator (AED), which would allow for those with a lower training level than the paramedics to use the defibrillation function of the equipment. This would build a security factor into our system by providing a device the emergency medical technicians (EMTs) could use in the absence of a paramedic, and by providing extra monitoring equipment for paramedics when they are called in from off-duty locations, which occurs when numerous medical emergencies happen simultaneously.

II. Overall Objectives

Request: *The City of Woodbury Public Safety Department requests \$41,600 towards the purchase of 8 new 12-lead monitor/defibrillators (4 of which are automatic), to be placed in paramedic units and ambulances. This money would also be used towards the purchase of chest hair clippers, instructor fees, 12-lead textbooks, and training software.*

Goals/Expected Results

The goals of our 12-lead program are to:

- 1) Increase the number of lives saved of those with heart problems.
- 2) Improve the quality of life for survivors of heart problems and their families.
- 3) Provide for medical surveillance of our firefighters by having a baseline 12-lead EKG on file to compare if an emergency arises on the scene involving a responder.
- 4) Equip the police and fire department EMS providers with state-of-the-art 12 lead monitor/defibrillators to enhance their patient assessment and treatment capabilities.
- 5) Establish a quality training program to educate our 27 paramedics and 72 EMTs on the optimum use of the 12-lead EKG.
- 6) Form partnerships with local hospitals, clinics, and surrounding EMS agencies to offer training and support with their 12-lead programs. We would like to serve as a resource for others interested in 12-lead programs.

Objectives

With approved funding, the Woodbury Public Safety Department will guarantee the completion of the following measurable objectives:

- 1) Order and coordinate the placement of eight 12-lead monitor/defibrillators and supplies in police/paramedic units and fire department ambulances.
- 2) Design and implement a training program to educate our 99 medical providers in the use of the 12-lead EKG. This will also be open to providers outside of Woodbury Public Safety. It is estimated that as many as 100 external medical personnel would attend the training when taking into account multiple clinics, a hospital, and other surrounding EMS agencies.
- 3) Collect on-going data on the progress of the program including number of 12-lead EKGs performed, number of heart attacks identified, and any quality assurance issues.
- 4) Report the results of our data collection activities to the funding agencies after the first six months and first year of the program. After the initial first year, reports will be made to funding agencies on a by request basis.

III. Implementation Schedule

<u>Activity/Objective</u>	<u>Conducted by</u>	<u>Time frame</u>
Purchase and distribute 12-leads	Chris Caulkins	Dec. 1, 2001
Design and implement training program	Chris Caulkins	July 1, 2001
Data collection	Chris Caulkins	On-going
Report to funding agencies	Chris Caulkins	Feb. and Dec. 2002

IV. Program Budget

12-lead implementation budget summary

Expense	Cost Sharing	Grant	Total
(4) 12-lead monitor/defibrillators	\$51,400	\$1,600	\$53,000
(4) 12-lead monitor/AEDs	25,600	38,400	64,000
(30) 12-lead textbooks	450	450	900
12-lead training software	100	50	150
(8) Clippers for hair removal	600	600	1200
Instructor Fee	500	500	1000
Grand Total	\$78,650	\$41,600	\$120,250

V. Evaluation

Data will be gathered to evaluate the 12-lead program on a six-month, one-year, and on-going basis. The following is a list of methods to evaluate the effectiveness of the program.

- 1) Track the amount of patients with heart-related complaints and how many had a 12-lead EKG performed.
- 2) Track the number of actual heart attacks identified via 12-lead.
- 3) Keep copies on file of all 12-leads performed. Track how many are clear and readable versus unreadable or poor quality tracings.
- 4) Keep a record on any equipment or procedure problems received and actions taken to mitigate those problems.
- 5) Track how many internal and external personnel are trained.
- 6) Gain feedback from training attendees in the form of a written evaluation and report the results.
- 7) After six months and again at one year circulate and retain a written evaluation from each paramedic provider on the effectiveness of the program and report the results.

Post-Use Paramedic Surveys (Average Results)

3=Excellent 2=Average 1=Poor

Report Date	Ability to obtain 12-lead	Ability to read 12-lead	Ability to defibrillate	Quality of equipment	Overall benefits of 12-leads

Equipment/Procedure Problems

Report Date	# of Problems Reported	Equipment Related	Procedure Related	Other	Comments

**Woodbury Public Safety Department
EMS Division**

12-Lead Training Evaluation

Name (Optional): _____

Internal or **External** Student (Circle One)

Training Level: Paramedic EMT FR RN MD RT Other: _____

Please rate the following questions using the three-point scale.

3=Excellent

2=Average

1=Poor

1) Quality of Instruction	3	2	1	N/A
2) Instructor's Knowledge	3	2	1	N/A
3) Instructor Feedback	3	2	1	N/A
3) Quality of Training Supplies	3	2	1	N/A
4) Quality of Training Facility	3	2	1	N/A
5) Your ability to obtain a 12-lead	3	2	1	N/A
6) Your ability to read a 12-lead	3	2	1	N/A
7) Your ability to defibrillate	3	2	1	N/A
8) Your knowledge gained overall	3	2	1	N/A

Comments:

**Woodbury Public Safety Department
EMS Division**

Name (Optional): _____

Please rate the following categories using the three-point scale.

3=Excellent

2=Average

1=Poor

- | | | | | |
|---|---|---|---|-----|
| 1) Your ability to obtain a 12-lead EKG. | 3 | 2 | 1 | N/A |
| 2) Your ability to read the 12-lead EKG. | 3 | 2 | 1 | N/A |
| 3) Your ability to defibrillate. | 3 | 2 | 1 | N/A |
| 4) The overall quality of the equipment. | 3 | 2 | 1 | N/A |
| 5) The benefits of the 12-lead in patient care. | 3 | 2 | 1 | N/A |

Comments: