



Into Practice

Mobile mammography: An evaluation of organizational, process, and information systems challenges



Casey Browder^a, Jan M. Eberth^{b,c,*}, Benjamin Schooley^d, Nancy R. Porter^{b,c}

^a Department of Health Services Policy and Management, Arnold School of Public Health, University of South Carolina, United States

^b Department of Epidemiology and Biostatistics, Arnold School of Public Health, University of South Carolina, United States

^c Statewide Cancer Prevention and Control Program, University of South Carolina, United States

^d Department of Integrated Information Technology, University of South Carolina, United States

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ABSTRACT

The purpose of this case study was to evaluate the information systems, personnel, and processes involved in mobile mammography settings, and offer recommendations to improve efficiency and satisfaction among patients and staff.

Data includes on-site observations, interviews, and an electronic medical record review of a hospital who offers both mobile and fixed facility mammography services to their community.

The optimal expectations for the process of mobile mammography from multiple perspectives were defined as (1) patient receives mammogram the day of their visit, (2) patient has efficient intake process with little wait time, (3) follow-up is completed and timely, (4) site contact and van staff are satisfied with van visit and choose to schedule future visits, and (5) the MMU is able to assess its performance and set goals for improvement.

Challenges that prevent the realization of those expectations include a low patient pre-registration rate, difficulty obtaining required physician orders, frequent information system downtime/Internet connectivity issues, ill-defined organizational communication/roles, insufficient site host/patient education, and disparate organizational and information systems.

Our recommendations include employing a dedicated mobile mammography team for end-to-end oversight, mitigating for system connectivity issues, allowing for patient self-referrals, integrating scheduling and registration processes, and a focused approach to educating site hosts and respective patients about expectations for the day of the visit.

The MMU is an important community resource; we recommend simple process improvements and information flow improvements to further enable the MMU's goals.

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1. Background

The American Cancer Society estimated 235,670 new cases of breast cancer in 2014 and 40,000 breast cancer-related deaths.¹ Breast cancer incidence rates have remained relatively stable since the early 1990s; between 1980 and 1987 there was a spike in breast cancer incidence which was largely due to greater use of mammography, leading to cancers being diagnosed at earlier stages.¹ Studies have shown that annual mammography screening reduces the risk of breast cancer death by 15–20%.² Though the percentage of women who reported having a mammogram in the past two years increased from 29% in 1987 to 70% in 2000, the

screening rate has stabilized.³ Ongoing efforts continue to decrease breast cancer death rates, improve access to health care for women, and encourage women to receive regular mammograms.

The prevalence and utilization of mobile mammography represents one example of these efforts. Recent studies have found that mobile mammography successfully engages women who have not had a recent mammogram or other preventive women's health services.³ Moreover, mobile mammography is promoted based on its convenience for patients and its ability to reach vulnerable populations who have limited access to health care.^{4–6} Unlike fixed-site mammography, mobile mammography programs have additional costs, including operational and maintenance costs of the mobile unit, drivers, overtime and travel and liability insurance.⁷ In order for a mobile mammography program to be successful, they must be cost-effective; to do this they must have high enrollment numbers and be able to run their program in a cost-effective manner.⁸ A national survey had found that just

* Corresponding author at: Cancer Prevention and Control Program, 915 Greene Street, Room 234, Columbia, SC 29208, United States.

Tel.: +1 803 576 5770; fax: +1 803 576 5624.

E-mail address: jmeberth@mailbox.sc.edu (J.M. Eberth).

under half (47%) of surveyed programs were able to operate a mobile mammography program in a profitable manner or were able to break even, and 52% reported minimal or substantial losses.⁹ However, studies have also shown that the cost-effectiveness of mobile mammography units is lower than their stationary counterparts, calling for a focused assessment of the costs vs. benefits of reaching a higher volume of patients using mobile means.^{10,11} This may be especially important for those units that reach numerous low-income patients through grant-funded programs.

The increased prevalence and use of health information technologies has facilitated improved processes for mammography screening. The transition to digital mammography from film-based screenings during the past 15 years has shortened appointment times and reduced the need for additional follow-up.¹² From a health services perspective, additional improvements are needed. For example, while screening mammograms using digital technology can be completed in as little as 15 min,¹³ delays may result from trying to obtain previous images from other providers prior to interpretation, validating contact information for the patient's primary care practitioner, and scheduling the patient for a diagnostic mammogram if an abnormality was present. These scenarios are particularly pertinent in mobile settings where many patients may not have a medical record already established with the provider, transportation may be difficult to obtain, and patients may not have insurance or a usual source of care.^{5,6}

The purpose of this case study is to explore the use of mobile mammography as a community health resource, including the information systems, personnel, and processes needed to sustain a high performance mobile mammography unit (MMU). Specifically, we seek to investigate challenges and opportunities to improving mobile mammography, and provide recommendations that will

enhance outreach efforts, improve workflow, and support a positive experience for patients, the hospital staff, and the site hosts. Secondly, we hope to offer insights that may prove useful by hospitals preparing to begin a mobile mammography program at their institutions.

2. Organizational context

This case study focused on a MMU that has been operated by a medical center in the southeastern U.S. for over 5 years, serving a large multi-county area. The MMU makes site visits about 4 times per week to pre-scheduled host locations. Last year, the MMU served nearly 2500 patients across over 125 site visits. To obtain a mammogram on the MMU, a patient must identify a referring physician to whom results can be sent and possess a method of payment. For low-income patients, grant funding from the National Breast and Cervical Cancer Early Detection Program, other non-profit organizations, or the hospital's foundation can be obtained.

The goals of the medical center in providing a MMU to the community are to enable increased access to mammography screenings for rural, underserved/uninsured women and to further lower the incidence of breast cancer in their service area. This case study reports on a quality assessment and improvement project to build upon past successes of the MMU. We took a patient-centered view of the mobile mammography service process, beginning with the time of initial patient contact, and concluding with patient follow-up (Fig. 1). Certainly, the health care process does not conclude for a patient or health care system at large after follow-up, however,

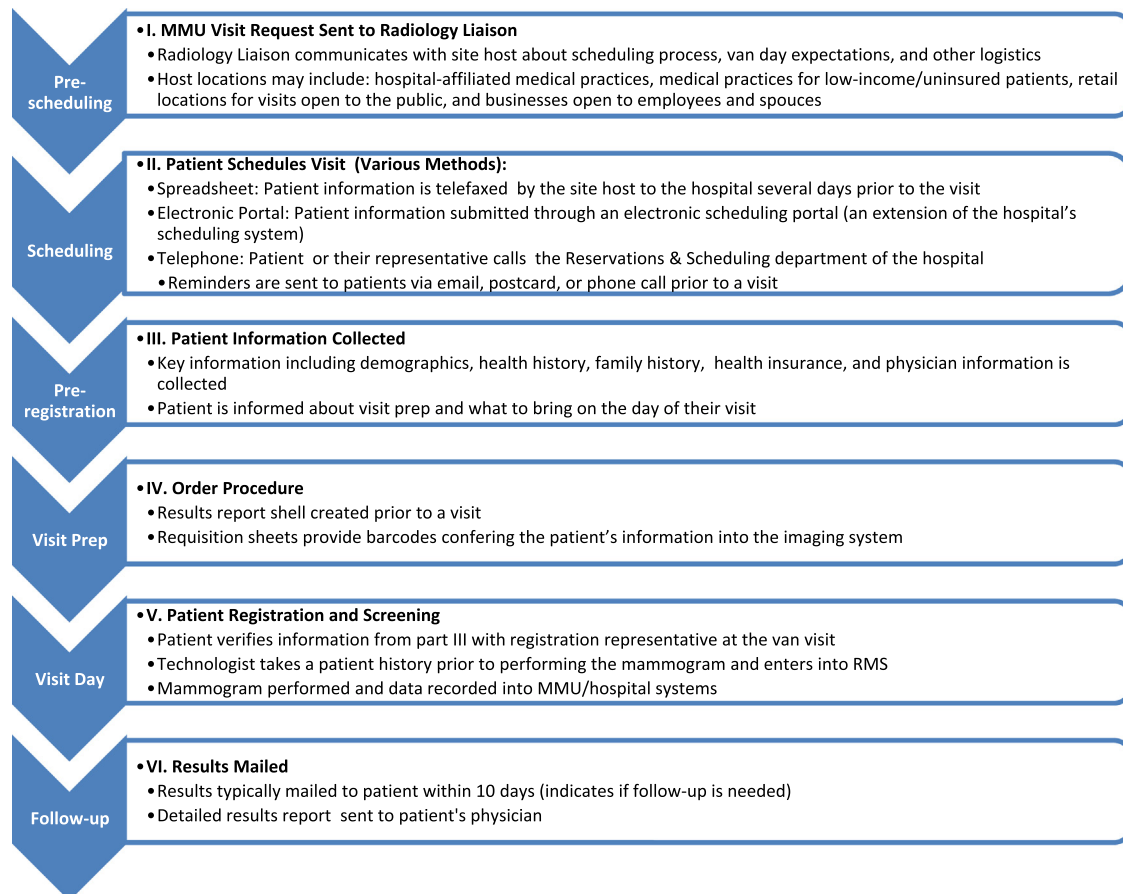


Fig. 1. Mobile mammography process steps and procedures.

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