Primary Intended Outcomes
1. Determine if pharmacist interventions in a clinic for heart failure, left ventricular assist device, and heart transplant patients decrease thirty-day readmissions.
2. Determine the number and types of interventions made by the pharmacist in this setting.

Relevant PPMI Recommendation
B9. For hospitals and health systems that provide ambulatory care services, drug therapy management should be available from a pharmacist for each outpatient.

Situation Analysis
Although many reports of pharmacist involvement in ambulatory clinics have been published, there are no reports of pharmacist interventions in a clinic that serves LVAD or heart transplant patients. In this complex patient population, the benefits of pharmacist involvement on a multidisciplinary care team have yet to be explored.

At MedStar Washington Hospital Center, a large teaching hospital in Washington, D.C., a clinical pharmacist developed a working relationship with the Advanced Heart Failure, LVAD, and Heart Transplant team by rounding with them on the inpatient service. The team then invited the pharmacist to work with them in their clinic one morning per week to help with medication management.

Service Description
During the pharmacist's weekly clinic session with the team, physicians see heart failure, LVAD, and heart transplant patients. In order to focus on the patients with the greatest need for medication management services, the pharmacist does medication review for all heart transplant patients, for patients who were recently discharged from the hospital, and for patients with especially complex medication regimens as determined by the pharmacist and the team. The workflow in the clinic generally proceeds as follows:

1. The medical assistant (MA) or nurse brings the patient into the clinic triage area, measures and records vital signs, and leads the patient into a room.
2. The MA or nurse gives the pharmacist the current medication list from the outpatient elec-
tronic medical record (EMR), and the pharmacist reviews recent EMR notes (from the hospital and the clinic) for possible other medications the patient may be taking.

3. The pharmacist reviews the medication list with the patient and makes notes of additional over-the-counter and prescription medications the patient is taking, as well as information about adherence to medication therapy. The pharmacist also asks the patient about side effects to medications and whether he or she is having financial difficulty with acquiring medications. The pharmacist educates the patient about the purpose of the medications, management of the disease state, and any other necessary information.

4. The pharmacist shares information acquired from the patient with the physician and provides recommendations for changes to medication therapy.

5. The physician examines the patient and follows up with the pharmacist for further input and recommendations as needed.

Examples of Documented Interventions
- The pharmacist reviewed the medication list with the patient and found that she is taking new prescriptions of metolazone, diltiazem, and naproxen from other physicians. The pharmacist instructed the patient to stop taking naproxen and educated her about the risks of NSAID use in heart failure.
- The pharmacist reviewed the medication list with the patient, did post-discharge medication reconciliation, and counseled the patient extensively regarding the purpose and side effects of post-transplant medications. The pharmacist found that the patient was taking an antacid for GERD which can interact with transplant medications; the pharmacist recommended that the physician prescribe a proton pump inhibitor instead and also recommended increasing the insulin dose for diabetes management.

Key Elements for Success
1. Working relationship with the multidisciplinary team and pharmacist creativity in determining the best way to fit into clinic workflow

2. Strong knowledge base of pharmacotherapy for heart failure, LVAD, and heart transplant patients

3. Pharmacist access to the EMR for both inpatient and outpatient settings

4. Excellent communication skills and ability to accurately assess adherence and educate patients about the purpose and side effects of their medications

Resource Utilization
Personnel: Clinical pharmacist

IT and other Infrastructure: IT staff set up access to outpatient EMR for the pharmacist

Supply expense: None (pharmacist uses existing supplies, such as computers)
Recognized Intangible Benefits
In-depth medication review by the pharmacist drew the attention of the physician team members to the fact that nonadherence to medical therapy is frequent among this patient population, often because medication changes are not clear to the patient. This increased awareness encouraged the physicians to attempt to be clearer in providing medication instructions to patients. Also, pharmacist attention to over-the-counter medication use sometimes revealed lack of patient education about which medications they should avoid (i.e. NSAIDs) and provided an opportunity for the pharmacist to educate patients in this area. Additionally, the involvement of the pharmacist in both inpatient and outpatient care for this patient population allowed for better continuity of care, as the pharmacist was aware of medication therapy provided along the entire spectrum of care. Also, in the clinic setting the pharmacist provided an “extra pair of eyes” to assure that important changes in lab values, clinical status, and medication therapy were recognized and addressed.

Outcome Measures
Records of pharmacist interventions in the clinic from June 2012 to February 2013 were reviewed and analyzed to determine number of patient encounters, number of interventions, patients per clinic, interventions per encounter, and types of interventions. Thirty-day readmission rates for patients seen by the pharmacist and for all patients admitted to the Advanced Heart Failure, LVAD, and Heart Transplant team were also reviewed.

Over a total of 21 clinic sessions, the pharmacist had 124 patient encounters and performed 215 interventions. The pharmacist saw a median of six patients (range 4-8) per clinic session and made a median of two interventions per patient (range 0-5). The most common type of intervention was medication reconciliation (27.8% of interventions), followed by medication education (21.3% of interventions), and discovery of nonadherence (20.4% of interventions). Other interventions included recommendations for prescribing new medications, discontinuation of medications, dose changes, prescribing an alternate medication, and lab monitoring. The pharmacist also provided drug information to prescribers, i.e. regarding drug interactions. The 30-day readmission rate for patients seen in the clinic by the pharmacist was 23.6%, and the readmission rate for all patients admitted to the Advanced HF, LVAD, and Heart Transplant team was 26%.

Lessons Learned
1. Education of the multidisciplinary team about the pharmacist’s role in the clinic setting is critical to assure that the pharmacist is integrated effectively into the clinic workflow.
2. Access to patient information in the inpatient and outpatient EMR is essential to assure that the pharmacist can perform comprehensive medication management for this complex population.
3. Access to databases for drug information and medical literature will help the pharmacist to be as effective as possible in answering complex drug information questions that come up in the clinic setting.
Other Considerations

The pharmacist who performed medication management services in the clinic setting for this group had specific experiences which built a solid foundation for the provision of this service:

1. The pharmacist had already built an excellent relationship with the team, as well as a strong knowledge base in pharmacotherapy in this patient population, by rounding with the team in the inpatient setting.

2. The pharmacist had participated in longitudinal ambulatory clinic rotations during her residency, which prepared her for practicing in the clinic setting.

Pharmacists who did not have previous experience in the clinic setting or with providing care for patients with heart failure, LVAD, and heart transplant patients would likely find it more difficult to provide outpatient services for this population. In addition, the pharmacist’s manager was open to the pharmacist taking time away from inpatient care duties to pilot this service; otherwise, this initiative would not have been possible.

Suggestions for Other Hospitals/Health Systems

1. When providing a new service for a special patient population, recruit a pharmacist who has experience with the population.

2. If the pharmacist does not have an established relationship with the medical team, convene a meeting with key team members to educate them on how a pharmacist can assist them in the outpatient setting with medication reconciliation, medication management, and provision of drug information.

3. Even if resources are scarce, attempt to provide enough pharmacist time for a pilot project of a new service. Once the medical team members see how helpful pharmacist services can be, they will be key allies in finding a way to continue pharmacist services in their practice setting.