



DEVELOPING OUTSTANDING POST-DISCHARGE CARE PROGRAMS FOR ACUTE CORONARY SYNDROME

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Objectives

1. Discuss the key components of discharge preparation for patients with acute coronary syndrome (ACS).
2. Describe how the use of various tools (e.g., Teach-back technique, Morisky assessment, discharge medication schedules) can enhance the individualization and effectiveness of the discharge process.
3. List the important elements of post-discharge care and the goals of an early transition-of-care clinic visit for ACS patients.
4. Discuss the importance of identifying and resolving medication-related problems prior to, during, and after discharge, particularly for patients with ACS.

Introduction

The inpatient management of acute coronary syndrome (ACS) has become increasingly concise with the adoption of earlier invasive approaches and shorter length of stay. According to the National Cardiovascular Data Registry, the median length of stay following primary percutaneous coronary intervention for ST-elevation myocardial infarction is now ≤ 2 days. Implementation of algorithmic ACS care with programs like "Get With the Guidelines" does not reduce adherence to evidence-based measures, even with shorter length of stay.¹ Thus, the window of time available to provide the patient and caregivers with education and elements of care coordination is smaller. Additional factors contributing to transition challenges in ACS include the complexity of the medication regimen, dietary and lifestyle modification recommendations, tobacco dependence treatment, and management of previously unidentified or uncontrolled comorbidities (such as hypertension or diabetes). The objective of ACS therapy is to restore function to normal or near normal levels, reduce risk of subsequent events and facilitate secondary prevention through aggressive control of risk factors.²

Therefore, in addition to optimizing triage and emergency/acute care, achieving excellent outcomes for ACS patients also depends on providing a safe transition to the post-acute care setting by establishing enhanced discharge processes and ensuring adequate outpatient planning and support. Key elements to providing a successful ACS discharge and establishing best practices in outpatient care will be addressed here (Figure 1). These elements form the basis for the ACS transition-of-care program adopted at the University of Kentucky (UK) Medical Center, named KATS PLEDGE (KY Adherence to Pharmacotherapy System: Program to Lead, Educate and Deliver Goal-Directed Care Effectively), which will be used here as an example.

FIGURE 01 Key Elements of Successful Discharge and Post-Acute Care Follow up



Discharge Preparation

To provide optimal continuity of care for ACS, discharge planning must begin on admission. Existing or newly diagnosed comorbid conditions, social concerns and other factors that require more complex discharge planning can usually be identified early and hence can be addressed sooner rather than later. Accurate medication history and reconciliation, assessment of medication adherence, prescribing of evidence-based and streamlined pharmacotherapy, multi-level effective communication and patient education about disease and therapy are key elements of discharge preparation.

An accurate and complete medication history can provide insight into previous history and medication allergies or intolerances and prevent unnecessary medication changes. For example, it may be counter-productive and confusing to change a high-potency statin or an angiotensin receptor blocker from one brand to another if patients confirm their home medications are well tolerated and affordable. It is also important to have an accurate previous home regimen to educate patients on discontinued medications or changed doses upon discharge. Institutions use a multitude of ap-



proaches to obtain medication histories. Studies show that assigning accountability and involving pharmacy personnel (technicians or pharmacists) improves documentation and accuracy.^{3,4}

Adherence is a complex behavior and it is a well-documented problem in cardiovascular disease management. As the complexity of a medical regimen increases, adherence declines. It is not unusual for a patient with newly diagnosed ACS to be admitted on no medications and discharged soon thereafter with “polypharmacy.” Therefore, it is important to consider the patient’s health literacy and past medication adherence to identify and address barriers to adherence. A simple three-question tool can rapidly identify inadequate functional health literacy: 1) How often do you have difficulty understanding written information about your medical condition? 2) How often do you have someone help you read written medical information? 3) How confident are you at filling out medical forms by yourself?⁵ The 8-question MORISKY assessment (Table 1) has also been validated as a tool to evaluate medication adherence.⁶ Utilizing these tools allows improved understanding of a patient’s health literacy and barriers to adherence, which can help with providing appropriate targeted education. Both disease and medication education should begin immediately and be reinforced throughout the hospitalization and into post-acute care settings. Understanding and improving patients’ perceptions about taking their cardiac medications will help to ensure that patients will take the evidence-based regimens provided.^{7,8}

Many resources exist to help health systems provide evidence-based therapy. Education regarding and systematic implementation of current treatment guidelines, reviewing and updating practices based on cutting edge clinical trials, solidification of practice through development of hospital protocols and pathways,

TABLE 01 Modified 8-Item MORISKY Assessment

1. Do you sometimes forget to take your medications?
2. Over the past two weeks, were there any days you did not take your medicine?
3. Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse when you took it?
4. When you travel or leave home, do you sometimes forget to bring along your medications?
5. Did you take your medication yesterday?
6. When you feel like your disease is under control, do you stop taking your medicine?
7. Do you ever feel hassled about sticking to your medication regimen?
8. How often do you have difficulty remembering to take your medicine?

as well as development of multidisciplinary patient care teams can help ensure that patients are prescribed the best possible pharmacologic and non-pharmacologic therapies. Although implementing standardized protocols is useful in adhering to evidence-based approaches and reducing variation, it is important to understand and consider the uniqueness of every patient’s clinical situation and to adjust accordingly.

Communication between the medical team, the patient and other caregivers and providers is of critical importance. Changes made to previous home therapy should be clearly relayed to all parties (patient, caregivers, primary care and referring providers, home pharmacists). Communication can prevent unnecessary confusion and improve adherence and continuity. Discontinuing old prescriptions at the patient’s pharmacy will prevent drug interactions, duplication of therapy, and again improve continuity.

Patient education should also begin early in the hospital stay. Armed with an understanding of the patient’s health literacy, and given the widespread availability of multimedia tools, education can be truly dynamic. For example, at UK HealthCare, the patient’s disease (e.g., atherosclerosis, risk factors, ACS) and therapy (e.g., coronary stenting, lipid lowering and antiplatelet agents) are explained to patients utilizing short video clips displayed on tablet computers in the preparation and recovery area of the catheterization laboratory. Medication education is provided each time the patient is given a medication to take, through tablet videos as well as written communication, which is reviewed for optimal local health literacy levels. More comprehensive medication education is provided prior to discharge and is described in more detail later.

Enhanced Discharge Process

Enhanced discharge processes are intended to facilitate patient education, improve effective communication and ensure safe transition of care. Several comprehensive tools have been shown to improve multiple aspects of patient care, including patient medication understanding, satisfaction, and adherence, and in some cases these tools have been shown to improve outcomes by reducing readmission. One such tool is Boston University’s Project Re-Engineered Discharge (Project RED), which has been widely imitated.⁹ Armed with accurate incoming medication history and reconciliation on admission, facilitation of comprehensive discharge reconciliation is a fundamental component of an enhanced discharge process. At UK HealthCare, ACS patients’ discharge medication reconciliation is facilitated by cardiovascular clinical pharmacists and finalized by discharging physicians or advanced practice providers. This double check provides much needed redundancy given the quick patient turn over and multiple medication changes. Providing patients with user friendly tools, such as discharge medication schedules and written instructions regarding which medications have been changed or discontinued is vitally important (Figure 2). Other tools, such as pill boxes and discharge prescription services, may further aid patients and improve adherence.



FIGURE 02

Example Discharge Medication Schedule from UK HealthCare

Medications You Should Take

Medication name	Morning Noon Evening Bed Time				Additional Instructions
	Morning	Noon	Evening	Bed Time	Instructions
Aspirin 81 mg oral tablet - By mouth (Also known as Low dose ASA, Aspirin low strength, Bayer low strength)	1 tab(s)				1 tab(s) orally 1 time a day
Atorvastatin 80 mg oral tablet - By mouth (Also known as Lipitor)				1 tab(s)	1 tab(s) orally 1 time a day (at bedtime)
Carvedilol 6.25 mg oral tablet - By mouth (Also known as Coreg)	1 tab(s)		1 tab(s)		1 tab(s) orally 2 times a day
Lisinopril 5 mg oral tablet - By mouth (Also known as Zestril, Prinivil)	1 tab(s)				1 tab(s) orally 1 time a day
Ticagrelor 90 mg oral tablet - By mouth (Also known as Brilinta)	1 tab(s)		1 tab(s)		1 tab(s) orally 2 times a day
Vitamin D3 1000 intl units oral tablet - By mouth (Also known as Vitamin D3, D 1000 IU, D3 1000)	1 tab(s)				1 tab(s) orally 1 time a day
Nitroglycerin 0.4 mg sublingual tablet - Under tongue (Also known as Nitrostat, Nitroquick)					1 tab(s) under tongue every 5 minutes, as needed for chest pain

- If you have medications at home that are not on this list:
- Call the doctor that gave you the medicine
 - Share this list with your doctor
 - Ask the doctor if you should stop taking them or keep taking them

Although patient and caregiver education should begin early and have built in redundancy, discharge education remains extremely important. As stated earlier, this should be in the context of a more comprehensive discharge process aimed at ensuring patient involvement, adherence and safe transition from inpatient to outpatient status. Aspects related to diet, exercise and risk factor control education are typically provided by cardiovascular nurses and dedicated educators and/or nutritionists at any opportunity during the typically short hospital stay. At UK HealthCare, education related to pharmacotherapy is provided by cardiology clinical pharmacists or their extenders (pharmacy interns, students, and residents). Pharmacists are uniquely trained to provide education to patients on their medications, and their interventions have been shown to increase identification of medication errors and improve patient adherence.¹⁰ Although resource intensive, it is important that pharmacist resources be allocated to patient education for particularly high-risk patient populations, such as those with ACS. Any medication education session should include review of medication indications (e.g., patients who take statins post-ACS are less likely to experience another myocardial infarction), potential adverse drug reactions and importance of adherence (particularly with dual-

antiplatelet therapy [DAPT]). The “teach-back” technique (also referred to as “show me”) is an evidence-based education process that ensures patients have gained understanding of vital information.¹¹ It is not meant to “quiz” the patient, but with practice and dedication to mastering this approach it may be employed naturally to patient interactions. In general, patients are simply asked to explain, in their own words, what they need to know or how to take a medication. This technique provides a mechanism for confirming either proper understanding or miscommunication or suboptimal understanding that requires re-education. Essential elements of this evidence-based education technique and the tools to learn and implement it can be found at teachbacktraining.org (Table 2).

An additional component of enhanced discharge processes that has been fully implemented at UK HealthCare is a dedication to ACS patients leaving with all their medications in hand via discharge prescription services. This is particularly important for patients prescribed new DAPT, since it has been well demonstrated that delays in filling contribute to increased cardiovascular morbidity and mortality.¹² In the case of clopidogrel, it has been shown that at least 1 in 6 patients delays filling their prescription with an average of



TABLE 02 Ten Elements of Competence for Using Teach-Back Effectively

1. Use a caring tone of voice and attitude.
2. Display comfortable body language and make eye contact.
3. Use plain language.
4. Ask the patient to explain back, using their own words.
5. Use non-shaming, open-ended questions.
6. Avoid asking questions that can be answered with a simple yes or no.
7. Emphasize that the responsibility to explain clearly is on you, the provider.
8. If the patient is not able to teach back correctly, explain again and re-check.
9. Use reader-friendly print materials to support learning.
10. Document use of and patient response to teach-back.

three days delay.¹³ Although few studies have addressed whether providing DAPT to patients prior to discharge can reduce this risk, it is widely accepted that the highest risk of subsequent events (such as stent thrombosis) is concentrated in the first month. Providing medications without co-payment post-myocardial infarction also has a beneficial impact on adherence. In the Post-Myocardial Infarction Free Rx Event and Economic Evaluation (MI FREEE) trial, the discharge statin, beta-blocker, and renin-angiotensin aldosterone inhibitors were provided at no cost to study patients. With a major limitation of not including antiplatelet therapy, the service did not reduce major cardiovascular events; however, there was an improvement in adherence and a reduction in overall patient costs.¹⁴ This trial hints at the importance of DAPT, but it also clearly shows the complexity of medication adherence and the need for a multifaceted and individualized intervention when tackling issues of non-adherence.

Another advantage of discharge prescription delivery is that it allows more targeted, consistent, and thorough education (e.g., showing the patients their medication or filling pill boxes). As previously mentioned, at UK HealthCare cardiovascular trained clinical pharmacists provide patient discharge medication education. Filling prescriptions in house allows the team to identify important financial barriers, ensure prior authorizations, help enroll patients in assistance programs, and/or adjust the pharmacotherapy regimen with the coordinated expertise of clinical pharmacists and cardiologists. There is also a potential financial benefit to the health system associated with outpatient pharmacy revenue generation (both on discharge and with new patient recurring volumes). Over 90% of ACS patients consent to participate in this program. Once patients opt in, a standardized prescription form is utilized by the team at

the time of hospital discharge and completion of discharge reconciliation (Figure 3). It is advisable that institutions that provide this service emphasize effective patient communication regarding refills and/or transfer of prescriptions to the previously established outpatient pharmacy. Such education should be provided both verbally and in written instructions. In patients with particularly low literacy, mail order service or pro-active communication with their community pharmacist to transfer prescriptions may be helpful.

Finally, care coordination is a vital component of the optimal discharge process. Providing patients with adequate information about follow up plans (e.g., appointment dates and times, follow up locations, any referrals, home resources, study results) prior to discharge can help ensure continuity post-discharge. Care coordination should also include ensuring adequate documentation and communication of care plans between inpatient and outpatient care providers, as well as specialists, primary care providers, pharmacy providers, etc.

One important aspect of coordination is encouraging and facilitating enrollment in cardiac rehabilitation programs. Evidence of the valuable role of rehabilitation programs is plentiful and it is a recommendation of the national guidelines as well as a quality metric for ACS care.^{2,15} In tertiary care centers, where ACS patients are frequently transferred from community and/or rural hospitals, it is important to identify and refer patients to cardiac rehabilitation centers closest to their residence. Providing patients with such referrals and contact information for follow up is an important component of the care coordination process.

At UK HealthCare, the inpatient clinical pharmacists and nurse discharge coordinators leave a detailed note in the electronic record documenting patient-specific pharmacotherapy discussions as well as information obtained during the discharge counseling session. The consistent and thorough documentation facilitates improved post-discharge care.

Post-Discharge Care

Individual components of the post-acute care follow up have been widely employed with mixed clinical outcome findings. This is especially true of the 24-48 hours post-discharge phone call. Although a scripted and appropriately managed call can provide an opportunity to answer patient questions, ensure prescriptions have been filled (if discharge prescriptions were not provided), and possibly prevent early readmission by reassurance of clinical status, the mixed results make full implementation of this single intervention challenging for resource justification. The success of follow up calls can be improved when combined with home visits and/or early discharge face-to-face clinic visits. At UK HealthCare, all patients are called within 48 hours by discharge nurses based on care units. Recently, UK started a home visit program following discharge, which leverages the outreach of the home hospice teams, allowing them to



FIGURE 03 Example Acute Coronary Syndrome (ACS) Discharge Prescription Form Used by UK HealthCare to Ensure Accurate Prescribing of Evidence-Based Therapies and Discharge Prescription Services to All ACS Patients

Please Fax Completed Form to CRP (Meds-to-Beds) 323-5622
 Faxed by (initials): on / /20_@

Patient name: _____
 DOB: _____
 MRN: _____

KATS PLEDGE

KY Adherence to pharmacotherapy System: Program to Lead, Educate, and Deliver Goal-directed care Effectively

This is a legal prescription form. Please complete and sign this form for ALL but ONLY patients who have received Percutaneous Coronary Intervention.

Gill Heart Institute
 800 S. Rose St., Suite G100
 Lexington, KY 40536
 Phone: 859-323-xxxx
 Fax: 859-323-xxxx

- John Doe, MD KY License #00000
- Jane Doe, MD KY License #11111
- John Smith, MD KY License #22222
- Jane Smith, MD KY License #33333
- John Rich MD KY License #44444
- Jane Rich, MD KY License #55555

*Check the interventional cardiologist above and add your prescriber information below the signature
 Core secondary prevention medicines will be filled and delivered to patient free of charge at time of hospital discharge.

Select below (unless contraindication):

- Aspirin 81 mg po daily #30, 11 refills

Select one below:

- Ticagrelor 90 mg po twice daily #60, 11 refills
- Clopidogrel 75 mg po daily #30, 11 refills

Select one below (and appropriate dose):

- Atorvastatin 80 mg po daily at bedtime #30, 11 refills
- Atorvastatin 20 mg po daily at bedtime #30, 11 refills (lower dose option for patients >75 yo)
- Pravastatin 80 mg po daily at bedtime #30, 11 refills

Select one below (and appropriate dose):

Metoprolol tartrate (Lopressor):

- 12.5 mg po twice daily #60, 11 refills
- 25 mg po twice daily #60, 11 refills
- 50 mg po twice daily #60, 11 refills
- 100 mg po twice daily #60, 11 refills

Carvedilol:

- 3.125 mg po twice daily #60, 11 refills
- 6.25 mg po twice daily #60, 11 refills
- 12.5 mg po twice daily #60, 11 refills
- 25 mg po twice daily #60, 11 refills

Select if indicated: DMII, LVSO (EF<40%), HTN or CRI (and appropriate dose):

Lisinopril:

- 2.5 mg po daily #30, 11 refills
- 5 mg po daily #30, 11 refills
- 10 mg po daily #30, 11 refills
- 20 mg po daily #30, 11 refills
- 40 mg po daily #30, 11 refills

Select if needed:

- SL Nitroglycerin 0.4 mg, place one tablet under tongue as needed for chest pain, #25, 3 refills

Additional medications may be electronically prescribed. Those medications will be the financial responsibility of the patient and not covered under the KATS PLEDGE program.

Delivery service available for prescriptions received M-F 8:00am-7:00pm, Sat 9:00am-4:30pm, Sun 1:00pm - 4:30pm.
 If you have questions about delivery, please call the Meds-to-Beds team at 859-218-xxxx.

MD/APP Signature (print & sign): _____
 KY Lic #: _____
 Pager #: _____

Date/Time: _____



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double as transition-of-care nurses after receiving training in specific diagnoses that are known for higher readmission rates (such as heart failure and ACS). However, the majority of patient support occurs at an early (within seven days) face-to-face transition-of-care clinic visit with a cardiovascular clinical pharmacist.

In the UK care model, the cardiovascular clinical pharmacist is credentialed and privileged to provide comprehensive medication therapy management and patient education on behalf of the interventional cardiologists. The office visit provides many elements of support for the patient with a clear emphasis on education and medication therapy management. Table 3 provides an overview of services provided in this clinic visit. Patient encounters last an average of 45 minutes. If a clinical concern is identified (e.g., procedural complication or serious adverse event), immediate support is provided by interventional cardiologists and/or advanced practice providers.

Given that a large portion of early and preventable readmissions are medication-related, the follow up at UK HealthCare is pharmacy-driven and, although multifaceted, focuses largely on identification

and resolution of medication-related problems (MRP). MRPs are defined as undesirable events experienced by patients that involve or are suspected to involve their drug therapy. Further categorization of MRPs and corresponding examples that are specific to ACS are shown in Table 4. For example, it is important to reassure patients who feel dyspneic after beginning ticagrelor therapy that this side effect frequently subsides within days and that the benefits of effective platelet inhibition outweigh the transient self-limited side effect. When angiotensin converting enzyme inhibitors are started in the hospital in patients with chronic kidney disease, it is important to check renal function and electrolytes within 7-10 days.

Care coordination and appropriate handover of patient care is also provided in the ACS transitional care management (TCM) clinic at UK. Ensuring that patients have follow up with their primary care providers, are established with cardiologists, have been referred for cardiac rehabilitation, and have care plans for co-morbidity management, is vital to their success. Also, education with teach-back on lifestyle modifications ensures appropriate emphasis on all aspects of secondary prevention.

**TABLE
03**

Activities in Acute Coronary Syndrome Transitional Care Management Clinic

Activity	Description
Hospitalization Review	Provide patient/family clarity on events, interventions, future directions (e.g., staged percutaneous coronary intervention)
General Assessment at Home	Identify angina or heart failure symptoms and/or medication-related problems
Medication Reconciliation: with review of prescription and over-the-counter meds utilizing teach-back	Clarify home medications not previously addressed, re-direct on education of new medications (indications, potential adverse drug experiences, importance of adherence), update accurate list in electronic medical record, provide patient a new updated list/schedule, identify and address medication-related problems
Patient Assessment: vitals, medication related problems, catheter access site, etc.	Adjust medications for blood pressure or heart rate (high or low), assess heart failure symptoms (adjust diuretic, medication titration), identify adverse drug experiences and adjust therapy
Laboratory Assessment	Monitor pharmacotherapy (serum creatinine, potassium, etc.) and/or follow up needs from inpatient (serum creatinine, hemoglobin/hematocrit, thyroid stimulating hormone)
Tobacco Dependence Education	Re-assess willingness to quit, adjust supportive pharmacotherapy, referral
Cardiac Rehabilitation	Confirm or make referral, discuss program goals
Schedule Re-assessment of Left Ventricle	Follow up with Cardiology/Electrophysiology for implantable cardioverter-defibrillator (ICD) placement if necessary
Dietary Invention	Discuss role of sodium in hypertension and low-sodium/low-fat diets, as well as plant-based and Mediterranean diets
Activity Education	Discuss return to work, exercise, sex, etc.
Follow Up Planning	Establish long-term cardiologist, arrange primary care physician follow up (communication), refer for specialists as needed (e.g., endocrinology, psychology, social worker, tobacco treatment specialists, nephrologist)



Conclusion

Providing optimal continuity for complex disease states, such as ACS, has been extensively evaluated. Individual interventions, such as follow up phone calls or medication reconciliation, have resulted in variable success. However, when multiple interventions are combined and multidisciplinary team members participate, outcomes are consistently improved. Implementation of the components discussed here, which focus on individualizing education, identifying and eliminating barriers to adherence and preventing medication-related problems throughout the hospital stay and in the post-acute care setting, can ensure that patients have the best chance at successful outcomes.

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TABLE 04

Classification of Medication-Related Problems (MRP)

Medication-Related Problem	Description/Example
Untreated medical condition	Patient meets criteria for aldosterone antagonist but not prescribed at discharge
Patient taking unnecessary drug (medication without indication)	Patient prescribed proton pump inhibitor without clear indication
Incorrect medication for patient's condition or age	Patient has low ejection fraction but is not on an evidence-based beta-blocker
Patient not taking medication correctly	Patient taking ticagrelor or carvedilol once daily
Correct medication but dose too low (subtherapeutic)	Patient started on low-dose angiotensin converting enzyme inhibitor for post-acute coronary syndrome care and hypertension, but blood pressure remains uncontrolled
Correct medication but dose too high (overdosage)	Patient on apixiban for atrial fibrillation but has low glomerular filtration rate and requires dose reduction
Adverse drug reaction	Patient experiencing rash with P2Y12 inhibitor or myopathy with statin therapy
Drug interactions (with drug or food)	Patient on phenytoin for seizures and prescribed ticagrelor for acute coronary syndrome (an absolutely contraindicated drug interaction)
Failure to receive a necessary medication	Patient recommended to take an over-the-counter proton pump inhibitor for gastrointestinal prophylaxis and has not picked up at pharmacy



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