



The Use of Procedural Standardization to Reduce Recognition to Reperfusion (R2R) Time in STEMI

General Information

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Project UPSTART – additional information

The following document provides more detailed information in response to common questions regarding Project UPSTART

What exactly is “Project UPSTART?”

Project UPSTART is a quality improvement project developed to help individual hospitals or systems minimize the time interval between recognition of ST-Elevation Myocardial Infarction (STEMI) and reperfusion of the blocked artery by PCI or thrombolysis. Minimizing this interval between “Recognition & Reperfusion” is one of the most important determinants of successful outcome in treating STEMI.

UPSTART is a carefully designed, systematic approach to STEMI care. It was developed as a broad-based framework of proven practices and ideas that focuses on optimizing key principals of STEMI management. These concepts and ideas have been simplified, tested and incorporated into a flexible template program that can be applied in a systems-based effort to improve time to reperfusion.

Hospitals and systems of all types are free to utilize this “reperfusion toolkit” of ideas and information by customizing it to fit their situation. By incorporating a wide variety of proven concepts and strategies directly into the program’s basic design, we have greatly simplified the process of optimizing STEMI care and made it much less frustrating and time consuming.

Implementation of the ideas and concepts found in UPSTART together as a system, (rather than as individual points) makes it possible to make improvements rapidly with much less effort than if each issue is addressed separately. The use of a standardized (yet customized) process greatly optimizes results versus effort. The use of Project UPSTART allows a hospital or system to rapidly improve the care of their STEMI patients.

Where was Project UPSTART developed?

The concepts within Project UPSTART were finalized at the University of Virginia as a cooperative effort between the departments of Emergency Medicine and Cardiology with substantial input from EMS personnel, cath lab staff and the department of quality improvement.

The entire design and development process however, is based on several years of cumulative experiences at multiple facilities, including Spectrum Health Systems in Grand Rapids, Michigan, where the concept of the STEMI ALERT process/STEMI ALERT Packet was developed and refined. Since that time the process has been implemented and tested in multiple hospitals (including PCI and non-PCI facilities) with excellent results.

In addition, the process has constantly been refined, utilizing input and experiences from many sources and facilities. We have attempted to integrate as many “best practice” concepts and ideas into the process as possible, seeking to incorporate the knowledge and experience of others.

What is the significance of the term “Excellence in R2R”?

Early recognition of STEMI on ECG is an absolute requirement -but not a guarantee-of early reperfusion. Project UPSTART focuses on a systematic approach to shortening the time to first ECG –whether that ECG is obtained in an emergency department or “in the field” -far removed from any hospital. An emphasis on this key action (recognition) rather than on the particular location of this action stresses the ongoing effort to push recognition of STEMI ever earlier into the infarct process.

Early recognition must be followed by early reperfusion. A second focus of Project Upstart is to facilitate earlier reperfusion by streamlining the reperfusion pathway once a STEMI is recognized. In many situations, the time to reperfusion is more critical than the particular reperfusion therapy utilized. UPSTART recognizes this key fact. Regardless of the chosen reperfusion strategy, Project UPSTART focuses on designing STEMI response systems that shorten time to reperfusion as much as possible.

In summary, Project UPSTART is focused on a systems-based approach to early STEMI recognition (regardless of location) followed by rapid reperfusion (regardless of chosen strategy). Use of the phrase “Excellence in R2R” reflects this focused emphasis on shortening the critical interval between these two key points.

How does Project UPSTART facilitate rapid improvement in comparison to a “trial and error” learning process?

Certain key concepts must be present for any STEMI treatment program to function effectively. These ideas are usually present (in some form) in all systems that offer excellence in STEMI care. These include the following:

- Screening ECGs must be obtained quickly and consistently
- The STEMI treatment process should be measured each time
- Protocols need to be standardized beforehand
- EMS needs to be integrated into the process
- Lines of communication must be clear
- Provider feedback must be rapid
- Patient transfer decisions must be made rapidly
- The day-to-day process must be extremely simple
- ED staff training must be basic but thorough

Many of these key concepts are obvious; some are not. Unfortunately, their importance often goes unrecognized, until pointed out by an unfortunate event or delay. Usually this occurs periodically, as a system experiences failure secondary to previously unappreciated faults. Each individual problem in the system is addressed as they occur, not before. This process of “trial and error” based improvement can be slow and painful.

To address this issue, Project UPSTART focuses on integrating solutions to many of these problems directly into the basic framework of the program. The idea is to develop STEMI treatment systems that minimize these problems in advance, before they even occur. It is the design of the system that then promotes speed and efficiency, not individual provider skill.

For example, use of the UPSTART Screening ECG Protocol, if consistently followed, will minimize the risk of an overlooked STEMI sitting in a crowded waiting room. Rather than expending the time and energy to create a screening protocol from

scratch, resources are instead shifted to implementation and utilization of an already proven design and insuring its consistent use.

Another case in point is the use of two data sheets (not one) to collect data during each STEMI ALERT. This may seem redundant. However, the value of this is obvious the first time one of the sheets is misplaced! In addition, the recipient of each copy doesn't have to wait for a copy of the info before independently assessing the process. This greatly increases efficiency of the provider feedback and quality improvement cycles.

In summary, the utilization of Project UPSTART greatly reduces the amount of "trial and error" learning required to fine tune the STEMI treatment process, thus facilitating more rapid improvement per unit of effort expended.

List some of the ideas and processes incorporated into Project UPSTART:

Project UPSTART was designed as a complete "reperfusion toolkit." It provides access to a wide variety of items, including:

- A proven, easily adaptable "STEMI ALERT" process
- A carefully tested "Screening ECG Protocol" to facilitate STEMI detection
- www.projectupstart.com – a fully integrated website
- A complete, internet-based staff education and training module
- Integrated measures of reperfusion time for each STEMI case
- Detailed assistance with development of the STEMI ALERT Packet
- Practical advice, forms, training materials and extensive implementation assistance
- An array of carefully developed paperwork templates suitable for customization by each site

The process of day-to-day STEMI detection and management in the emergency department is the primary focus of UPSTART. However, the importance of other segments of the STEMI treatment pathway are recognized and addressed as well. In particular, emphasis is place on integrating EMS and cath lab staff as integral components of the treatment process.

Discuss the four key actions UPSTART utilizes in the day-to-day process of STEMI detection and management:

This discussion highlights the simple elegance of the UPSTART process. Simplicity of (daily) execution is an important factor in sustained success of any quality improvement process. Since ST-Elevation MI is an infrequent, yet stressful event in most emergency departments, clear simple actions yield the best results.

With that in mind, UPSTART is based on only four essential actions:

- 1) Patients presenting with possible STEMI have screening ECGs done quickly and consistently. Since history and clinical exam is not accurate in detecting STEMI, the UPSTART "Screening ECG Protocol" is always be visible in key areas of the ED to guide this process.

- 2) Whenever a STEMI is identified, a “STEMI ALERT Packet is immediately opened. The information within this packet is then distributed to the personnel caring for that STEMI patient; this concise information guides the STEMI treatment process.
- 3) Simplified data collection occurs during every STEMI ALERT. This is done by completing two simple data collection sheets during the alert. These data collection sheets have been carefully designed to minimize the additional effort required.
- 4) Data measured during a STEMI ALERT is collected and sent to appropriate quality improvement personnel for fast evaluation and feedback. This drives ongoing improvement and enthusiasm for the process.

Experience has shown that these four actions are easily implemented into the daily practices of any emergency department with minimal additional effort. Since they are such basic actions, compliance is easy to measure. Once they become ingrained into the routine practices of an emergency department, these four actions require minimal effort to maintain.

It’s important to note that the STEMI ALERT concept utilized by Project UPSTART has been carefully tested and developed in actual emergency departments. From its initiation it has been continually fine-tuned and revised. One constant focus has been to make the process as simple as possible and minimize any additional work the UPSTART process adds to a busy emergency department.

Why is consistent use of the UPSTART “Screening ECG Protocol so important?”

It’s simple: without early STEMI recognition, there can be no progress towards early reperfusion. Even though a STEMI is usually apparent once an ECG is reviewed, rapid and consistent STEMI detection can be difficult. The Emergency Department is a busy and hectic environment with multiple demands constantly placed on the ED providers and staff. In addition, a STEMI is a rare and often unexpected event that can be easily overlooked without constant vigilance and patient screening. This constant vigilance can be hard to maintain in a busy ED due to “provider fatigue.”

The fact that many STEMI patients present “atypically” complicates the situation. It is well accepted that history, clinical judgment and physical exam are not sufficient to detect patients with STEMI. This can only be done by use of the ECG. Failure to understand this key concept places an institution at high risk of ongoing problems with missed or delayed recognition of STEMI.

To address this concern, the “UPSTART Screening ECG Protocol” has been developed. It simplifies the issue by offering a clear and concise listing of who does (and does not!) require an immediate screening ECG. By converting this sometimes difficult question into a simple yes/no format, the risk of a missed STEMI is considerably reduced. UPSTART encourages consistent use of this protocol by providing multiple, attractive, professionally designed copies for placement in key areas. Time and energy is can then be expended on compliance and training, not ‘reinventing the wheel”.

What exactly is a “STEMI ALERT PACKET”?

A STEMI ALERT Packet is a carefully designed packet of forms placed in the emergency department in a highly visible location. Each STEMI ALERT Packet

contains several basic forms that have been carefully adapted to that particular treatment site. These forms help guide the precise evaluation and treatment of the STEMI patient and facilitate data collection on each STEMI case.

The design and use of a carefully site-customized STEMI ALERT Packet is the cornerstone of the UPSTART process. Its use greatly simplifies the process of emergent STEMI management. Emergency Department staff simply open the packet and follow the instructions. In addition, since the STEMI ALERT Packets at each site will have been carefully adapted to reflect optimum practices at that particular institution, they can be altered as needed to reflect improvements in process.

Use of the STEMI ALERT Packet complements the use of the Screening ECG Protocol. Emergency department personnel utilize the protocol constantly to screen for STEMI. When a STEMI is detected, they open a STEMI ALERT Packet and follow the enclosed instructions.

What are the benefits of utilizing a STEMI ALERT Packet as opposed to posting a simple protocol or relying on memorized procedures?

The Emergency Department is a very busy place with multiple layers of providers -often working overlapping shifts. In addition, a STEMI is a rare event that each ED provider may encounter only infrequently. This type of situation does not promote the type of rehearsed efficiency essential for rapid yet efficient action. It is instead, a set-up for error. Expecting rotating and/or transient staff to remember exacting protocols under a stressful situation is not reasonable -or successful.

In addition, the reperfusion process can be complicated, requiring assessment of many factors and the cooperation of multiple care providers. To avoid confusion and delay it is essential that the specific information required to treat a patient presenting with STEMI be quickly accessible, simple to understand and portable.

The most efficient process to address these issues is to instantly provide each staff person involved in treating a STEMI with a set of explicit and clear instructions at the time the information is required. That is the purpose of the individualized checklists found in the STEMI ALERT Packet. Instead of trying to remember complex protocols or constantly referring to a chart on a wall, the ED providers can refer to the carefully developed checklists in the STEMI ALERT Packet.

This concept of utilizing checklists to help guide complex processes and minimize error is a well-known tenet of quality improvement and has been repeatedly utilized by many different industries, including air transportation.

How does the STEMI ALERT Packet function once a STEMI is identified?

As mentioned above, when a STEMI is recognized, the first response will be for someone to open a STEMI ALERT Packet and distribute the information to the involved physician, nurse and “scribe.” Each of these is provided a checklist containing provider-specific, institution-specific instructions that was carefully developed beforehand. By following their checklist, each provider is prompted on exactly what to do.

In this “parallel processing situation” each involved provider will have a very clear list of tasks, minimizing the chance for error or cumulative delay. Having the checklists on paper makes them instantly available, portable, and provider-specific. Color coding of the sheets helps aid recognition.

This concept of an instantly accessible set of “best practices pocket guides” again illustrates the value of the generalized UPSTART process carefully tailored to the needs of each specific institution.

Why is accurate data collection important to the process?

Regardless of the process, accurate data collection is essential for improvement. The two data collection sheets in the STEMI ALERT Packet are very simple forms, yet contain all the necessary data points to analyze the STEMI treatment process from initiation to finish. Data Sheet A is orange in color and Data Sheet B is yellow.

During a STEMI alert, the ED staff works together to complete the appropriate portions of these forms. If the patient is transferred to another institution or to the cath lab Data sheet B is always transferred with them. Data Sheet A is retained in the emergency department.

This careful emphasis on information collection results in completed data sheets that cumulatively contain all the important time intervals from initial STEMI recognition to reperfusion. Once this information is delivered to quality improvement personnel it can be utilized for examining each alert.

Project Upstart does not result in the collection of excess data. The data points collected are simple and minimal in number. Many of them are the same data points utilized by CMS, JAHCO or the ACTION registry. As a result, data collected from the UPSTART data sheets can actually reduce your data collection burden.

The data collected on Data Sheets A & B during an alert has been carefully refined and minimized. It is not geared towards providing research data or compiling a registry. It has been carefully tailored to those bits of information necessary to track the process and provide feedback. It is strictly a quality improvement process.

Explain the use of paper documents for data collection, rather than electronic data capture:

Utilization of a paper document to collect data eliminates the need to reconstruct data points from multiple charts or forms, thus reducing errors of omission and translation. In addition, it simplifies the process of tracking patients that are transferred from the ED to the PCI lab or from the ED to another facility.

A paper form can follow the patient to their final treatment site and (if completed) minimize the additional effort needed to reconstruct a case for analysis. Ensuring that the quality assessment process is as simple as possible is crucial for ongoing compliance. The use of easily accessible data collection sheets is the most effective method to ensure that data will be collected during the actual process.

Many problems within the STEMI treatment process are easily correctable. If they are quickly addressed after they occur, improvement can be rapid. This requires accurate, easily accessible data. Again, the best way to do this is with key data accurately obtained during the actual process, quickly delivered with a minimum of effort to quality improvement personnel.

Can Project UPSTART benefit all facilities that treat STEMI?

Yes. UPSTART has been carefully designed to function within hospitals and systems of all types—regardless if their primary treatment strategy is PCI or thrombolytics. It is also extremely helpful in minimizing (and measuring) transfer times. Because it is so adaptable, it can easily be altered to fit any situation. The only thing necessary is a thorough understanding of the treatment options available at each site.

It is well accepted that decreasing time to reperfusion in STEMI is critical for improving patient outcomes. Time to treatment, particularly in early infarction, may be

more important than the particular reperfusion strategy chosen. With that in mind, UPSTART focuses on improving early STEMI detection and time to reperfusion based on what is best for the patient at that location.

How does UPSTART benefit institutions that typically transfer STEMI patients for emergent PCI at another facility?

A key point of UPSTART is that it can be utilized to improve and streamline regional or multi-site STEMI care networks, not just individual institutions. In fact, this is where the benefits of UPSTART may be most significant. Substantial delays in time to reperfusion often occur in patients transferred for reperfusion from one facility to another. In addition, it is difficult to measure the true recognition to reperfusion (R2R) times of transferred patients in a timely and consistent manner. These two factors contribute to the substantially longer reperfusion times on STEMI patients undergoing transfer.

By working to streamline transfers (before they occur) and by measuring transfer times between institutions, UPSTART allows institutions to optimize the care of transfer patients AND measure the results of their efforts.

How does UPSTART determine the most appropriate “default” reperfusion strategy (PCI or thrombolysis) for each individual site?

The UPSTART approach to STEMI can be tailored to the preferred strategy of each site, and does not endorse one particular strategy over another. It is designed to accommodate any strategy. For example, if an institution utilizes an “identify and transfer” strategy for STEMI, their STEMI ALERT Packet can be customized to reflect this strategy, optimizing the transfer process. Sites that routinely use thrombolytics utilize UPSTART to expedite decision making and patient evaluation for lysis, thus reducing door to drug time.

It’s important to note that UPSTART does not focus on the discussion regarding efficacy of primary PCI vs. thrombolytics. Nor does it elaborate on the controversies of regionalization. It is strictly designed to optimize any chosen reperfusion strategy. The entire focus of UPSTART is to help design the most efficient STEMI treatment pathway possible for any given situation and provide the tools to consistently measure outcomes.

However, the integrated data collection component of the UPSTART process allows for assessment and fine tuning of the process and encourages feedback and cooperative effort. If the data then shows unacceptable R2R times despite an optimized system, adjustments in pre-determined treatment strategies may be considered by the participating institutions. In this manner, each system can gather the accurate data necessary to address this important question based on current results.

Just exactly how does UPSTART facilitate cooperative approaches to STEMI care?

The use of Project UPSTART makes the sometimes difficult task of linking hospitals together much easier. Typically, each “site of entry” into that particular STEMI network designs a customized STEMI ALERT process. The paperwork in their particular STEMI ALERT Packet will then reflect the strategies and actions best suited for that site. As a result, each site will have a slightly different process. The use of UPSTART materials and procedures, however, greatly standardizes the process.

As a result, the basic processes at each site are the same. All sites utilize the same Screening ECG Protocol. When a STEMI is detected, the care providers at that site open a STEMI ALERT Packet and follow instructions. If this includes transferring the patient for PCI, the process is clearly delineated and is carried out without delay. If the treatment strategy may include thrombolysis, clear information is included within the STEMI ALERT packet. The use of standardized data collection sheets allows for prompt feedback among various sites providing additional cohesion among sites.

By standardizing the basic process, yet allowing for variability at each site, the use of UPSTART to implement and standardize regional approaches to STEMI care is readily apparent. In addition, the use of the internet-based Provider Training Module and standardized implementation strategies maximizes efficiency of effort.

How can Project Upstart favorably impact attempts to form regional STEMI care systems?

Regionalization of STEMI care can be a complicated subject complicated by economics, referral patterns, geography, etc. A primary goal of UPSTART has been to facilitate the cooperative effort and feedback necessary to implement successful regional approaches to STEMI care. However, it does this in a calm and low-key fashion, bypassing many potential political obstacles. This occurs in several ways:

- Project Upstart is an evidence-based quality improvement tool, not a set of guidelines. It does not dictate treatment strategies, preferred medications, transfer arrangements, etc. It focuses only on improvement of an existing system and measurement of the results. Regardless of the political situation within a system, this is a common goal agreeable to everyone.
- Careful attention to every detail minimizes cumulative delays and indecision points. This fact alone can greatly decrease the difficulties associated with inter-facility patient transfers. However, truly optimized improvement requires close personal cooperation between facilities. The initial improvements experienced when UPSTART is implemented on a regional scale encourage this personalized effort.
- During patient transfers, Data Sheet B from the STEMI ALERT Packet is sent with the patient to the receiving hospital. The system will then have a complete record of the recognition to reperfusion time on that patient. This data can then be shared with the transferring hospital further facilitating a cooperative approach.
- EMS services are fully integrated into the treatment process and are actively involved in the feedback loop. This facilitates interaction among all facilities with EMS serving as the linkage.

Discuss how UPSTART works to integrate EMS into STEMI treatment pathways:

EMS is vital in the treatment of STEMI patients -not only for efficient transfer to and between treating facilities but also for initial recognition of STEMI pre-hospital. The use of pre-hospital ECG is not only an important advance in alerting hospitals of patients with STEMI arriving at their facility, but also aids in the efficient triage of pre-hospital

patients towards primary PCI facilities, bypassing facilities without PCI. This can substantially shorten reperfusion times.

Pre-hospital ECG functions best within a system that is already optimized and operating smoothly in all other respects relating to STEMI management. Implementing this concept in systems that lack efficient, standardized approaches to STEMI management “from the front door on in” often leads to frustration, false activations of the STEMI system, and minimal improvement in comparison to effort expended. By optimizing every component of the STEMI treatment pathway, Project UPSTART ensures that the time savings made possible by pre-hospital ECG are not lost secondary to system inefficiencies further downstream.

In addition, Project UPSTART incorporates the use of pre-hospital ECG into the STEMI treatment process by utilizing EMS as the key to early STEMI recognition. As discussed earlier, early reperfusion mandates early recognition. Facilitating ECGs in the field is the final step in a smoothly functioning STEMI treatment process.

UPSTART provides information, customizable EMS form templates and educational materials to facilitate ECGs in the field and their integration into the in-hospital STEMI process.

What is required for an institution to participate in UPSTART?

Participation is open to any institution or system. A participation fee is not charged. Project UPSTART is not affiliated with any specific organization. It is strictly a quality improvement program. Utilization does not interfere with any quality improvement initiatives that an institution may currently be involved in.

The data collection component of Project UPSTART actually assists in the collection of important data necessary for other uses, such as AMI core measures. Since this data is recorded in real-time as the process occurs and is available on one sheet, it is easier to access, decreasing the need to “data mine” the entire patient chart to obtain valuable quality improvement and compliance data.

Discuss the implementation process:

Project UPSTART has been specifically designed to simplify the time and effort involved in optimizing STEMI care networks. Every effort has been made to simplify the process and provide the tools and processes necessary for quick and efficient implementation.

Once an institution or system decides to become involved in Project UPSTART, a site coordinator is selected. This person will act as the contact person for that specific facility and will also function as the coordinator of implementation. The first task is to complete a short institutional data collection form. This form collects the basic information necessary to initiate the customization of the UPSTART process to that particular site.

After this information is obtained, discussions are held with staff and physicians to gather additional information on the STEMI treatment process at that institution and determine what improvements might be needed to optimize the process. Once general agreement is obtained, these details are then incorporated into the forms and processes of the general UPSTART process, particularly in customizing the STEMI ALERT Packet.

Once the specific details of the process and paperwork are confirmed, STEMI ALERT Packets specific to that site are constructed and placed in the emergency department in a conspicuous place. The Screening ECG Protocol is placed in various

areas of the emergency department and triage areas. The physical components of the process are now ready.

Staff education, occurring at the same time, is the key to process success. To facilitate this, an entire staff education and training module (discussed next) has been developed and placed on the internet for easy accessibility. Standardizing the education process is a major step toward decreasing the time and effort required for efficient implementation.

The UPSTART process itself is simple and uncomplicated. Most difficulties with its use arise from deficiencies in the education process, leading to noncompliance with its four key actions. Thorough education is a must.

For additional information on implementation, please read the in-depth implementation manual or visit our website.

Discuss the unique “Provider Education Module” that has been specifically designed to facilitate and standardize staff education

Education and implementation of change can be difficult in an institution. This is particularly difficult in an environment such as the emergency department, where there are multiple layers of care providers, typically working overlapping and revolving shifts. Under these conditions, it can be difficult to schedule meetings and provide education.

To address this issue, UPSTART has developed an internet and DVD-based educational program for participating institutions. This was designed to facilitate the UPSTART implementation process by simplifying and standardizing staff education. Putting the educational component on the internet assures that it is conveniently accessible to everyone.

The Provider Training Module, accessible at www.projectupstart.com, consists of a written tutorial, a professionally produced instructional video, and the Provider Training Exam. The entire module takes about 40 minutes to complete. In addition, the Provider Training Exam can be printed, completed and turned in for education credit or confirmation of training completion.

Please review our “Provider Education and Training Manual” for additional information.