Implementing an Evidence Based Hospital Discharge Process

Learning from the experience of Project Re-Engineered Discharge (RED)
Webinar – January 14, 2013

Chris Manasseh, MD
Director, Boston HealthNet Inpatient Service
Assistant Professor, Department of Family Medicine
Boston University School of Medicine
Outline

a) RED review

b) RED implementation
1. Rationale for RED – Post discharge events
2. Principles of RED - Checklist
3. RED Intervention – Two key components
4. Evidence for RED – Results of RED Randomized Controlled Trial (RCT)
5. Role of Health Information Technology
RED Implementation

- Steps
- Successes
- Strategies
Rationale for RED
Post discharge events

Problems ➔ Consequences
Discharges are dangerous!

• 19% of patients had a post discharge adverse event
  - 1/3 preventable and 1/3 ameliorable

Annals of Internal Medicine

The Incidence and Severity of Adverse Events Affecting Patients after Discharge from the Hospital

Alan J. Forster, MD, FRCPC, MSc; Harvey J. Murff, MD; Josh F. Peterson, MD; Tejal K. Gandhi, MD, MPH; and David W. Bates, MD, MSc

Ann Intern Med 2003;138

• 23% of patients had a post discharge adverse event
  - 28% preventable and 22% ameliorable

CMAJ 2004;170(3)

Adverse events among medical patients after discharge from hospital

Alan J. Forster, Heather D. Clark, Alex Menard, Natalie Dupuis, Robert Chernish, Natasha Chandok, Asmat Khan, Carl van Walraven
## Problems

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Communication</td>
</tr>
<tr>
<td>2.</td>
<td>Documentation</td>
</tr>
<tr>
<td>3.</td>
<td>Medications</td>
</tr>
<tr>
<td>4.</td>
<td>Outstanding issues</td>
</tr>
<tr>
<td>5.</td>
<td>Post hospital follow up</td>
</tr>
<tr>
<td>6.</td>
<td>Patient preparation for care transition</td>
</tr>
</tbody>
</table>
Problem - 1
Communication

1. What is the standard?
   a. Is there a protocol?
   b. Is it being tracked?

2. Who knows about this?
   a. Medical home
   b. Hospitalists
   c. Patients

3. How is this impacting outcome?
   a. Patient safety
   b. Provider satisfaction
Problem - 2
Documentation

1. What is being documented?
   a. Is there a standard?
   b. Is it being monitored?

2. Who’s responsible?
   a. Initiation
   b. Finalization
   c. Review

3. How is this transmitted?
   a. Method?
   b. Measure?
Problem - 3
Medications

1. Reconciliation – “It’s more than generating an updated list.”

2. Reasons for errors
   a. Prescribing
   b. Accessing
   c. Dispensing
   d. Administering
Problem — ‘And More’

1. Outstanding issues
   a. What are they?
   b. Whose responsible?

2. Post hospital follow up
   a. Availability, Awareness and accessibility
   b. Compliance

3. Patient preparation for care transition
   a. Awareness?
   b. Understanding?
Consequences

- Increase rates of hospital utilization
- Increase costs
- Increase potential for post hospital adverse events
- Decrease patient satisfaction
The Solution

Can improving the discharge process reduce unplanned hospital utilization and post discharge adverse events?
Principles of RED
Creating the checklist
Employing Engineering Methodologies

Readmission Within 6 Months

Probabilistic Risk Assessment

Hospital Discharge

Process Mapping

Failure Mode and Effects Analysis

Patient Readmitted Within 3 Months

Qualitative Analysis

Root Cause Analysis
RED Checklist
Adopted by National Quality Forum as Safe Practice-15

Eleven mutually reinforcing components:

1. Patient education throughout hospital course
2. Schedule follow-up appointments – physician visits & tests
3. Follow up on outstanding test results
4. Organize post-discharge services
5. Confirm medication plan – reconcile discharge medications
6. Reconcile discharge plan with national guidelines
7. Review steps for what to do if problem arises
8. Transmission of discharge summary to primary care physician
9. Assess patient understanding of discharge plan
10. Give written discharge plan
11. Provide telephone reinforcement
RED Intervention
Two key components
The RED Intervention
Two key components

- In Hospital – Preparation & Education of written plan
  - Developing the After Hospital Care Plan (AHCP)
    - Daily input from the care team
  - Teaching the AHCP

- After Discharge – Reinforcement of the plan
  - Phone call within 72 hours after discharge
    - Assess clinical status
    - Review medications and appointments
After Hospital Care Plan

- Patient-centered discharge instruction booklet
- Designed to reach patients with limited health literacy
- Individualized to each patient and hospital
** Bring this Plan to ALL Appointments **

After Hospital Care Plan for:

** John Doe **

Discharge Date: October 20, 2006

Question or Problem about this Packet? Call your Discharge Advocate: (617) 414-6822

Serious health problem? Call Dr. Brian Jack: (617) 414-2080
EACH DAY follow this schedule:

**MEDICINES**

<table>
<thead>
<tr>
<th>What time of day do I take this medicine?</th>
<th>Why am I taking this medicine?</th>
<th>Medication name Amount</th>
<th>How much do I take?</th>
<th>How do I take this medicine?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>blood pressure</td>
<td>PROCARDIA XL NIFEDIPINE 90 mg</td>
<td>1 pill</td>
<td>By mouth</td>
</tr>
<tr>
<td>Morning</td>
<td>blood pressure</td>
<td>HYDROCHLOROTHIAZIDE 25 mg</td>
<td>1 pill</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td>blood pressure</td>
<td>CLONIDINE HCl 0.1 mg</td>
<td>3 pills</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td>cholesterol</td>
<td>LIPITOR ATORVASTATIN CALCIUM 20 mg</td>
<td>1 pill</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td>stomach</td>
<td>PROTONIX PANTOPRAZOLE SODIUM 40 mg</td>
<td>1 pill</td>
<td>By mouth</td>
</tr>
<tr>
<td>Time</td>
<td>Condition</td>
<td>Medication</td>
<td>Dose/Application</td>
<td>Method</td>
</tr>
<tr>
<td>------</td>
<td>--------------------</td>
<td>-----------------------------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Morning</td>
<td>heart</td>
<td>ASPIRIN EC 325 mg</td>
<td>1 pill</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td>to stop smoking</td>
<td>NICOTINE 14 mg/24 hr</td>
<td>1 patch (for 4 weeks)</td>
<td>On skin</td>
</tr>
<tr>
<td></td>
<td>Then, after 4 weeks use</td>
<td>NICOTINE 7 mg/24 hr</td>
<td>1 patch</td>
<td>On skin</td>
</tr>
<tr>
<td></td>
<td>Blood pressure</td>
<td>COZAAR LOSARTAN POTASSIUM 50 mg</td>
<td>1 pill</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td>Infection in eye</td>
<td>VIGAMOX MOXIFLOXACIN HCI 0.5 % soln</td>
<td>1 drop</td>
<td>In your left eye</td>
</tr>
<tr>
<td>Noon</td>
<td>Blood pressure</td>
<td>ATENOLOL 75 mg</td>
<td>1 pill</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td>Blood pressure</td>
<td>LISISNOPRIL 40 mg</td>
<td>1 pill</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td>Infection in eye</td>
<td>VIGAMOX MOXIFLOXACIN HCI 0.5 % soln</td>
<td>1 drop</td>
<td>In your left eye</td>
</tr>
<tr>
<td>Time</td>
<td>Condition</td>
<td>Medication</td>
<td>Dose/Usage</td>
<td>Administration</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------</td>
<td>-----------------------------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Evening</td>
<td>Infection in eye</td>
<td>VIGAMOX MOXIFLOXACIN HCl</td>
<td>1 drop</td>
<td>In your left eye</td>
</tr>
<tr>
<td>Bedtime</td>
<td>Blood pressure</td>
<td>CLONIDINE HCl 0.1 mg</td>
<td>3 pills</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TRAMADOL HCl 50 mg</td>
<td>1-2 pills</td>
<td>By mouth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NITROGLYCERIN 0.4 mg</td>
<td>1 pill every 5 minutes (if need more than 3 pills, call 911)</td>
<td>Under your tongue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NICORELIEF NICOTINE POLACRILEX 4 mg gum</td>
<td>Gum</td>
<td>chew</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PERCOCET OXYCODONE-ACETAMINOPHEN 5-325 mg</td>
<td>1 pill 3 times each day If you need it</td>
<td>By mouth</td>
</tr>
</tbody>
</table>
### Appointment Page

**Bring this Plan to ALL Appointments**

**John Doe**

**What is my main medical problem?**  
Chest Pain

**When are my appointments?**

<table>
<thead>
<tr>
<th>Tuesday, October 24th at 11:30 am</th>
<th>Thursday, October 26th at 3:20 pm</th>
<th>Wednesday November 1st at 9:00 am</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Brian Jack Primary Care Physician (Doctor)</td>
<td>Dr. Jones Rheumatologist</td>
<td>Dr. Smith Cardiologist</td>
</tr>
<tr>
<td>at Boston Medical Center ACC – 2nd floor</td>
<td>at Boston Medical Center Doctor’s Office Building 4th floor</td>
<td>at Boston Medical Center Doctor’s Office Building 4th floor</td>
</tr>
<tr>
<td>For a Follow-up appointment</td>
<td>For your arthritis</td>
<td>to check your heart</td>
</tr>
<tr>
<td>Office Phone #: (617) 414-2080</td>
<td>Office Phone #: (617) 638-7460</td>
<td>Office Phone #: (617) 555-1234</td>
</tr>
</tbody>
</table>

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# Appointment Calendar

## October 2006

<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pharmacist will call today or tomorrow</td>
<td>Dr. Jack at 11:30 am at Boston Medical Center ACC – 2nd floor</td>
<td>Dr. Jones at 3:20 pm at Boston Medical Center Doctor’s Office Building – 4th floor</td>
<td>Left hospital</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>30</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Patient Activation Page

Questions for
Dr. Jack
For my appointment on
Tuesday, October 24th at 11:30 am

Check the box and write notes to remember what to talk about with Dr. Jack

I have questions about:
☐ my medicines
☐ my pain
☐ feeling stressed

What other questions do you have?

Dr. Jack: These tests were outstanding at discharge:
Stress Test done on October 24th and Blood Cultures done on October 20th.
Congestive Heart Failure.

*Heart failure, also called Congestive Heart Failure is a serious condition in which the heart can no longer pump enough blood to the rest of the body.*

**Things you need to do:**

Fill all of your medicine prescriptions, finish your medicine and take as directed.

Rest as needed.

Weigh yourself daily and write it down.

Call your doctor right away if you have:
- Weight change by ___ pounds for ___ days
- Sudden weakness
- Trouble breathing
- Serious cough

Do not smoke. Avoid other’s smoke.

Keep all of your follow-up appointments.
Evidence for RED – Results of RCT
Primary & Secondary outcomes
Testing the RED Intervention
Randomized Controlled Trial

Enrollment Criteria
• English speaking
• Have telephone
• Able to independently consent
• Not admitted from institutionalized setting

Enrollment
N=750

Randomization

RED Intervention
N=375

Usual Care
N=375

30-day Outcome Data

Enrollment Criteria
• Adult medical patients admitted to Boston Medical Center (urban academic safety-net hospital)
Delivering the intervention
How well did we perform

<table>
<thead>
<tr>
<th>RED Component</th>
<th>Intervention Group (No,%) (N=370) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment scheduled with Primary Care Physician (PCP)</td>
<td>346 (94%)</td>
</tr>
<tr>
<td>AHCP given to patient</td>
<td>306 (83%)</td>
</tr>
<tr>
<td>AHCP/Discharge Summary faxed to PCP</td>
<td>336 (91%)</td>
</tr>
<tr>
<td>Pharmacy telephone call completed</td>
<td>228 (62%)</td>
</tr>
</tbody>
</table>

* 3 subjects excluded from outcome analysis: subject request (n=2), died before index discharge (n=1)
**Primary Outcome:**
Hospital Utilization within 30 days after Discharge

<table>
<thead>
<tr>
<th></th>
<th>Usual Care (n=368)</th>
<th>Intervention (n=370)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital Utilization</strong> *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total # of visits</td>
<td>166</td>
<td>116</td>
<td>0.009</td>
</tr>
<tr>
<td>Rate (visits/patient/month)</td>
<td>0.451</td>
<td>0.314</td>
<td></td>
</tr>
<tr>
<td><strong>Emergency Department (ED) Visits</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total # of visits</td>
<td>90</td>
<td>61</td>
<td>0.014</td>
</tr>
<tr>
<td>Rate (visits/patient/month)</td>
<td>0.245</td>
<td>0.165</td>
<td></td>
</tr>
<tr>
<td><strong>Readmissions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total # of visits</td>
<td>76</td>
<td>55</td>
<td>0.090</td>
</tr>
<tr>
<td>Rate (visits/patient/month)</td>
<td>0.207</td>
<td>0.149</td>
<td></td>
</tr>
</tbody>
</table>

* Hospital utilization refers to ED + Readmissions
## Secondary Outcomes *

<table>
<thead>
<tr>
<th></th>
<th>Usual Care (n=308)</th>
<th>Intervention (n=307)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCP follow-up rate</td>
<td>135 (44%)</td>
<td>190 (62%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Identified dc diagnosis</td>
<td>217 (70%)</td>
<td>242 (79%)</td>
<td>0.017</td>
</tr>
<tr>
<td>Identified PCP name</td>
<td>275 (89%)</td>
<td>292 (95%)</td>
<td>0.007</td>
</tr>
</tbody>
</table>

* Self-reported 30 days post-discharge
Self-Perceived Readiness for Discharge
30 days post-discharge

- Prepared
- Understand Appts
- Understand Meds
- Understand Dx
- Questions answered

Usual Care vs. RED
## AHCP Evaluation

<table>
<thead>
<tr>
<th>Question</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In the past 4 weeks, how often did you refer to your AHCP?</strong></td>
<td></td>
</tr>
<tr>
<td>Daily or Frequently</td>
<td>29%</td>
</tr>
<tr>
<td><strong>How useful was the AHCP booklet?</strong></td>
<td></td>
</tr>
<tr>
<td>Extremely or Very useful</td>
<td>58%</td>
</tr>
<tr>
<td><strong>How helpful was the RED medication calendar?</strong></td>
<td></td>
</tr>
<tr>
<td>Extremely or Very helpful</td>
<td>72%</td>
</tr>
</tbody>
</table>

*Patient-reported 30 days after discharge*
## Outcome Cost Analysis

<table>
<thead>
<tr>
<th>Cost (dollars)</th>
<th>Usual Care (n=368)</th>
<th>Intervention (n=370)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital visits</td>
<td>412,544</td>
<td>268,942</td>
<td>+143,602</td>
</tr>
<tr>
<td>ED visits</td>
<td>21,389</td>
<td>11,285</td>
<td>+10,104</td>
</tr>
<tr>
<td>PCP visits</td>
<td>8,906</td>
<td>12,617</td>
<td>-3,711</td>
</tr>
<tr>
<td>Total cost/group</td>
<td>442,839</td>
<td>292,844</td>
<td>+149,995</td>
</tr>
<tr>
<td>Total cost/subject</td>
<td>1,203</td>
<td>791</td>
<td>+412</td>
</tr>
</tbody>
</table>

We saved $412 for each patient given RED
The Role of Health Information Technology (IT) ‘Virtual Discharge educator’
Using Health IT to Overcome Challenge of Clinician Time

Virtual Patient Advocates

- Emulate face-to-face communication
- Develop therapeutic alliance—empathy, gaze, posture, gesture
- Teach AHCP
- Do “Teach Back”

Characters: Louise (L) and Elizabeth (R)
Automated Discharge Workflow

Patient information entered into workstation → Paper booklet generated and reviewed → Booklet images, indexes, and patient health information downloaded to the kiosk → Patient – VN interaction → Issues displayed for nurse follow-up
Patient interacting with Louise
Overall Usability

Overall Satisfaction

Mean = 6.5
Std. Dev. = 1.119
N = 197

Ease of Use

Mean = 1.84
Std. Dev. = 1.73
N = 198
Online Louise

Post-discharge web-based system designed to emulate the post-hospital phone call
- Enhance adherence
  - Medications
  - Appointments
- Monitor for adverse events

Posts “alerts” to nurse who follow-up each morning
RED Implementation

Steps, Successes & Strategies
12 Steps to Implement the ReEngineered Discharge

Step 1 - Make a clear and decisive statement and get buy in

Step 2 - Appoint team leader

Step 3 - Constitute implementation team

Step 4 - Analyze current discharge process and rehospitalization rate
12 Steps to Implement the ReEngineered Discharge

Step 5 - Establish goals
What is the target rehospitalization rate?

Step 6 - Identify the target patient population

Step 7 - Decide who would assume the role of discharge advocate

Step 8 - Identify the person who will conduct follow-up phone calls
12 Steps to Implement the ReEngineered Discharge

Step 9 - Determine method to train discharge advocates & those who will conduct follow up phone call

Step 10 - Decide how to generate ‘After Hospital Care Plan’

Step 11 - Adapt RED for the diverse patient population

Step 12 - Measure progress of RED implementation
  - Process outcomes
  - Patient outcomes
What to Expect

- Improved patient satisfaction
- Greater self-perceived ‘Readiness for Discharge’
- 30% decrease in hospital utilization within 30 days of discharge
- Improved PCP follow-up rate
RED implementation
Success stories

Boston HealthNet plan

Preventing Avoidable Episodes project (PAVE)
-> Consortium of 18 hospitals/systems in southeastern Pennsylvania
Success stories
Boston HealthNet plan

- Period -> calendar year 2011
- Patients given RED -> 500
  - Discharge educator = dedicated registered nurse (RN)
  - Post discharge phone call = plan’s care manager
- Results -> 30 day all cause readmission rate
- Cost savings -> well over $400k
Quarterly All-Cause 30 Day Readmission Rate Trend
by Selected Payer (N=41,887)
(January 2010 - July 2011)

Note: The above data is only for all-cause readmissions within 30 days to BMC only. The unit of analysis are inpatient discharges. The following discharges are excluded from the numerator: discharges in which the readmission is for (1) chemotherapy; (2) radiation therapy; (3) rehabilitation; (4) dialysis; and (5) delivery/birth.

The following are excluded from the denominator: index discharges with (1) nonviable neonates; (2) coming from hospice; and (3) deceased discharge disposition.

OB/GYN and neonatology MS-DRGs are excluded from the data.

BMC HLTHNET MEDICAID cases are discharges with a primary payer of BMC HLTHNET MEDICAID.

Non-BMC HLTHNET MEDICAID are discharges with one of the following primary payers: MEDICAID, MEDICAID LIMITED, MEDICAID MNGCARE, MEDICAID MNGCARE OTH, MEDICAID NOT MA, NETWK HLTH MEDICAID, NHP MEDICAID, or NHP OTHER MEDICAID.
Success stories
PAVE project

- Period -> 18 months from May 2010
- Mixed intervention -> all using 2 components of RED

Results
- Partnering with patients to make follow up appointments
  - Up from baseline of 68% to 96%
- Coordinating follow up testing
  - Up from baseline of 67% to 77%
- Improved process of patient education during hospitalization
  - Up from baseline of 18% to 45%
- Improved coordination of care among providers -> 95%
RED Implementation – Strategies During hospitalization

- Formal screening tool to determine risk for readmission

- Process in place for patient education
  - Discharge educator
    - Developing and teaching after hospital care plan
  - Pharmacist

- Standardized communication
  - Primary care providers
  - Other providers
    - Home care
    - Nursing Home
RED Implementation – Strategies Prior to discharge

Discharge Nurse Educator
- Uses checklist
- Assesses patient understanding of discharge plan
  (Teach back process used)

Care Team
- Discusses discharge plan daily at team huddle

Patient
- Receives written discharge plan
  (An AHCP is personalized for every patient leaving the hospital)
Discharge is not rushed or late in the day

AHCP and discharge summary are sent to PCP office

Patient reminded about post discharge phone call
  – phone number for follow-up call confirmed
# Practical application of RED

Utilizing team members to deliver RED components

<table>
<thead>
<tr>
<th>MD team</th>
<th>RN team</th>
<th>Case Mgmt</th>
<th>Unit Coordinator/Rounding Asst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educate patient</td>
<td>Confirm medication plan</td>
<td>Coordinate post discharge services</td>
<td>Arrange 7-10 days post discharge follow up visit</td>
</tr>
<tr>
<td>Discuss outstanding issues</td>
<td>Teach AHCP</td>
<td>Review steps to take when problems arise</td>
<td>Prepare and provide AHCP to be given to patient</td>
</tr>
<tr>
<td>Reconcile discharge plan with national guidelines</td>
<td>Assess degree of understanding – employ teach back</td>
<td>Reinforce AHCP 24-48 hours post hospital discharge with a phone call</td>
<td>Transmit AHCP &amp; discharge summary within 24 hours post dc</td>
</tr>
</tbody>
</table>
Current hospital discharge process needs re-engineering.

Creating effective interventions require current processes to be well studied.

Culture change begins with buy in from leadership and continues with dynamic multi-disciplinary implementation team.
Collaboration with IT, provides solutions in overcoming challenges of time and human resources.

Customized written discharge plan to patients, optimizes self care post hospitalization.

Call to patients post discharge, reinforcing plan, enhances compliance.
Thank you!

Chris.Manasseh@bmc.org

Project RED Website
http://www.bu.edu/fammed/projectred/