Creating A Sustainable Model for Improved Utilization of a Mobile Health Clinic in Nashville, TN

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Agenda

1. Introduction
2. Background
3. Methodology
4. Results
5. Discussion
6. Recommendations
7. Conclusion
Introduction
Chronic Illnesses: A National Epidemic

• Prevalence:
  - Affect 145 million Americans (nearly 50%) as of 2009 (RWJF 2012)

• The “Big 3”: Hypertension, Diabetes, Obesity
  - Hypertension: 30% adults 18-64, 60% 65+
  - Diabetes: 12% adults 18-24
  - Obesity: 65% adults overweight (BMI 25-30) or obese (BMI +30) (RWJF 2012)

• Costs To Society
  - 75% of all American healthcare spending ($1.65 trillion) on these 3 and conditions like them (US News & World Report)
  - Quality of life decline (2x more ”unhealthy days” per month as unaffected individuals) (CDC HRQOL, 2012)
3 Preventable Risk Factors (PRF’s) Lead to "The Big 3"

- Lack of physical activity
- Tobacco use
- Poor nutrition
Introduction (cont.)
Chronic Illnesses: Tennessee’s Unique Risk

•"Ahead of The Curve":
  -TN residents suffer from many chronic diseases and their risk factors in higher proportions than national average

•The ”Big 3” in Tennessee
  -Hypertension: 32.6% told BP was high
  -Diabetes: 14.9% diabetic vs. 12% gen. US
  -Obesity: 65.3% overweight or obese

(CDC BRFSS 2012)

•Davidson County at A Glance
  -High levels of both diagnosed conditions and PRF’s
    -35.3% aware of high BP; 14.8% diabetic; 58.2% overweight / obese
    -36.4% w/ no physical activity, 8% w/ no fruits or veggies in 30 days
    -25.3% former smokers; 1 in 6 smoke currently

(Nashville Public Health Dept. 2011)
As part of its mission to help address the healthcare needs of the medically underserved in Nashville, UNHS owns and operates a Mobile Health Screening Unit (MHSU). Essentially a "doctor’s office on wheels", the MHSU has the potential to make a significant impact on the health of the community by bringing preventive screenings and services into the community.
3 Key Problems in MHSU Operations

1. **Lack of data for patient**
   - No results sheet to patients
   - No written patient education about chronic conditions being screened for

   **RESULT:** Screen does little to impact patient behavior

2. **Lack of data for clinic**
   - No patient data collected by provider about screening for clinic use

   **RESULT:** Clinic cannot assess or prove efficacy of mobile unit

3. **Staffing of MHSU**
   - Paid healthcare provider used to staff MHSU with overtime pay
   - Pay is the same regardless of patients screened

   **RESULT:** MHSU is high-cost and low-impact for the clinic
High Cost, Low Impact
A Vicious Cycle

If current operations are not improved, the MHSU will continue to remain an unharnessed resource for a community that is desperately in need.
The Project:

Create An Improved and Sustainable Model of Operations for the MHSU

Over a six week-time frame, our intent was to develop an improved healthcare delivery model for the MHSU that would address the specific weaknesses of the current model and resolve them in a fashion that the clinic can sustain over the long term. We resolved to determine measurable goals and parameters to define and track "success" in this endeavour, and to show definitively that the community is being positively impacted by the changes implemented.
Methodology: 3 Key Goals for New Model
“Success”

- Create self-reporting patient forms providing data to UNHS
- Create patient results form for patient to keep
- Create reproducible patient education materials on screened conditions
- Updatable Excel database w/ blinded patient statistics for analysis
- Replace paid staff provider with trained healthcare student volunteers
- Schedule events on weekdays with non-clinic staff

Timeline for Implementation: 6 weeks
The Project:
Additional Project Parameters

- Selective booking of Community Centers
  - 1 regional
  - 4 "neighborhood"
- 1 event per zip code served by Eastern UNHS
- Min. 1 week time frame for advertising
Tools

Student Recruitment

1. Letter of recruitment distributed
   - Two local medical colleges
   - Five local nursing schools (FNP programs)
   - Three local student-based clinics
   - PCLP Scholars
   - UNHS MD residents

2. Signup Website form at: tinyurl.com/unhshealthscreens

   • Real-time-updated admin spreadsheet containing student volunteer information via Google Drive

Patient Data

2. "Patient Summary" Result Form

   • Patient information sheets (Spanish and English) on:
     - High blood pressure
     - Diabetes
     - Developing A Healthier Lifestyle

Patient Data For Clinic / Student

3. For clinic:
   - Self-report “Health Screening And Assessment Form”

3. For Student:
   - “scripted” version of “Health Screening and Assessment Form” w/ percentiles, prompts for counseling, etc.

   • Feedback form to comment anonymously on experience / make suggestions for improvement
Tools Continued

Student Recruitment Materials
What Is Diabetes and How Can I Control It?

When you have diabetes, your body either doesn’t make enough insulin or can’t use its own insulin as well as it should, or both. This causes sugars to build up too high in your blood. Most of the food you eat is turned into glucose, or sugars, for your body to use for energy. Insulin is a hormone needed to convert sugars and other food into energy, or glucose.

### Patient Summary

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure:</td>
<td>Blood Glucose:</td>
</tr>
<tr>
<td>Diabetic Foot Screen:</td>
<td>BMI:</td>
</tr>
</tbody>
</table>

Follow-up with your physician is recommended:
- [ ] Immediately
- [ ] Within _____ days/weeks
- [ ] Routine Well Follow-Up

Lifestyle modifications recommended:
- [ ] Reduce salt
- [ ] Reduce alcohol
- [ ] Stress management
- [ ] Weight loss
- [ ] Reduce sugar/carbohydrates
- [ ] Spirit/Emotional support
- [ ] Exercise
- [ ] Stop smoking

Ask your physician about:
- [ ] Diabetes
- [ ] Hypertension
- [ ] Weight Loss
- [ ] Asthma
- [ ] Diabetic Foot Problems

### Notes

### What Type Is It?

This disease is most often type 1 or type 2. Type 1 is a rare disease that usually begins in childhood. Type 2 is more common and occurs in adulthood.

### Am I at Risk?

Diabetes is a disease that affects the way your body uses food for energy. It affects people of all ages. This is why the physical fitness program is important for everyone.

### How Common?

Diabetes is a common condition. It is a serious health concern that can lead to other serious health problems.

### How can I control it?

Diabetes can be controlled with diet, exercise, and medication. It can be treated, but not cured.

### ¿Qué es la presión alta?

Otro nombre para la presión arterial alta es la hipertensión. La presión arterial alta significa que la presión en sus arterias está elevada. La presión arterial es la fuerza con que la sangre empuja las paredes de las arterias pequeñas. Se mide con dos números, por ejemplo, 110/70 mm Hg. El primer número (presión sistólica) es la presión cuando el corazón late. El segundo número (presión diastólica) es la presión cuando el corazón descansa entre latidos.

La presión normal es menos de 120/80 mm Hg. Si es adulto y su presión sistólica es de 123 a 130, o su presión diastólica es de 80 a 89 (o ambas), usted tiene la “pre-hipertensión”. La presión alta es una presión sistólica de 140 o más y/o una presión diastólica de 90 o más que persiste alta a través del tiempo.

En la mayoría de las veces, no existe un trastorno concreto que causa la presión alta. Generalmente no puede curarse, pero si puede controlarse.

Unas 25 millones de personas en este país (1 de cada 3 adultos) tienen la presión alta, y muchos no la saben. De no tratarla, la presión alta puede dañar los vasos sanguíneos al cerebro, el corazón y los riñones. Esto puede causar una vida más corta y una tasa más alta de enfermedades.

¿Quién tiene mayor riesgo?
- Las personas con familias cercanas que tienen la presión alta
- Las mujeres embarazadas
- Las personas mayores de 35 años
- La gente con sobrepeso
- Las personas que no hacen actividad física
- Las que consumen demasiado sal
- Las que toman alcohol en exceso

¿Cómo puedo saber si tengo la presión alta?

Normalmente, no lo puede saber. Muchas veces se la tiene y no la sabe. La única manera de saber si su presión está alta es hacer que su médico la mida regularmente.

¿Qué hacer si tiene la presión alta?

El tratamiento para la presión alta puede variar, pero puede incluir:
- Medicamentos para bajar la presión
- Cambio de dieta para bajar la presión
- Ejercicio regular para bajar la presión
- Reducción de peso para bajar la presión
- Evitar el tabaco para bajar la presión
Clinic and Student Data

Tools Continued

Health Screening and Assessment Form

Name: ___________________________ Gender: M F Age: ________
Address: ___________________________ ZIP: __________
Phone Number: ___________________________ Primary Language: ________
Student Team: ___________________________ Interpreter: ________

Screening: I would like to offer you health screenings for high blood pressure and high blood sugar.

1. Have you ever been told that you have high blood pressure? Y N
   a. Yes, are you on medication? Y N
   b. Do you take your medications? Y N How often? ________
   c. Did you take your medications today? Y N
2. What is your weight? ________, What is your height? ________, BMI ________ Y N
3. Do you smoke? Y N How long have you smoked? ________, How many packs per day? ________
4. Blood pressure reading: ________ Cuff size (circle): adult / extra large
   A. NORMAL: If systolic < 120 and diastolic < 80, advise patient that BP reading today is normal.
   B. PRE-HYPERTENSION: If systolic 120-139 and diastolic 80-99, advise patient that BP reading today is in a new category called “Pre-Hypertension.” These are not considered hypertensive but are at risk for developing hypertension. Recommend following up with primary doctor within the next several months to discuss hypertension prevention strategies and lifestyle modifications.
   C. ELEVATED: If systolic 140-159 and diastolic 90-99, advise patient that BP reading today is elevated and recommend contacting the primary doctor within 1 month.
   D. HIGH: If systolic 160 and diastolic is 100, advise patient that BP reading today is elevated and recommend contacting the primary doctor immediately for mental status changes, advice patient to consult their primary doctor TODAY. If these attitude changes, advise patient that BP reading today is in a new category called “Pre-Hypertension.” These are not considered hypertensive but are at risk for developing hypertension. Recommend following up with primary doctor within the next several months to discuss hypertension prevention strategies and lifestyle modifications.
   E. URGENT HIGH: If systolic is 2 or diastolic is 2, consult their primary doctor immediately.
5. Is this a new positive screen for high blood pressure? Y N

Mobile Health Screen Student Participant Feedback Form

I am: medical student • medical resident • nursing student • NP student • BSN • Other (specify): ________

2. I participated in the Mobile Health Screen event held on: ________ at: ________
3. Overall, I would rate my experience volunteering with the Mobile Health Screen Unit at: ________
   1 = very enjoyable • 2 = enjoyable • 3 = neutral • 4 = not at all enjoyable
4. The day went very much as was described to me when I signed up: ________
   1 = very much • 2 = somewhat • 3 = not at all
Screening Procedure

1. Self-report form completed
2. Verbal review of form with patient
3. Compute BMI; BMI noted on patient and clinic forms; patient counseled
4. Patient blood pressure taken; result noted on both forms; "new positives" specially noted
5. Patient glucose taken; result noted on both forms; "new positives" specially noted
6. Recommendations to patient
7. Distribution of results and information
Eight screening events held over 4 zip codes in a 2.5 week span (37206, 37207, 37216, 37209)

- Adult parameters measured: height, weight, BMI, blood pressure (numeric), blood pressure category, glucose level (numeric), glucose level category, #of risk factors for diabetes, smoking history, medical home status
- Pediatric parameters measured: height, weight, BMI%ile, weight category, blood pressure (numeric), blood-pressure %ile for age and stature, glucose level (numeric), glucose level category, medical home status
- Six medical student volunteers participated during project; all gave feedback

<table>
<thead>
<tr>
<th></th>
<th>Adult</th>
<th>Pediatric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (Total = 102)</td>
<td>73</td>
<td>29</td>
</tr>
<tr>
<td>Medical home vs no medical home</td>
<td>72</td>
<td>21</td>
</tr>
<tr>
<td>Glucose checks</td>
<td>66</td>
<td>17</td>
</tr>
<tr>
<td>Blood pressure checks</td>
<td>69</td>
<td>15</td>
</tr>
<tr>
<td>BMI</td>
<td>71</td>
<td>7</td>
</tr>
</tbody>
</table>
Results

Overview

- 28% hypertensive
  - Of these, 22% “new (+)” (6% of total BP’S)

- 18% hyperglycemic
  - Of these, 25% “new (+)” (5% of total glucose checks)
Results

Screened Patients In Medical Homes Have Better Health

Patient Demographics—Patients in Medical Homes vs. Not in Medical Homes

- **Blood Pressure**
  - % of MH patients: 75.50%
  - % of NMH patients: 22.40%

- **Blood Glucose**
  - % of MH patients: 80.90%
  - % of NMH patients: 14.90%

- **BMI**
  - % of MH patients: 85%
  - % of NMH patients: 50%

- **% of Patients**
  - Normal or Prehypertensive / Normal Weight
  - Elevated / Overweight
  - High / Obese
  - Urgent High / Morbidly Obese
Results

Pediatric Screenings

**Pediatric Data—Blood Pressure (as % of 100)**
- Normotensive (<90th %ile): 80%
- Pre-Hypertensive (>90th and <95th %ile): 13%
- Hypertensive (>95th %ile): 7%

**Pediatric Data—BMI Percentiles (as % of 100)**
- Underweight (<5th %ile): 14%
- Healthy Weight (>5th and <85th %ile): 72%
- Overweight (>85th and <95th %ile): 0%
- Obese (>95th %ile): 14%

**Pediatric Data—Fingerstick Glucose (% of 100)**
- Normal: 100%
- Elevated: 0%

**Pediatric Data—Medical Home (% of 100)**
- Yes: 14%
- No: 86%

N= 7
### Results

#### Comparative Cost-Benefit Analysis of Models

<table>
<thead>
<tr>
<th>Costs:</th>
<th>Costs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Care Provider: $12.16 per hour</td>
<td>Medical Student: None</td>
</tr>
<tr>
<td>Gas to drive MJHS (lasts 4 events): $30 per tank</td>
<td>Gas to Drive MJHS (lasts 4 events): $30 per tank</td>
</tr>
<tr>
<td>Medical Supplies (lasting 4 screen events): $74.77</td>
<td>Medical Supplies (lasting 2 screen events): $74.77</td>
</tr>
<tr>
<td>cotton balls (1 bag): $1.71</td>
<td>cotton balls (1 bag): $1.71</td>
</tr>
<tr>
<td>lancets (box of 100): $16.77</td>
<td>lancets (box of 100): $16.77</td>
</tr>
<tr>
<td>test strips (set of 100): $36.50</td>
<td>test strips (set of 100): $36.50</td>
</tr>
<tr>
<td>Band-Aids (box of 40): $3.60</td>
<td>Band-Aids (box of 40): $3.60</td>
</tr>
<tr>
<td>disposable gloves (box of 100): $8.95</td>
<td>disposable gloves (box of 100): $8.95</td>
</tr>
<tr>
<td>hand sanitizer: $4.25 per bottle</td>
<td>hand sanitizer: $4.25 per bottle</td>
</tr>
<tr>
<td>costs total: $212.77</td>
<td>costs total: $164.77</td>
</tr>
<tr>
<td>costs per screen event: $89.20</td>
<td>costs per screen event: $59.83</td>
</tr>
</tbody>
</table>

- Information given to patient: verbal screen results only
- Information collected by clinic: none

#### Number of Patients Screened

<table>
<thead>
<tr>
<th>Number of Patients Screened (avg): 10</th>
<th>Number of Patients Screened (avg): 102 / 8 = 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost Per Patient to UNHS: $8.92</td>
<td>Percentage increase in screens per week: 100%</td>
</tr>
<tr>
<td>Total Cost Per Patient To UNHS: $4.61</td>
<td>200% increase in screens per week</td>
</tr>
</tbody>
</table>

- Screens per Week: 1
- Screens Per Week: 3
- Percentage reduction in screening event price: (29.61 / 89.20) * 100 = 33.2%
- Percentage reduction in cost per patient: (4.31 / 8.92) * 100 = 48.3%
- Percentage increase in patients screened: (8 / 10) * 100 = 80%
Discussion
Was Our Project A Success?

Goal 1: Streamline collection of data

• Distribution of results forms and patient information to all screened patients (n=102)
  • 73 adult
  • 29 pediatric

• Data analysis able to be completed on n = 72 and 22, respectively (see results section)

• Excel spreadsheet w/ blinded patient data, all forms and patient education materials, and recruitment websites / spreadsheets fully operational

RESULT: DATA ACQUIRED AND DISTRIBUTED FOR BOTH CLINIC AND PATIENTS

Goal 1 was successfully met!
Discussion
Was Our Project A Success?

Goal 2: Decrease cost to UNHS

Cost-benefit analysis shows:

- 33.2% percentage reduction in per-screening event cost
- Simultaneous 30% percentage increase in # of patients screened
- Results overall in 48.3% percentage reduction in cost per patient to UNHS

RESULT: SCREENED MORE PATIENTS AT LOWER COST THAN PREVIOUS MODEL

Goal 1 was successfully met!
Goal 2 was successfully met!
Goal 3: Increase # of screening events

- Completed eight screening events over a 2.5 week period—three times the number of screens completed per week by the previous model

RESULTS: DEFINITE INCREASE IN NUMBER OF SCREENING EVENTS
Discussion

**BONUS Feature: Key Points of Data**

• “Average” patient
  • Normo-tensive
  • Normo-glycemic
  • Obese
  • In a medical home
  • Consistent w/ current descriptions of target community

• Data fairly consistent with CDC and NPHD numbers;
  • Slightly lower-possibly community center population (more likely healthy?)
• 21.8% of hypertensives (5.8% of all BP screens) “new positives”—validates preventive value of screening program
• 25% of hyperglycemics (4.5% of all screens) “new positives”—validates preventive value of screening program

• Patients in medical homes tended to have better health than those not in medical homes—by identifying and referring these patients to UNHS, MHSU can make a significant difference in many individuals’ quality of life
• Continued acquisition of data by the clinic should result in higher n, even stronger power, and continued compelling arguments for efficacy of screening program
Discussion

Challenges and Difficulties

• Frequent difficulties with acquiring driver
• Confusion between site and team about services rendered
• Low number of student volunteers
Discussion
Is This Project Sustainable?

 Volunteer student feedback positive
 Small time window
 “Stranger” as recruiter
 Multiple requests at UNHS for volunteer opportunities
 Medical students eager for “hands-on” medicine; idealistic about “mission”

<table>
<thead>
<tr>
<th>Feedback Question</th>
<th>Average Response (1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Community Impact</td>
<td>9.3</td>
</tr>
<tr>
<td>Likely to Help Again</td>
<td>9.5</td>
</tr>
<tr>
<td>Likely to Refer Others</td>
<td>9.5</td>
</tr>
<tr>
<td>Overall Experience</td>
<td>8.7</td>
</tr>
</tbody>
</table>

All systems are “go”!
# Recommendations
Keeping the MHSU Project Running and Growing

## Additional Staff and/or Modified Driving Policy

| 1 | • Could include “approved student drivers” trained and documented by UNHS  
   |   | • Alternatively, specially designated staff member(s) solely for MHSU events |

## Standardized Form for Screening Site Completion Prior to Event

| 2 | • Many miscommunications between services desired and services provided—potential patients lost  
   |   | • Forms eliminate ambiguity and ensure correct resources are provided for each event |

## Potential Future Services to Add

| 3 | • Examples include: fingerstick cholesterol screen, diabetic neuropathy check, asthma screen for children  
   |   | • Additional services draw medical volunteers eager for procedures; QOC provided to patient increases |
Recommendations
Keeping the MHSU Project Running and Growing

Immediate Referral of “New Positives” and Those Without Medical Homes

1. Greater likelihood of patient entering “system”
2. Increases preventative impact factor

Indication at First Visit of Referral From Mobile Event

3. Simple question on patient data form
4. Will allow UNHS definitive proof of MHSU efficacy
5. Additional documentation for grants, etc.
Conclusion

Create An Improved and Sustainable Model of Operations for the MHSU

- MHSU is now a much more effective tool in the battle against chronic disease in Nashville, TN
  - Proven efficacy
  - Reliable data
  - Sustainable model / materials

- Multiple exciting possibilities for the future
  - Possible reports, studies, grants
  - More healthcare students committed to community health
  - Increased prevention of "The Big 3"

- A happier and healthier Nashville!
Special Thanks To:

1. Mr. William Wyatt, Health Promotions Coordinator of UNHS
2. Ms. Katie Hill, Mobile Health Unit Operator
3. Dr. Afua Boaten, Interim CMO, UNHS
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