A Geisinger Health System Profile Highlighting:

**Post-Discharge Monitoring Using IVR Reduces 30-Day Readmissions in Case-Managed Medicare Population**

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Presenters

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*Director of Population Management Operations/Geisinger Health Plan.*  
In this role, Diane is responsible for administrative oversight of Case / Disease Management programs. She has also been responsible for the start up and maintenance of the medical home model, Proven Health Navigator. Diane serves as a liaison between the Geisinger Health Plan and Geisinger’s Community Practice Service Line. Diane is responsible for staff oversight and development for both Case and Health Management. Both Case and Disease Management programs provide interventions that optimize patient and provider satisfaction, quality, and efficiency outcomes.

**Maria Lopes, MD, MS**  
*Chief Medical Officer/AMC Health*  
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Patient Centered Medical Home

• A patient-centered medical home integrates patients as active participants in their own health and well-being.
• Patients are cared for by a physician who leads the medical team that coordinates all aspects of preventive, acute and chronic needs of patients using the best available evidence and appropriate technology.
• These relationships offer patients comfort, convenience, and optimal health throughout their lifetimes.
Defining the Medical Home

Source: Health2 Resources  9.30.08

Superb Access to Care
- Patients can easily make appointments and select the day and time.
- Waiting times are short.
- Email and telephone consultations are offered.
- Off-hour service is available.

Patient Engagement in Care
- Patients have the option of being informed and engaged partners in their care.
- Practices provide information on treatment plans, preventative and follow-up care reminders, access to medical records, assistance with self-care, and counseling.

Clinical Information Systems
- These systems support high-quality care, practice-based learning, and quality improvement.
- Practices maintain patient registries; monitor adherence to treatment; have easy access to lab and test results; and receive reminders, decision support, and information on recommended treatments.

Care Coordination
- Specialist care is coordinated, and systems are in place to prevent errors that occur when multiple physicians are involved.
- Follow-up and support is provided.

Team Care
- Integrated and coordinated team care depends on a free flow of communication among physicians, nurses, case managers and other health professionals (including BH specialists).
- Duplication of tests and procedures is avoided.

Patient Feedback
- Patients routinely provide feedback to doctors; practices take advantage of low-cost, internet-based patient surveys to learn from patients and inform treatment plans.

Publicly available information
- Patients have accurate, standardized information on physicians to help them choose a practice that will meet their needs.
30-Day Readmissions

• 17.6% of Medicare hospitalizations due to 30-day readmissions ($15 Billion)$^1$
• 50% of Medicare FFS patients with a 30-day readmission did not visit an outpatient physician prior to readmission$^2$
• Affordable Care Act (PPACA) directs CMS to track readmission rates and implement payment penalties
• Discharge planning is variable, communication gaps occur

$^1$ MPAC Report to Congress, June 2008.
$^2$ Jencks et al., NEJM 2009
Post-Discharge Monitoring

- 2010 Cochrane Systematic Review of RCT’s concluded that in-hospital discharge planning “probably” brought about small reductions in readmissions
- No RCTs specifically evaluating IVR’s for post-discharge
- 1 RCT of telemonitoring in heart failure patients only

- Chaudrhy et al. (NEJM 2010): No improvements in 180-day readmissions or mortality for patients taking daily IVR calls
- Substantial dropout concerns: 14% of patients assigned to IVR never used; 45% were no longer using it by final week of study
ProvenHealth Navigator® (PHN): Geisinger’s Medical Home Program

**Patient-centered primary care**
- Patient and family engagement & education
- Enhanced access and scope of services
- Team-based care
- Chronic disease and preventive care optimized with HIT

**Integrated population management**
- GHP employed in-office care managers
- Patient-specific intervention plans
- Population profiling & segmentation - predictive modeling

**Value care systems**
- Micro-delivery referral systems
- 360° care systems – SNF, ED, hospitals, HH, etc

**Quality outcomes**
- Patient satisfaction
- HEDIS and bundled chronic disease metrics
- Preventive services metrics

**Value-based reimbursement**
- Fee-for-service with P4P payments for quality outcomes
- Physician and practice transformation stipends
- Value-based incentive payments
- Payments distributed on Quality Performance
Primary Care Redesign

Patient and family engagement & activation
- Self-management education
- Informed decision making

Physician led team-delivered care
- Physician leadership must set stage for expectation of practice
- Acute/chronic illness care with enhanced access for expanded scope of services
- Redefining roles – “top of the license”
- Responsibility and awareness of where patient is at all times – hospital, SNF, home

Chronic disease and preventive care optimization via IT enabled planned visits
- EMR tools
- HP tools for non-EMR practices
## Integrated Population Management

<table>
<thead>
<tr>
<th>Components</th>
<th>Core Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Segmentation</td>
<td>Predictive modeling</td>
</tr>
<tr>
<td></td>
<td>Risk stratification</td>
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<tr>
<td>Health Promotion</td>
<td>Preventive care &amp; Screenings</td>
</tr>
<tr>
<td>Disease Management</td>
<td>Self-management education</td>
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<tr>
<td></td>
<td>Medication management</td>
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<tr>
<td>Case Management</td>
<td>Care coordination</td>
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<td></td>
<td>Exacerbation management</td>
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<tr>
<td></td>
<td>TOC</td>
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<td></td>
<td>Tele-monitoring</td>
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<tr>
<td>Pharmacy Management</td>
<td>Brand vs. generic</td>
</tr>
</tbody>
</table>
Embedded Case Management: The core to our success

<table>
<thead>
<tr>
<th><strong>Personal Care Link</strong></th>
<th><strong>Embedded Case Manager</strong></th>
<th><strong>Recognized Team Member</strong></th>
</tr>
</thead>
</table>
| Comprehensive Care Review – medical, social support | - **High risk** patient case load  
- 15 - 20% Medicare  
- 5% commercial  
- 125 - 150 pts per CM | Regular follow-up of high risk patients |
| TOC follow-up – acute care, SNF, ED | - 1 CM per 800 Medicare lives  
- 1 CM per 5000 commercial lives | Facilitates access – PCP, specialist, ancillary |
| Direct phone access – questions, exacerbation protocols | - Not disease management focused  
- Focus on those at most risk  
- Focus on driving issue within the case | Facilitate special arrangements – home care, hospice, AAA |
| Patient, family support contact | | Links health care team to payer |
Transitions of Care

• Pt contact within 24-48 hrs post discharge
• Telephonic outreach
  • Medication reconciliation
  • Ensure safe transition post discharge
  • with appropriate services in place
    • Home Health
    • DME
    • Safe to be in their home?
  • Facilitate post hospital PCP & CM appt within 3 - 5 days
• Close follow-up for 30 days
Chronic Care Management

**Heart Failure**
- Diuretic Titration Protocol
- Daily weights
- Telemonitoring
- Education
- Self management
- Outreach

**COPD**
- Rescue kit
- Symptom monitoring
- Education
- Self management
- Medication
- Outreach
GHS Experience with Monitoring

2006-09: Internally-developed “manual” monitoring program for post-discharge
   - Goal was early identification of post-discharge complications, to avoid ED visits and hospitalizations
   - Clerical staff made manual calls to patients with 8-9 questions
   - Answers that raised red flags were elevated to nurse case manager for follow-up
   - Not scalable, ~30 minutes per call/follow-up

2009: Automated “Geisinger Monitoring Program” (GMP) program using AMC technology
One IVR call per week, 4 weeks
2-3 minute survey
Questions about:
- Medication adherence and side effects
- Pain, shortness of breath, fever, edema, falls
- GI or neurological symptoms
- Psychosocial support
- Incision site complications (for surgical patients)
Branching logic based on current & prior responses
IVR calls did not replace all contact from CM, but allowed CM’s to extend reach and prioritize patients
Results
<table>
<thead>
<tr>
<th>Variable</th>
<th>GMP Patients (n=875)</th>
<th>Control Patients (n=2,420)</th>
<th>p-value before PS adjustment</th>
<th>p-value after PS adjustment*</th>
<th>Standardized Difference (SD) after PS adjustment*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (%)</td>
<td>45.4</td>
<td>42.8</td>
<td>0.19</td>
<td>0.69</td>
<td>0.02</td>
</tr>
<tr>
<td>Age (mean, yrs)</td>
<td>75</td>
<td>78</td>
<td>&lt;.001</td>
<td>0.07</td>
<td>0.06</td>
</tr>
<tr>
<td>HCC Risk (mean)</td>
<td>1.35</td>
<td>1.75</td>
<td>&lt;.001</td>
<td>0.97</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>% with Chronic Kidney Disease</td>
<td>5</td>
<td>4</td>
<td>0.09</td>
<td>0.70</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>% with Diabetes</td>
<td>11</td>
<td>15</td>
<td>&lt;.001</td>
<td>0.78</td>
<td>0.03</td>
</tr>
<tr>
<td>% with Hypertension</td>
<td>24</td>
<td>30</td>
<td>&lt;.001</td>
<td>0.99</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Admits per 1000 patient-months (mean)</td>
<td>44.1</td>
<td>46.7</td>
<td>0.76</td>
<td>0.89</td>
<td>0.03</td>
</tr>
<tr>
<td>Readmits per 1000 patient-months (mean)</td>
<td>14.0</td>
<td>13.4</td>
<td>0.90</td>
<td>0.91</td>
<td>0.02</td>
</tr>
<tr>
<td>Mean inpatient expenses per patient-month ($)</td>
<td>$338.93</td>
<td>$353.93</td>
<td>0.72</td>
<td>0.68</td>
<td>0.02</td>
</tr>
<tr>
<td>Mean total expenses (excluding prescriptions) per patient-month ($)</td>
<td>$1253.94</td>
<td>$1371.37</td>
<td>0.16</td>
<td>0.47</td>
<td>0.03</td>
</tr>
</tbody>
</table>

*p>0.05 and SD <0.10 suggest adequate balance.
# GMP vs. Control (2007-09)

<table>
<thead>
<tr>
<th>Year</th>
<th>GMP Cohort (n=875 members)</th>
<th>Control Cohort (n=2,420 members)</th>
<th>Comparison of GMP vs. Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N, Admissions N (%) Readmissions</td>
<td>N, Admissions N (%) Readmissions</td>
<td>Absolute % Reduction in Readmits</td>
</tr>
<tr>
<td>2007</td>
<td>155 25 (16.1)</td>
<td>657 124 (18.9)</td>
<td>-2.8%</td>
</tr>
<tr>
<td>2008</td>
<td>288 59 (20.5)</td>
<td>1,171 268 (22.9)</td>
<td>-2.4%</td>
</tr>
<tr>
<td>2009</td>
<td>1329 209 (15.7)</td>
<td>3,565 714 (20.0)</td>
<td>-4.3%</td>
</tr>
<tr>
<td>Total</td>
<td>1,772 293 (16.5)</td>
<td>5,393 1,106 (20.5)</td>
<td>-4.0%</td>
</tr>
</tbody>
</table>
### Within GMP Cohort Only (Pre/Post)

<table>
<thead>
<tr>
<th></th>
<th>Before GMP</th>
<th>During GMP</th>
<th>After GMP</th>
<th>Comparison of “During GMP” vs. “Before or After”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N,</strong> Admits</td>
<td>584</td>
<td>1,018</td>
<td>170</td>
<td>Absolute % Reduction in Readmits</td>
</tr>
<tr>
<td><strong>N (%)</strong> Readmits</td>
<td>158 (27.1)</td>
<td>103 (10.1)</td>
<td>32 (18.8)</td>
<td>Relative % Reduction in Readmits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>p-value</strong></td>
</tr>
<tr>
<td></td>
<td>-15%</td>
<td>-60%</td>
<td></td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

*Note: Pre/Post data within GMP cohort only.*
## Regression: Within-Person Results

<table>
<thead>
<tr>
<th>Analysis Method</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>p-value</th>
<th>Relative % Reduction in Odds of Readmission [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Analysis (Per Protocol)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unadjusted</td>
<td>0.502</td>
<td>(0.350, 0.720)</td>
<td>0.0008</td>
<td>50% [28-65%]</td>
</tr>
<tr>
<td>PS Regression</td>
<td>0.504</td>
<td>(0.352, 0.723)</td>
<td>0.0002</td>
<td>50% [28-65%]</td>
</tr>
<tr>
<td>PS Stratification</td>
<td>0.556</td>
<td>(0.401, 0.772)</td>
<td>0.0004</td>
<td>44% [23-60%]</td>
</tr>
<tr>
<td><strong>Intent To Treat Analysis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unadjusted</td>
<td>0.596</td>
<td>(0.421, 0.843)</td>
<td>0.0035</td>
<td>40% [16-58%]</td>
</tr>
<tr>
<td>PS Regression</td>
<td>0.596</td>
<td>(0.421, 0.844)</td>
<td>0.0035</td>
<td>40% [16-58%]</td>
</tr>
<tr>
<td>PS Stratification</td>
<td>0.649</td>
<td>(0.483, 0.870)</td>
<td>0.0039</td>
<td>35% [13-52%]</td>
</tr>
<tr>
<td><strong>Censoring Dropout Observations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unadjusted</td>
<td>0.438</td>
<td>(0.297, 0.647)</td>
<td>&lt;.0001</td>
<td>56% [35-70%]</td>
</tr>
<tr>
<td>PS Regression</td>
<td>0.441</td>
<td>(0.299, 0.650)</td>
<td>&lt;.0001</td>
<td>56% [35-70%]</td>
</tr>
<tr>
<td>PS Stratification</td>
<td>0.498</td>
<td>(0.351, 0.706)</td>
<td>&lt;.0001</td>
<td>50% [29-65%]</td>
</tr>
</tbody>
</table>
Discussion/Conclusions
Strengths and Limitations

• Robust pre-post parallel design, with multiple sensitivity analyses to test assumptions & limit bias
• Very high compliance/completion rate
  – Only 34 of 875 GMP patients (4%) failed to complete 4 weeks’ calls
  – These patients were included in analysis as GMP patients
• Medicare population in integrated health system
• Long-standing use of an ambulatory EHR system
• IVR was added on top of an existing case management program (and still showed incremental effect)
• Observational study
  – Study design and analysis attempted to minimize bias
  – However, CMs’ selection of patients for IVR could still confound
Conclusions

• Use of IVR with case management, as compared to case management alone, was associated with a 44% relative reduction in 30-day readmissions [$p=0.0004$, 95% confidence interval 23-60%]

• Although the ability to implement this was expedited within an integrated health system and case management model, the core components of trained clinical staff, effective communication tools and commercial telemonitoring systems such as AMC can be implemented elsewhere in innovative and creative provider models.
Thank you for your participation…

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Complimentary Webinar: Speaking from experience: **Geisinger System on how they reduced readmissions by 44%**

**Webinar Details:** Thursday, March 8\(^{th}\), 2012 | 2:00pm ET / 11:00am PT

Are you interested in learning more about the remote patient monitoring programs Geisinger Health System has utilized and how they are reducing healthcare cost by reducing readmissions?

**Register Today** in the exhibit hall at the **AMC Health Booth** or **register at amchealth.com** to join a complimentary webinar: a profile of Geisinger on March 8\(^{th}\) at 2:00pm ET