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StarTracker: An Automated EMR Panel Management Tool to Enhance Geriatric Outpatient Care

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INTRODUCTION

Decision support linked to quality measures has the potential to enhance quality of care and chronic disease management. The HITECH mandate of the 2009 Affordable Care Act requires electronic health records (EHR) to be implemented by 2014 and to function as a lever to provide patient and population. It should provide data capture and patient access, information exchange and care coordination, and promote improved outcomes of care. With over 700 U.S. vendors offering electronic records, the EHR is here to stay. We describe the development and geriatric primary care clinic implementation of StarTracker, a real-time, diagnosis/patient specific EHR dashboard designed to provide decision support for outpatient chronic disease management.

StarPanel is an integrated electronic patient chart used extensively since 1998 throughout Vanderbilt inpatient and outpatient environments. StarPanel was developed by Vanderbilt University Department of Biomedical Informatics faculty members and Informatics Center staff. All clinical patient data generated at the Vanderbilt University Medical Center (VUMC) over the past decade have been stored in StarPanel. The system receives data from approximately 100 diverse sources, including real-time laboratory results feeds, radiology system reports, pathology reports, electrocardiography reports and traces, dictated reports from outside transcription companies, and feeds from census, physician orders, and billing systems. StarPanel stores these data permanently in an integrated, patient-centric database optimized to support clinical queries.

StarTracker, a recent development in StarPanel, supports chronic disease management and outpatient decision support. This development provides StarPanel users the ability to identify specific diagnoses within each physician’s patient populations. Combined with basic keyword searches, these tools create robust disease registries. In turn, these registries permit the system to generate real-time diagnosis/patient-specific decision support at the point of care to implement chronic care models on target populations using defined search criteria and time frame data in the EHR.

Between 2006-08, StarTracker implemented a geriatric dashboard including 12 total quality measures, many based on Assessing Care of Vulnerable Elderly (ACOVE) criteria.

Table 1. StarTracker Geriatric Dashboard

- Renal function (serum creatinine level and Modification of Diet in Renal Disease (MDRD) based estimate of glomerular filtration rate (GFR)
- Hematocrit level
- Influenza vaccination status
- Pneumococcal vaccination status
- Outpatient clinic visit-associated assessment of activities of daily living (ADL questionnaire completed by patients)
- Alert for patients prescribed any strongly contraindicated medication (based on modified Beers’ list of meds)
- Colorectal cancer screening status documented
- Breast cancer screening documented
- Mini-mental status score for the patient
- Advance directives/living will documented
- Blood pressure
- Smoking status

Figure 1.

**StarTracker Conditions/Diseases:** No Tracked Conditions  Hide/Show Dashboard  Modify Registry Data

*** notation indicates test is due for repeat and value may be outdated.

<table>
<thead>
<tr>
<th>Geriatrics Preventive</th>
<th>eGFR</th>
<th>HCT</th>
<th>FLUVAX</th>
<th>PVAX</th>
<th>ADLs</th>
<th>MedAlert</th>
<th>MMSE</th>
<th>AdvDir</th>
<th>CRC</th>
<th>Mammogram</th>
<th>PAP</th>
</tr>
</thead>
</table>

*Patient-specific guidelines*

The Geriatric StarTracker dashboard in StarPanel was implemented in 2008 in the VUMC Adult Primary Care Center. This site includes 1,496 patients over the age of 65. We report on our 2006-2011 experience following implementation of StarTracker. Patients must have had one or more visits in the practice during the run-up time between July 1, 2006 and January 1, 2008. These patients were then tracked for a period of four years between January 1, 2008 and December 31, 2011. This study was approved for exemption by the Vanderbilt Institutional Review Board.

StarTracker data was downloaded by data dump to a spreadsheet for descriptive statistical analysis and displayed in Table 2. Elderly patients had a high disease burden (HTN 47.4%, DM 18.6%, CHF 6.4%, renal insufficiency 42%); were heavy utilizers of healthcare (10.3 OPD visits yearly, 16.9% ED visits previous 2 years, 36.5% hospitalized previous 2 years, 20.3% 5 year mortality); and displayed the following characteristics (1 or more potentially inappropriate medications 23%, difficulty with ADL’s 27%, had MMSE performed 24%). Quality improvement initiatives included 29% enrollment in the My Health Team at Vanderbilt medical home program and 37.4% patients with access to the My Health at Vanderbilt (MHAV) e-communication portal.

**Table 2. Descriptive Statistics following Implementation of the Geriatric Dashboard**

**Population Description** (patients over age 65 as of 2008)

N=1496
Male 36%, Female 64%
Age 65-75 = 631 (42%)
76-85 = 582 (39%)
> 85 = 283 (19%)
Died during study period = 304 (20.3%)

Of patients alive at end of study (n = 1192):
Hospitalized at least once in past 2 years = 435 (36.5%)
Hospitalized more than once in past 2 years = 203 (17.0%)
At least one ED visit in past 2 years = 201 (16.9%)
More than one ED visit in past 2 years = 73 (6.1%)
OPD Visits = avg. 10.3 per year
PCP Visits = avg. 2.2 per year
No show = <1%

<table>
<thead>
<tr>
<th>Trend Data</th>
<th>N  (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTN</td>
<td>709 (47.4%)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>280 (18.7%); Insulin requiring = 57/280 (20.3%)</td>
</tr>
<tr>
<td>CHF</td>
<td>96 (6.4%)</td>
</tr>
<tr>
<td>Anemia</td>
<td>HCT &lt;=30 (159/1496) = 10.6%</td>
</tr>
</tbody>
</table>
| Renal Function      | eGFR < 60 (629/1496) = 42%
                        | eGFR > 30 (97/1496) = 6.5% |

<table>
<thead>
<tr>
<th>Dashboard Data</th>
<th>N  (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty with ADL’s</td>
<td>406 (27)</td>
</tr>
<tr>
<td>MMSE</td>
<td>368 (25%); 24% MMSE score &lt;20 (0-30)</td>
</tr>
<tr>
<td>PIMS</td>
<td>213 (14%) at least 1 high risk category</td>
</tr>
</tbody>
</table>
<pre><code>                    | 344 (23%) at least 1 moderate risk category |
</code></pre>

Health Promotion-Quality Initiatives
346/1192 (29%) are in the My Health Team medical home program (began 2010).
446/1192 (37.4%) have access to the My Health at Vanderbilt (MHAV) e-communication portal.

DISCUSSION
Standard disease state outcomes suggest that most community physicians attain 50% of disease state targets, whereas the EHR has been credited with helping the VA attain 75% targets.\(^9\) Despite the many current valid criticisms of EHRs by physicians, including data entry, compatibility and portability challenges, StarTracker has the potential to improve performance of provider practices. Development is near completion that would allow all physicians to see their entire geriatric patient population and patient-by-patient measures in summary form – including basic statistical functions, e.g. mean values and percent at target for different measures.

In addition to profiling practices, prescribing patterns, co-morbidities, and achievement of aggregate disease state goals, StarTracker represents the development of meaningful use techniques to improve systems of care, to facilitate attention to outcomes, and potentially change physician behaviors. This capability can be of great importance in training programs as well as quality improvement applications. StarTracker has the ability to display disease state data vis-à-vis clinical practice guidelines, and aid in the modification and management of co-morbidities.\(^10\) Panel management tools such as StarTracker also help define populations of frail patients by combinations of diseases, assessments, or laboratory values,\(^11\) with promise of development of individualized, patient-specific medical home clinical management tools, and responding to new quality measures including physician quality reporting (PQRS).\(^12\)

Strengths of the StarTracker panel management tool include the documentation of useful data for clinicians presented in real time at the point of patient care. This enhanced functionality has the potential of improving quality of care by displaying quality indicators as decision support for physicians.
CONCLUSION

Panel management tools such as StarTracker can only present information to the physician, and as such remain passive interventions. However, they hold out the promise to assist physicians in utilizing the EHR to enhance patient care in productive and meaningful ways and lead the way for broader applicability such as pop-up reminders, team based care with non-physicians acting on alerts, and targeted focus on quality improvement and disease management for selected states and PQRS reporting requirements for billing and documentation for ICD-10 and new CPT codes including transitions of care, coordination of care, and advance care planning.

Additionally, EHR functionality improvements may enhance access and continuity, assist to identify and manage populations, plan and manage care, provide patient communication self-care and individualized education, track and coordinate care with other providers, as well as measure and improve performance, all components of a patient-centric medical home.

References: