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# Achievable Benchmarks of Care for Primary Care Quality Indicators in a Practice-Based Research Network

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A number of sources publish health care quality reports in the United States, but there is limited information about achievable performance in primary care settings. The objective of this article is to report Achievable Benchmarks of Care (ABCs) for 54 quality indicators. Eighty-seven practices participating in a demonstration project in the Practice Partner Research Network (PPRNet), representing 35 US states and 711 969 patients, were included in the analyses. PPRNet practices use a

common electronic medical record (Practice Partner, Seattle, Washington). ABCs ranged from 25% to 99%. High ABCs ( $\geq 90\%$ ) were achieved for blood pressure screening, lipid screening, and avoiding antibiotics in upper respiratory infection. Some calculated ABCs may be lower than the actual ABCs due to incomplete data recording or abstracting. Primary care practices can achieve high performance across a number of quality indicators, and PPRNet ABCs can serve as benchmarks for primary care practitioners and payers. (*Am J Med Qual* 2008;23:39-46)

**Keywords:** benchmarking; primary health care; quality indicators; practice-based research network

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Quality improvement in preventive and chronic care depends on the accurate collection of clinical data and the setting of realistic goals. On a national level, the Agency for Healthcare Research and Quality (AHRQ), the National Committee for Quality Assurance (NCQA), and the Commonwealth Fund are 3 agencies involved in this pursuit.<sup>1-3</sup> Through analysis of national surveys and databases, they provide consumers, payers, and providers with calculated performance on quality indicators such as cancer screening and diabetes care. This information may be important on the grand scale for policy and business decision making, but it does little to motivate or inspire health care providers to improve their individual or practice performance. In a 2003 survey of 100 physicians' ability to benchmark, less than one quarter reported having the ability to compare performance to peers within their specialty or within similar



health plans; only 11% reported the ability to benchmark with physicians nationally.<sup>4</sup>

Benchmarking in health care has been described as the identification of top performers so that their practices may be understood and emulated.<sup>5</sup> Combining benchmarks with performance feedback helps with goal setting and leads to improved quality, greater than achieved through performance feedback alone.<sup>6-8</sup> Sources of benchmarks for quality indicators available to individual providers or practices include Healthy People 2010,<sup>5</sup> NCQA Health Plan Employer Data and Information Set (HEDIS) data,<sup>6</sup> and the AHRQ National Healthcare Quality Report (NHQR).<sup>7</sup> Each source has a different database and a unique method for calculation of the benchmark. Quality targets in Healthy People 2010 are calculated by statistical regression using current performance rates, knowledge of current programs and expected change, and expert judgment and consensus.<sup>8</sup> HEDIS data include mean and 90th percentile performance rates on a standardized set of performance measures for various health plans. Data collection and calculation methods employed by health plans for HEDIS may vary, and plans may select not to report on certain measures each year.<sup>9</sup> The AHRQ's NHQR has compiled a list of quality indicators that are informed by databases from multiple national surveys and observational studies.<sup>10</sup> Despite this apparent fund of knowledge, it has been argued that such national figures have little impact or influence on efforts toward quality improvement on an individual practice or provider level.

Compared to benchmark selection of the mean performance or the 90th percentile of providers or practices, Achievable Benchmarks of Care (ABCs) are benchmarks reflecting care provided to at least 10% of the total eligible patient population. They ensure that high performers (ie, practices) with small numbers of cases do not unduly influence the level of the benchmark.<sup>11,12</sup> By design, ABCs represent an empirically derived attainable level of excellence.

The purpose of this study is to report ABCs for a broad spectrum of quality care indicators in a network of primary care practices across the United States. This is the most diverse, comprehensive compilation of benchmarks based on primary care practice data. The indicators are composed of evidence-based preventive care and treatment guidelines that reflect areas of underuse, overuse, and misuse of health care services.<sup>1,13</sup> Through calculation of ABCs for a broad set of quality indicators in a network of primary care practices, it is possible to

identify achievable targets for primary care providers and payers.

## METHODS

### Design

This quantitative, descriptive study was designed to identify the ABC for each of 54 quality indicators. Benchmarks were calculated using data electronically extracted from the electronic medical record (EMR) of primary care practices involved in an AHRQ-funded project. The project was approved by the Institutional Review Board for Human Research at the Medical University of South Carolina.

### Data Source

Founded in 1995, the Practice Partner Research Network (PPRNet) is a practice-based research and learning network of primary care practices that uses a common EMR, Practice Partner (Practice Partner, Seattle, Washington).<sup>14</sup> PPRNet involvement is voluntary and offered to all practices that use Practice Partner's EMR. Practice Partner, now owned by McKesson (San Francisco, California), has marketed a fully integrated EMR system since 1986, which is now used by more than 1000 physician practices in the United States. Approximately 25% of Practice Partner primary care practices participate in PPRNet. The Certification Commission for Healthcare Information Technology (CCHIT) has deemed Practice Partner a CCHIT-Certified Ambulatory Electronic Health Record. The EMR maintains and integrates data on diagnoses, vital signs, laboratory data, preventive services, other data elements, and the text of notes and reports. Essentially all data elements in the EMR, exclusive of confidential identifiers and text of notes, are extracted quarterly from all patients in the practice for PPRNet research and quality improvement activities. Practices included in this analysis were involved in a 4-year quality improvement demonstration project titled "Accelerating the Translation of Research Into Practice" (A-TRIP). The ABCs were calculated using data as of June 30, 2006.

Extent of participation in quality improvement activities offered by A-TRIP was dependent on the practice. All PPRNet practices that provided quarterly data extracts from their EMRs received performance reports showing their current and past performance as well as PPRNet benchmarks and medians for each quality indicator. A-TRIP indicators



were developed from evidence-based treatment and preventive care guidelines in 8 clinical domains: diabetes mellitus,<sup>15-17</sup> cardiovascular disease and stroke,<sup>16-22</sup> cancer screening,<sup>23-25</sup> immunizations,<sup>26-29</sup> respiratory and infectious disease,<sup>30-33</sup> mental health and substance abuse,<sup>34-36</sup> nutrition/obesity,<sup>15-17,37</sup> and inappropriate medication use for the elderly.<sup>38</sup> There is substantial overlap between the quality measures in this study and those included in the Ambulatory Care Quality Alliance recommended starter set for ambulatory clinical performance measures.<sup>39</sup> PPRNet measure specifications are available on the PPRNet Web site.<sup>40</sup>

In addition to receiving performance reports, practices were offered on-site biannual visits by A-TRIP investigator(s) and annual network meetings to assist with quality improvement implementation. Site visits focused on academic detailing, reviewing the latest performance report, refining use of EMR tools, and participatory planning for quality improvement projects with providers and staff. Network meetings provided formal and informal venues to learn about strategies of top performers and to review progress of the A-TRIP project. The PPRNet quality improvement model<sup>41</sup> employed in A-TRIP and the A-TRIP intervention methodology have been described previously.<sup>42</sup>

### Achievable Benchmarks of Care Algorithm

In this study, ABCs were determined for each of 54 quality indicators. Of the 54 indicators presented in this study, 46 were process measures, such as receipt of a preventive service or prescription for an indicated medication, and 8 were outcome measures, including targets for blood pressure, hemoglobin A1c, and cholesterol.

Each ABC was calculated by first ranking the practices by performance, after incorporating a Bayesian adjustment to their performance fraction.<sup>11,12,43</sup> Second, a subset of patients eligible for the specific measure was created, starting with the highest ranked practice and continuing through the practice rankings, cumulatively adding all of each practice's eligible patients (en masse) to the subset until the patient pool represented at least 10% of the total number of eligible patients across all practices. Finally, the ABC was determined by dividing the total number of patients receiving the recommended care in this subset by the total number of patients eligible to have received the recommended care. This methodology, discussed elsewhere in more detail, ensured that high

**Table 1**

Demographics and A-TRIP (Accelerating the Translation of Research Into Practice) Involvement of Participating Practices (n = 87 Practices)

Total number of clinicians	434
Total number of patients	711 969
Male, %	43.4
Age over 18 years, %	88.1
Average age, y (SD)	42.8 (20.6)
Practice specialty	
Family medicine, n (%)	65 (74.7)
Internal medicine, n (%)	17 (19.5)
Multispecialty, n (%)	5 (5.7)
Length of involvement in A-TRIP (average in years) (range)	2.9 (1.2-3.4)
Practices receiving at least 1 site visit, n (%)	57 (65.5)
Practices attending at least 1 network meeting, n (%)	56 (64.4)

performers with few eligible patients did not overly influence the final benchmark.<sup>11,12</sup> In addition to the ABCs, the performance range among practices was determined for each indicator.

Also, to better understand how many ABCs were surpassed by top-performing practices, the total number of ABCs achieved by each practice was calculated. The distributional properties of this total were examined across practices, including the mean, median, range, and 90th percentile.

## RESULTS

Eighty-seven practices from 35 states provided complete data extracts as of June 30, 2006, and were included in the analyses. Demographic information for practices and the extent of their involvement in A-TRIP activities are provided in Table 1.

For each quality measure, Table 2 presents the ABC, total number of patients used for calculating the ABC, and the performance range among practices. ABCs ranged from 25% to 99%. The highest ABCs (those above 90%) included measures of routine vital signs such as blood pressure and recommended laboratory tests for patients with chronic illnesses (eg, lipid monitoring for patients with diabetes mellitus and cardiovascular disease). However, ABCs in this range were also seen for measures of avoiding antibiotic prescriptions for upper respiratory infection, use of antidepressants for depression, and avoiding inappropriate medications in the elderly. High ABCs



**Table 2**  
Achievable Benchmarks of Care in PPRNet (Practice Partner Research Network) Practices

Measure	Number of Eligible Patients	A-TRIP ABC, %	Performance Range Among Practices, %
<b>Diabetes mellitus<sup>15-17</sup></b>			
HDL measure in 1 year	29 937	92	12-96
Triglyceride measure in 1 year	29 937	92	13-96
BP measure in 6 months	29 937	91	26-95
LDL measure in 1 year	29 937	91	16-96
Patients with DM and HTN with ACE inhibitor or ARB prescription in 1 year	20 922	83	39-89
A1c measure in 6 months	29 937	79	9-84
Most recent A1c <7%	18 876	76	11-82
Most recent LDL <100 mg/dL	22 013	72	25-84
Most recent triglyceride <150 mg/dL	22 444	70	25-78
Patients older than age 40 with antiplatelet prescription in 1 year	27 402	69	6-92
Urinary microalbumin measure in 1 year	29 937	68	1-72
Most recent HDL >45 mg/dL	22 498	64	19-79
Most recent BP <130/80 mm Hg	24 746	54	14-59
<b>Heart disease and stroke<sup>16-22</sup></b>			
Adults: BP measure in 2 years	329 455	99	63-100
CHD patients with measure of LDL in 1 year	11 317	92	10-100
Atherosclerosis patients with measure of LDL in 1 year	9472	90	14-100
HTN patients with BP measure in 6 months	83 472	90	34-93
HTN diagnosis for 3 BPs >140/90 mm Hg in 1 year	26 103	89	9-100
Atrial fibrillation patients with anticoagulant/antiplatelet in 1 year	4304	88	30-100
CHD patients with lipid-lowering prescription in 1 year	11 317	88	35-100
Atherosclerosis patients with lipid-lowering prescription in 1 year	9472	83	27-91
Adults: Total cholesterol measure in 5 years	329 455	82	9-93
Adults: HDL measure in 5 years	329 455	82	9-92
CHD patients with most recent LDL <100 mg/dL	8168	81	20-100
HTN patients with most recent BP <140/90 mm Hg	67 682	80	24-90
Heart failure patients with ACE inhibitor or ARB prescription in 1 year	4451	78	30-100
Heart failure patients with beta-blocker prescription in 1 year	4451	72	14-100
Atherosclerosis patients with most recent LDL <100 mg/dL	6380	72	20-100
HTN patients with antiplatelet prescription in 1 year	83 472	62	3-71
Hyperlipidemia patients with antiplatelet prescription in 1 year	75 959	59	3-80
<b>Cancer screening<sup>23-25</sup></b>			
Mammogram in past 2 years in women ≥40 years	126 390	79	0-87
Pap test in past 3 years in women 18 to 64 years without hysterectomy	151 823	76	0-83
Colorectal cancer screening up to date in patients ≥50 years	150 601	67	1-81
<b>Immunizations<sup>26-29</sup></b>			
Pneumococcal immunization ever recorded for patients ≥65 years	62 709	86	1-93
Tetanus immunization in past 10 years for patients ≥12 years	355 909	73	0-91
Influenza immunization in past year for patients ≥65 years	62 709	70	1-77
Pneumococcal immunization ever recorded for eligible patients 18 to 64 years (COPD, CHD, CHF, chronic renal disease, alcohol abuse, diabetes mellitus)	36 920	50	0-69
Influenza immunization in past year for eligible patients 18 to 64 years (asthma, COPD, CHD, CHF, chronic renal disease, alcohol abuse, diabetes mellitus)	36 920	46	1-53
Two hepatitis A immunizations ever recorded for patients with chronic liver disease	530	28	1-35
<b>Respiratory/infectious disease<sup>30-33</sup></b>			
Upper respiratory infection: avoiding antibiotics within 3 days of unique visit	1993	90	0-97
Acute pharyngitis: avoiding antibiotics within 3 days of unique visit	1617	83	0-85
Acute bronchitis: avoiding antibiotics within 3 days of unique visit	1219	79	0-86
Controller prescription for children 5 to 17 years old with asthma in past year	4391	71	9-100
Controller prescription for adult asthma patients in past year	17 987	70	27-80
Women 16 to 25 years old screened for chlamydia in 1 year	19 906	36	0-44

(continued)



Table 2 (continued)

Measure	Number of Eligible Patients	A-TRIP ABC, %	Performance Range Among Practices, %
Adult mental health and substance abuse <sup>34-36</sup>			
Prescription for antidepressant in patients with depression in past year	21 041	94	52-100
Smoking cessation counseling in past year for patients with tobacco abuse	24 362	85	0-87
Adult patients screened for at-risk drinking in past 2 years	329 455	54	0-84
Alcohol counseling in past year for patients with alcohol abuse	1079	49	4-60
Adult patients screened for depression in past 2 years	329 455	25	1-66
Nutrition and obesity <sup>15-17, 37</sup>			
Glucose in past year in patients with a diagnosis of obesity	19 439	90	14-66
Diet/nutrition counseling for patients with obesity, HTN, DM, or hyperlipidemia diagnoses	125 812	58	0-95
Inappropriate prescribing in the elderly <sup>38</sup>			
Avoiding the use of drugs always inappropriate in patients $\geq 65$ years in past year <sup>a</sup>	62 709	99	92-99
Avoiding the use of drugs rarely appropriate in patients $\geq 65$ years in past year <sup>b</sup>	62 709	97	75-98

ABC, Achievable Benchmarks of Care; ACE, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; A-TRIP, Accelerating the Translation of Research Into Practice; BP, blood pressure; CHD, coronary heart disease; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; DM, diabetes mellitus; HDL, high-density lipoprotein; HTN, hypertension; LDL, low-density lipoprotein.

a. Barbiturates, flurazepam, meprobamate, chlorpropamide, meperidine, pentazocine, trimethobenzamide, belladonna alkaloids, dicyclomine, hyoscyamine, and propantheline.

b. Chlordiazepoxide, diazepam, propoxyphene, carisoprodol, chlorzoxazone, cyclobenzaprine, metaxalone, and methocarbamol.

(80%-90%) also were seen for recommended medication management, such as the use of angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARB) in patients with coexisting hypertension and diabetes mellitus, anticoagulant or antiplatelet therapy for those with atrial fibrillation, or lipid-lowering therapy for patients with coronary heart disease (CHD). ABCs in this range were also found for glucose screening for patients with a diagnosis of obesity and important clinical targets, such as blood pressure control for patients with hypertension and low-density lipoprotein (LDL) control for patients with CHD. ABCs above 70% were found for mammogram and Pap smear screenings and many difficult to achieve clinical targets, such as glycosylated hemoglobin and LDL control for patients with diabetes. Although ABCs were above 70% for routine immunizations based on age, they were lower for those recommended for certain disease states. Wide ranges in performance among practices were seen for most of the indicators. These ranges may reflect differences in performance but also very likely reflect missing data. For example, if a practice recorded laboratory data or medication prescriptions in text sections of the chart, rather than on laboratory tables or medication lists, these data would not be available to PPRNet.

Of the 54 total quality measures, every practice achieved at least 1 ABC, and the highest number of

ABCs achieved by a single practice was 24. The average number of ABCs met by practices was 4.8 (SD = 4.3), and the median was 3.0. The 90th percentile for the total number of ABCs achieved (out of 54) was 11; that is, the top 10% of practices were able to equal or surpass 20% (11/54) of the individual ABCs.

## DISCUSSION

Setting realistic performance goals according to evidence-based guidelines is a key step in planning and assessing quality improvement efforts in both clinical and research capacities. To date, methods used to present national benchmarks or targets have been surveys of patients and providers, consensus data, and data from national surveys and databases. An alternative and perhaps more realistic determination is the calculation of ABCs through analysis of practice-based data from a complete patient population. In this study, we used data from the EMRs of 87 practices representing more than 700 000 patients to calculate benchmarks for 54 primary care quality indicators, designed for use by providers, payers, and administrators.

Because significant variability in indicator definition, data collection methods, population selection, and benchmark calculation exists when reviewing



national survey results, it is difficult to compare our results to published national performance rates. In addition, some limitations to this study may affect generalizability of the results. The practices included in the analyses were all members of a practice-based research network of users of a common EMR and had participated in a quality improvement demonstration project for an average of almost 3 years. Although participation was minimally defined as submitting quarterly EMR extracts, approximately two thirds of practices hosted site visits or attended network meetings. Many PPRNet A-TRIP practices are enthusiastic about quality improvement and about using their EMR to effect change, resulting in a higher benchmark compared to primary care practices across the United States not engaged in quality improvement. However, we believe that PPRNet practices serve as excellent examples for other practices of levels of care that can be achieved when quality health care is a priority.

Another limitation is incomplete data capture for all measures. This limitation largely affected the ranges reported, but may have an impact on the ABCs for screening and counseling measures in the mental health and substance abuse areas because many practices may only have documented this information in text sections of the EMR. However, missing data, although affecting performance ranges, should have little or no impact on most ABCs because they are calculated from high-performing practices, which would not be high performing if they had absent data for any particular measure.

Strengths of this study include the novel application of ABC methodology to a national practice-based research network database and the breadth of quality indicators evaluated. Although alternative methods exist for determining data-driven benchmarks (eg, percentile-based measures, unweighted and weighted averages), ABC benchmarks have been shown to represent an attainable level of excellence; are based on data from all patients in all practices in a predefined, data-driven manner; and are not unduly influenced by high-performing practices with small numbers of eligible cases (although even practices with a small number exhibiting high performance contribute to the benchmark).<sup>11</sup>

Selection of applicable and relevant indicators is critical in performance evaluation.<sup>44</sup> The quality measures presented are based on evidence-based guidelines available at the initiation of A-TRIP project site visits in 2002. Since that time, the Ambulatory Care Quality Alliance has published a starter set of 26 performance measures.<sup>39</sup> Both

PPRNet A-TRIP measures and the Ambulatory Care Quality Alliance starter set reflect the Institute of Medicine's Priority Areas<sup>45</sup> of diabetes mellitus, heart disease, asthma, cancer screening, and immunizations.

The ABCs calculated were perceived to be valid by PPRNet A-TRIP practices and received acceptance as the target level, which is vital to their utility in quality improvement efforts.<sup>46</sup> In other studies, when used as an audit and feedback strategy, ABCs have been shown to improve process measures in diabetes care and preventive service delivery.<sup>47,48</sup> If applied to a broad range of primary care practices in the United States, ABC methodology may also enhance national quality targets such as Healthy People 2010.<sup>49</sup>

Our comprehensive summary of ABCs on a broad range of evidence-based quality indicators can be applied to other primary care practices. ABCs offer realistic benchmarks for performance in individual practices but may also be considered by insurers in pay-for-performance initiatives and by national stakeholders as targets for health care quality.

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