

# Implementing the Quadruple Aim in Behavioral Health Care

Walter Matthew Drymalski, PhD

## ABSTRACT

**Objective:** Implementation of the Quadruple Aim of health care must begin with a clearly articulated set of concepts, or core domains (CDs), that comprise each aim. These CDs can then be operationalized with existing or new measures. If aligned to the organization's mission and strategic goals, these CDs have the potential to focus quality improvement activities and reduce measurement burden. This article represents the efforts of a publicly funded behavioral health system to operationalize the Quadruple Aim through the development of CDs.

**Methods:** Various stakeholders across the organization were consulted on their perceptions of the Quadruple Aim and the CDs they believed should support it. Then, a review of existing literature on core metrics for health care and

population health was completed, summarized, and integrated with the stakeholder feedback.

**Results:** These efforts led to the development and adoption of 15 CDs, with an accompanying literature review and set of recommendations of new and existing measures for each domain.

**Conclusions:** It is possible to create a comprehensive yet economical set of CDs and attendant measures that can be implemented in a staged, scalable, enterprise manner. It is hoped that the process articulated here, and the accompanying literature review, may be of some benefit to other public or government-run health systems in their own quality improvement journey to operationalize the Quadruple Aim by developing a set of CDs.

**Keywords:** quality measures; quality improvement; adult behavioral health.

First articulated in 2008, the Triple Aim proposes that health care systems should simultaneously seek to improve the patient's experience of care, improve the health of populations, and reduce the per capita costs of care for populations.<sup>1</sup> More recently, some have argued that health care provider burnout can deleteriously impact the attainment of the Triple Aim and have therefore advocated for an expanded focus to include a fourth Aim, the work life quality of the staff.<sup>2</sup> Milwaukee County Behavioral Health Division (BHD), a publicly funded, county-based behavioral health care system in Milwaukee, Wisconsin, recently adopted the Quadruple Aim as the framework by which it will organize its quality activities.

Although originally developed for medical organizations, BHD believes that the Quadruple Aim has strong applicability to county-level behavioral health services. Many county-based behavioral health divisions provide a variety of programs to large segments of the county based on financial eligibility and/or clinical need, and thus often have responsibilities to populations or subpopulations, rather

than programs. County health divisions, such as Milwaukee County's Department of Health and Human Services, are often asked to improve outcomes and client experience of care with neutral growth budgets and less reliance on taxes to fund programs, while simultaneously attracting and retaining competent staff.

Crucial to the effective implementation of the Quadruple Aim, however, is a clear set of population-level measures that help organizations assess their progress.<sup>3</sup> Unfortunately, as some authors have noted, evaluation of the Quadruple Aim remains a challenge because the "concepts of (population) health, quality of care and costs are not unanimously defined and measures for these concepts are under construction."<sup>4</sup> Several authors have provided some guidance to assist in the development of a set of measures that effectively capture the elements of the Quadruple Aim.<sup>5,6</sup> However,

*From the Milwaukee County Behavioral Health Division, Milwaukee, WI.*

the recent rapid proliferation of quality measures in health care<sup>7,8</sup> has been both burdensome and costly for providers.<sup>9,10</sup> Any measures adopted should not only be as meaningful as possible with regards to assessing progress towards the basic aims of health care, but should also be parsimonious, to limit measurement burden for providers (and patients) and focus attention on important issues.<sup>11,12</sup>

To select the most effective, parsimonious set of measures possible, one must first select a set of key foci from among the many possible areas of focus that the core measure is intended to represent. The core domains (CDs), if appropriately consistent with the strategic goals of the organization, provide a mechanism to orient the efforts of the organization at every level and help every staff member of the organization understand how his or her work impacts the progress towards these goals.<sup>11</sup> The CDs, therefore, represent the opportunity to affect a greater integration of efforts across the organization toward these shared aims, creating uniformity of purpose at every level. Further, increasing organizational attention on the CDs can also help to reduce measurement burden by streamlining and focusing the data capture processes on the most valuable elements of quality and health, and discarding other extraneous measures (albeit not at the expense of other reporting requirements).<sup>11</sup> The remainder of this article describes the CDs selected by BHD to assess its progress toward implementation of the Quadruple Aim and are organized by the Aim which they best represent.

### Methods

To effectively implement the Quadruple Aim at BHD, it was necessary to clearly define the subpopulation of focus for our efforts.<sup>6</sup> In this case, the subpopulation of interest was defined as all adult clients (18 years and older) who received at least 1 service encounter within a specified time frame from a program that BHD either operated or contracted with to provide care. Services provided by the BHD network include everything from psychiatric inpatient services to mental health and addiction treatment and care management. A limited array of social services, including housing and employment services, is also available to eligible consumers. BHD is the county-run behavioral health provider for individuals who are uninsured or underinsured in Milwaukee County, a demographically diverse, primarily urban county of approximately 950,000 people located in

Wisconsin. Approximately 15,000 adults receive services at BHD each year.

This work began by obtaining executive sponsorship for the project, in this case from the Chief Operations Officer and Executive Medical Director of BHD. With their backing, an initial review of the literature produced a preliminary set of possible domains, for which we created working definitions. We then made a list of key stakeholders throughout BHD to whom we needed to present the idea of the Quadruple Aim, and the CDs under each Aim, to secure their support. These stakeholders, which included individuals involved in quality activities, program managers, and executive leadership, were strategically selected based on their relative influence within the organization. A set of brief presentations and handouts explaining the project were then developed and shared at different focus groups with these stakeholders over the course of 6 months. These focus groups served to not only educate the organization about the Quadruple Aim and the CDs but afforded participants an opportunity to provide feedback as well.

During the focus groups, we asked participants which domains they believed were most important (were “core”) when operationalizing the Quadruple Aim. The focus groups provided feedback on the domain definitions, feedback that was used to develop uniform, mutually agreed upon definitions for the CDs that were generalizable to all departments at BHD, regardless of the focus of their services within the continuum of care or the continuum of age. This was a crucial step, as it will eventually enable BHD to aggregate data across departments, even if there are minor discrepancies in the specific items they use to assess the CDs. Comments from the focus groups ultimately resulted in a truncated list of domains and definitions, which, coupled with the literature review, resulted in our final set of CDs.

During our review of the literature, we also looked for items that we felt could best represent each CD in the briefest, most meaningful way. (These items were not meant to supersede existing data, but to provide examples that could be implemented with existing data or recommendations that could be utilized in the absence of existing data.) During this process, we made every effort to make use of existing data-reporting requirements. For example, if we had a state mandate to collect data on housing status, we attempted to leverage this required data point to represent the CD related to housing. In other cases, we attempted to

utilize claims or other administrative data to operationalize the CD, such as in the cost-of-care metric articulated in the section the Third Aim. For CDs for which no data existed or were insufficient, we emphasized the use of single- versus multi-item scales. For example, if we found a single-item global assessment of quality of life that had good psychometric properties relative to its longer parent scale, we selected the single item. This approach to item selection allowed us to create the most efficient, parsimonious set of measures possible, which we believed would enable us to comprehensively assess all the CDs with the least amount of burden to staff and clients. These items were presented at stakeholder focus groups, during which we asked for comments on the existing measures in their program or department and gave them the opportunity to comment on the new recommended measures.

A working definition is provided for each CD, followed by a brief review of the research base supporting its inclusion in the final list. The item(s) selected by BHD to represent each CD and the source of the item(s) are then supplied. These items were based either on measures currently collected because of existing reporting mandates or, in the case where extant measures were not available, on new items that demonstrated acceptable psychometric properties in the research literature. The CDs and items are organized by the Aim they best represent. A full list of the CDs by Quadruple Aim and items by CD is provided in the **Appendix** of the online version of this article. This article concludes with a brief summary of this effort and a discussion of how staff will utilize these items at different levels throughout the BHD system.

### The First Aim: Population Health Health Outcomes

**Deaths.** This can be defined as the cause of death, as determined by the medical examiner's office (where appropriate) or as the age at time of death. This CD can also be reported as proportion of deaths considered premature (eg, before age 75) or calculated as total years of potential life lost.

*Brief review and suggested item(s).* Rates and causes of premature mortality are critical foci for the County Health Rankings & Roadmaps,<sup>13</sup> the Institute for Healthcare Improvement's "Guide to Measuring the Triple Aim,"<sup>16</sup> the Centers for Disease Control and Prevention's "Community Health Assessment for Population Health Improvement,"<sup>14</sup>

and the Institute of Medicine's (IOM) "Vital Signs: Core Metrics for Health and Health Care Progress."<sup>11</sup> There is ample evidence that individuals with serious mental illness are at increased risk of early mortality relative to the general population,<sup>15-18</sup> and this risk applies to those with substance use disorders as well.<sup>15,19-20</sup> BHD tracks all deaths that occur while patients are receiving BHD-funded, community-based services.

**Self-Reported Health and Well-Being.** This CD asks patients to rate their current physical and mental health status, as well as their overall quality of life.

*Brief review and suggested item(s): Self-rated physical health.* Premature mortality among individuals with behavioral health issues appears to be due, in large part, to their increased vulnerability to the development of medical comorbidities.<sup>16,21</sup> A single self-rating question has demonstrated considerable sensitivity to premature mortality,<sup>22,23</sup> with predictive properties up to a decade prior to death.<sup>24,25</sup> Further, self-rated health has been associated with subsequent functional decline,<sup>26,27</sup> acute service utilization,<sup>28,29</sup> and overall health care costs.<sup>28</sup>

*Brief review and suggested item(s): Self-rated mental health.* Mental health disorders are associated with significant disability worldwide,<sup>30</sup> and comorbid mental health issues can exacerbate the course of other medical problems. For example, depression is associated with increased rates of mortality among individuals with diabetes and<sup>31</sup> cardiovascular disease,<sup>32</sup> as well as with rates of overall mortality,<sup>33</sup> and psychiatric comorbidity is associated with longer lengths of stay and higher costs among patients hospitalized for medical problems.<sup>34</sup> Research has found that a single-item measure of self-rated mental health is associated with the presence of psychiatric diagnoses, psychiatric symptoms, and subsequent depression and serious mental illness up to 1 year post-assessment.<sup>35,36</sup> There is even evidence that self-rated mental health may be more strongly associated with self-ratings of overall health than self-ratings of physical health.<sup>37</sup>

*Brief review and suggested item(s): Self-rated quality of life.* Quality of life is a critical component of the recovery journey and overall health.<sup>38</sup> For example, the County Health Rankings & Roadmaps lists "quality of life" as 1 of its key "health outcomes" in its County Health Rankings.<sup>13</sup> As some authors have noted, quality of life is often inferred from other "objective" recovery domains, such as employment, health status, or housing status. However, there is

evidence that these objective domains are functionally distinct from the inherently subjective construct of quality of life.<sup>39</sup> This has led other authors to conclude that these domains should be assessed separately when evaluating outcomes.<sup>40</sup> Single-item quality of life assessments have been used in research with individuals with cancer,<sup>41</sup> adults with disabilities,<sup>42</sup> patients with cystic fibrosis,<sup>43</sup> and children with epilepsy.<sup>44</sup> For this effort, BHD selected the first global quality of life item from the World Health Organization's WHOQOL-BREF quality of life assessment,<sup>45</sup> an item used in other quality of life research.<sup>46</sup>

### Health Factors

**Substance Use.** This CD is a composite of 4 different types of substance use, any recent heavy alcohol use (defined as 5 or more drinks in one sitting), any recent drug use, any recent prescription drug abuse, and any recent tobacco use.

*Brief review and suggested item(s).* As noted, substance use disorders confer an increased risk for early mortality<sup>15,19</sup> and are significantly implicated in disease disability burden worldwide.<sup>30</sup> Substance use has also been associated with both the onset<sup>47,48</sup> and exacerbation of mental health diagnoses.<sup>49-51</sup> Further, substance use appears to heighten the risk of violence in the general population<sup>52</sup> and especially among those with a co-occurring mental illness.<sup>53,54</sup> The County Health Rankings & Roadmaps list alcohol and drug use as key behaviors to address to improve the overall health of a given county,<sup>13</sup> and the Centers for Medicare & Medicaid Services (CMS) has endorsed initiation and engagement in addiction treatment as one of the measures in its Adult Core Set.<sup>55</sup>

Tobacco use continues to be one of the most significant risk factors for early mortality worldwide, and evidence indicates that it is associated with a lower life expectancy of nearly 10 years.<sup>56</sup> Unfortunately, rates of tobacco use are even higher among those with severe mental illness relative to the general population, and their rates of smoking cessation are lower.<sup>57,58</sup> Tobacco use is a significant risk factor for the high rates of early mortality in individuals with severe mental illness.<sup>18</sup> Further, a recent meta-analysis noted that, relative to those who continued to smoke, those who ceased smoking had reduced rates of psychological distress and increased quality of life rankings.<sup>59</sup> Reducing tobacco use is one of the key components of the County Health Rankings & Roadmaps, and medication assistance

with smoking and tobacco use cessation is also listed in the CMS Adult Core Set.<sup>13,55</sup>

An accumulating body of evidence suggests that single-item measures can adequately detect alcohol<sup>60-62</sup> and drug use disorders.<sup>60-64</sup> McNeely and colleagues recently developed and tested a brief 4-item screen, the Tobacco, Alcohol, Prescription medication, and other Substance use (TAPS) tool.<sup>65,66</sup> Preliminary evidence suggests that the TAPS tool can effectively identify the presence of problematic and disordered use of tobacco, alcohol, prescription medications, and other drugs.<sup>65-67</sup> BHD will use the 4 items from the TAPS tool to represent its substance use CD.

**Education/Employment Status.** This CD assesses the proportion of BHD members who have completed high school, who are in some type of educational or training program, or who are engaged in some type of employment activity (defined as full-time, part-time, supported, sheltered workshop, or as a full-time homemaker).

*Brief review and suggested item(s).* Research indicates that unemployment is a risk factor for mortality, even after controlling for other risk factors (eg, age, sex, socioeconomic status [SES], health).<sup>68</sup> Unemployment is associated with poorer physical and mental health in the general population and among those with disabilities.<sup>69-71</sup> Promisingly, evidence suggests that gaining employment or re-employment is associated with better health,<sup>72</sup> even for individuals with substance use disorders<sup>73</sup> or moderate<sup>74</sup> to severe mental health disorders.<sup>75-78</sup> Some authors have even proposed that, above and beyond the associated health benefits, employment may also help to realize a modest cost savings due to reduced service utilization and disability.<sup>79,80</sup> Employment is a core tenet in the Substance Abuse and Mental Health Services Administration's (SAMHSA's) model of recovery,<sup>81</sup> and is also listed as an important recovery goal for individuals with behavioral health issues.<sup>82</sup> BHD collects data on employment status on all the patients it serves as part of its state-mandated reporting requirements and will use this item in the CD data set.<sup>83</sup>

**Living Situation.** This is measured as the proportion of people who live in permanent, supportive, stable housing; it may also be measured as the percentage of the population living with severe housing problems or who are homeless.

*Brief review and suggested item(s).* Housing problems can be conceptualized as 3 inter-related components: conditions within the home, neighborhood conditions, and

housing affordability, each of which can contribute uniquely to poorer physical and mental health of individuals and families<sup>84</sup> and to educational outcomes for children.<sup>85,86</sup> Further, individuals who are homeless have a standardized mortality ratio 2 to 5 times that of the general population,<sup>87-89</sup> even after controlling for low income status,<sup>90</sup> and some evidence suggests these rates are even higher among unsheltered versus sheltered homeless individuals.<sup>91</sup> Interventions to improve the condition of housing have demonstrated positive impacts on both physical and mental health,<sup>92</sup> and a recent study found that individuals receiving housing assistance in the form of public housing or multifamily housing from the Department of Housing and Urban Development had better self-rated physical and mental health relative to individuals on the wait list for housing assistance.<sup>93</sup> Moreover, the provision of housing has been shown to promote reductions in substance use and health service utilization among homeless individuals with substance use disorders.<sup>94</sup> Rog and colleagues reviewed the literature on permanent supportive housing for individuals with substance use or mental health disorders who were homeless or disabled, and found that provision of housing led to reduced rates of homelessness, emergency department (ED) and inpatient utilization and increased consumer satisfaction.<sup>95</sup>

Importantly, evidence suggests that housing is viewed as facilitative of recovery. For example, in a recent qualitative study of homeless individuals with mental illness, housing was seen as a critical first step in recovery, providing a sense of security, increasing feelings of personal independence and autonomy, improving perceptions of health and well-being, and affording a stable environment to rebuild relationships with important others.<sup>96</sup> BHD collects data on housing status on all the patients it serves as part of its state-mandated reporting requirements and will utilize this item in the CD data set.<sup>83</sup>

**Social Relationships.** This is defined as recent interactions with family, supportive networks (formal and informal), and other recovery services.

*Brief review and suggested item(s).* Research has long established that social relationships have a significant impact on health, including rates of mortality as well as physical and mental health morbidity.<sup>97-99</sup> Social connectedness is another of the pillars supporting an individual's recovery in SAMHSA's formulation. Several reviews of the recovery literature<sup>38,82</sup> support its importance to the recovery process and inclusion in any assessment of holistic

recovery. Social support has been shown to promote recovery among individuals with severe mental illness<sup>100-102</sup> and substance use disorders,<sup>103</sup> and may mitigate the progression of chronic, life-threatening physical illnesses.<sup>97</sup> For the purposes of BHD's CD data set, the social support question from the "100 Million Healthier Lives Common Questionnaire for Adults" will be used to assess individuals' perceived adequacy of social support.<sup>104</sup>

**Legal Involvement.** Defined as involvement with the civil or criminal justice system, including arrests, imprisonment, or detention.

*Brief review and suggested item(s).* Involvement in the criminal justice system is both disruptive for the individual in recovery and expensive to the larger health care system.<sup>105</sup> Individuals with substance use<sup>106</sup> and severe mental health disorders<sup>107</sup> are over-represented in the prison system, and evidence suggests that general physical and mental health declines while individuals are in prison.<sup>108,109</sup> Perhaps even more concerning, numerous studies have demonstrated an increase in mortality rates for individuals recently released from prison relative to the general population, particularly during the period immediately following release.<sup>108-110</sup> This relationship may even persist long term.<sup>111</sup> Further, research indicates that individuals recently released from prison have increased emergency care and hospital utilization.<sup>112,113</sup>

Incarceration can have significant impacts on the health of the broader community as well. For example, research has found an association between parental incarceration to rates of infant mortality,<sup>114</sup> increased behavioral and developmental problems of children of incarcerated parents,<sup>115,116</sup> lower rates of child support payments,<sup>117</sup> and poorer cardiovascular health of female partners of incarcerated individuals.<sup>118</sup> Formerly incarcerated individuals experience slower wage growth as well.<sup>119</sup> However, evidence also indicates that engagement in mental health<sup>120</sup> and substance abuse<sup>121</sup> treatment can reduce the likelihood of subsequent recidivism. As part of its state-mandated reporting, BHD is required to provide information on the criminal justice system involvement of its clients in the previous 6 months, including whether they have been jailed or imprisoned,<sup>83</sup> and this will function as its measure of legal involvement in its CD data set.

**Socioeconomic Status.** Socioeconomic status is the social standing or class of an individual or group. It is often measured as a combination of education, income, and occupation. It can also be defined subjectively, such as

one's evaluation of status relative to similar others or based on an individual's interpretation of her or his financial needs.

**Brief review and suggested item(s).** A large body of evidence supports the existence of a robust relationship between lower SES and poor health, including mortality and chronic medical diseases,<sup>122-124</sup> as well as mental illness.<sup>125-127</sup> Although previous research has examined this relationship using objective indicators of SES (eg, income, education level, occupation), there has recently been an increased interest in exploring the relationship of subjective SES with health indices. Subjective SES is generally assessed by asking individuals to rate themselves relative to others in the society in which they live, in terms of wealth, occupation, educational level, or other indicators of social status. Evidence suggests that subjective SES is associated with objective measures of SES,<sup>128-130</sup> and relates to measures of physical and mental health as well, even after controlling for objective SES.<sup>130-135</sup> BHD will be using a modified version of the Subject SES Scale,<sup>131,135</sup> which is deployed in the "100 Million Healthier Lives Common Questionnaire for Adults."<sup>104</sup>

**Acute Service Use.** This is defined as an admission to a medical or psychiatric emergency room or to a medical or psychiatric hospital or to a detoxification facility.

**Brief review and suggested item(s).** The CMS Adult Core Set includes "plan all cause readmissions" as a key quality metric.<sup>55</sup> Hospital readmissions are also endorsed by the National Committee on Quality Assurance as one of its Health Effectiveness Data and Information Set (HEDIS) measures and by the National Quality Forum. Readmissions, despite their widespread endorsement, are a somewhat controversial measure. Although readmissions are costly to the health care system,<sup>136</sup> the relationship between readmissions and quality is inconsistent. For example, Krumholz and colleagues<sup>137</sup> found differential rates of readmission for the same patient discharged from 2 different hospitals, which were categorized based on previous readmission rates, suggesting that hospitals do have different levels of performance even when treating the same patient. However, other data indicate that 30-day, all-cause, risk-standardized readmission rates are not associated with hospital 30-day, all-cause, risk-standardized mortality rates.<sup>138</sup>

Chin and colleague found that readmissions to the hospital that occurred more than 7 days post-discharge were likely due to community- and household-related

factors, rather than hospital-related quality factors.<sup>139</sup> Transitional care interventions that have successfully reduced 30-day readmission rates are most often multicomponent and focus not just on hospital-based interventions (eg, discharge planning, education) but on follow-up care in the community by formal supports (eg, in-home visits, telephone calls, outpatient clinic appointments, case management) and informal supports (eg, family and friends).<sup>140-143</sup> Further, qualitative evidence suggests that some individuals perceive psychiatric hospitalizations to be the result of insufficient resources or unsuccessful attempts to maintain their stability in the community.<sup>144</sup> Thus, unplanned or avoidable hospital readmissions may represent a failure of the continuum of care not only from the perspective of the health care system, but from the patient perspective as well.

Frequent or nonurgent use of EDs is conceptually similar to excessive or avoidable inpatient utilization in several ways. For example, overuse of EDs is costly, with some estimates suggesting that it is responsible for up to \$38 billion in wasteful spending each year.<sup>145</sup> Individuals with frequent ED visits have a greater disease burden<sup>146</sup> and an increased risk of mortality compared to nonfrequent users.<sup>147</sup> Research suggests that individuals who visit the ED for non-urgent issues do so because of perceived difficulties associated with accessing primary care, and the convenience of EDs relative to primary care.<sup>148-150</sup> Moreover, similar to the hospital readmission literature discussed earlier, successful strategies to reduce high rates of ED utilization generally focus on continuum of care interventions, such as provision of case management services.<sup>151-155</sup>

This evidence implies that frequent ED utilization and hospital readmissions may not be a fundamental issue of quality (or lack thereof) in hospitals or EDs but rather a lack of, or ineffectual, transitional and continuum of care strategies and services. To underscore this point, some authors have argued that a system that is excessively crisis-oriented hinders recovery because it is reactive rather than proactive, predicated on the notion that one's condition must deteriorate to receive care.<sup>156</sup>

Although some organizations may have access to claims data or may function as self-contained health systems (eg, the Veterans Health Administration [VHA]), others may not have access to such data. In the absence of claims data, patient self-report of service utilization has been used as a proxy for actual agency records.<sup>157</sup> Although con-

cordance between medical and/or agency records and patient self-report has been variable,<sup>157</sup> evidence generally suggests that rates of agreement are higher the shorter the recall time interval.<sup>158,159</sup> BHD does not have access to comprehensive claims data and has therefore chosen to use 5 dichotomously scored (yes/no) questions—related to medical inpatient, medical ED, psychiatric inpatient, psychiatric ED, and detoxification use in the last 30 days—to represent the CD of acute service utilization.

## The Second Aim: Quality of Care

### Safety

Safety is defined as avoiding injuries to patients from the care that is intended to help them.

**Brief review and suggested item(s).** As noted in “Crossing the Quality Chasm,” the IOM’s seminal document, “the health care environment should be safe for all patients, in all of its processes, all the time.”<sup>160</sup> The landmark Harvard Medical Practice Study in 1991 found that adverse events occurred in nearly 4% of all hospital admissions and, among these, over a quarter were due to negligence.<sup>161</sup> Other estimates of adverse events range as high as 17%.<sup>162</sup> Indeed, a recent article by Makary and Daniel estimated that medical errors may be the third leading cause of death in the United States.<sup>163</sup> Unfortunately, research on safety in the mental health field has lagged behind that of physical health,<sup>164</sup> with evidence indicating that research in nonhospital settings in mental health care may be particularly scarce.<sup>165</sup> In a study of adverse events that occurred in psychiatric inpatient units in the VHA system between 2015 and 2016, Mills and colleagues found that of the 87 root cause analysis reports, suicide attempts were the most frequent, and, among safety events, falls were the most frequently reported, followed by medication events.<sup>166</sup> Another report on data collected from psychiatric inpatient units in the VHA revealed that nearly one-fifth of patients experienced a safety event, over half of which were deemed preventable.<sup>167</sup> These numbers likely represent an underestimation of the true volume of safety events, as another study by the same research group found that less than 40% of safety events described in patient medical records were documented in the incident reporting system.<sup>168</sup> BHD will utilize the total number of complaints and incident reports submitted within a given time frame as its “safety” metric in the CD data set.

### Wait Time for Service

The CD is defined as the length of time between the date a patient first contacted BHD for services and the date of their first clinical service.

**Brief review and suggested item(s).** “Timeliness” was listed among the 6 aims for improvement in “Crossing the Quality Chasm” in 2001, and it remains no less relevant today.<sup>160</sup> For example, evidence indicates that access to primary care is inversely related to avoidable hospitalizations.<sup>169</sup> One study found that, of patients hospitalized for cardiovascular problems, those who had difficulty accessing routine care post discharge had higher 30-day readmission rates.<sup>170</sup> Among VHA patients, longer wait times are associated with more avoidable hospitalizations and higher rates of mortality.<sup>171</sup> Longer wait times appear to decrease the likelihood of attending a first appointment for individuals with substance use<sup>172,173</sup> and mental health disorders.<sup>174</sup> Importantly, longer wait times are associated with lower ratings of the patient experience of care, including perceptions of the quality of and satisfaction with care,<sup>175</sup> and may be associated with worse outcomes for individuals in early intervention for psychosis treatment.<sup>176</sup> For the purposes of the CD data set, BHD will monitor the length of time between the date a patient first contacted BHD for services and the date of their first clinical service.

### Patient Satisfaction

Patient satisfaction is defined as the degree of patients’ satisfaction with the care they have received.

**Brief review and suggested item(s).** Research has consistently demonstrated the relationship of the patient’s experience of care to a variety of safety and clinical effectiveness measures in medical health care,<sup>177</sup> and the therapeutic alliance is one of the most consistent predictors of outcomes in behavioral health, regardless of therapeutic modality.<sup>178</sup> Patient satisfaction is a commonly assessed aspect of the patient experience of care. Patient satisfaction scores have been correlated with patient adherence to recommended treatment regimens, care quality, and health outcomes.<sup>179</sup> For example, Aiken et al found that patient satisfaction with hospital care was associated with higher ratings of the quality and safety of nursing care in these hospitals.<sup>180</sup> Increased satisfaction with inpatient care has been associated with lower 30-day readmission rates for patients with acute myocardial infarction, heart failure, and pneumonia,<sup>181</sup> and patients with schizophrenia who

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reported higher treatment satisfaction also reported better quality of life.<sup>182,183</sup> Many satisfaction survey options exist to evaluate this CD, including the Consumer Assessment of Healthcare Providers and Systems and the Client Satisfaction Questionnaire; BHD will utilize an outpatient behavioral health survey from a third-party vendor.

### The Third Aim: Cost of Care

#### Cost of Care

This can be defined as the average cost to provide care per patient per month.

*Brief review and suggested item(s).* Per capita cost, or rather, the total cost of providing care to a circumscribed population divided by the total population, has been espoused as an important metric for the Triple Aim and the County Health Rankings.<sup>6,13</sup> Indeed, between 1960 and 2016, per capita expenditures for health care have grown 70-fold, and the percent of the national gross domestic product accounted for by health expenditures has more than tripled (5.0% to 17.9%).<sup>184</sup> One of the more common metrics deployed for assessing health care cost is the per capita per month cost, or rather, the per member per month cost of the predefined population for a given health care system.<sup>6,185,186</sup> In fact, some authors have proposed that cost of care can be used not only to track efficient resource allocation, but can also be a proxy for a healthier population as well (ie, as health improves, individuals use fewer and less-expensive services, thus costing the system less).<sup>187</sup> To assess this metric, BHD will calculate the total amount billed for patient care provided within BHD's health network each month (irrespective of funding source) and then divide this sum by the number of members served each month. Although this measure does not account for care received at other health care facilities outside BHD's provider network, nor does it include all the overhead costs associated with the care provided by BHD itself, it is consistent with the claims-based approach used or recommended by other authors.<sup>6,188</sup>

### The Fourth Aim: Staff Well-being

#### Staff Quality of Work Life

This can be defined as the quality of the work life of health care clinicians and staff.

*Brief review and suggested item(s).* Some authors have suggested that the Triple Aim framework is incomplete and have proffered compelling arguments that provider

well-being and the quality of work life constitutes a fourth aim.<sup>2</sup> Provider burnout is prevalent in both medical<sup>2,189</sup> and behavioral health care.<sup>190,191</sup> Burnout among health care professionals has been associated with higher rates of perceived medical errors,<sup>192</sup> lower patient satisfaction scores,<sup>189,193</sup> lower rates of provider empathy,<sup>194</sup> more negative attitudes towards patients,<sup>195</sup> and poorer staff mental and physical health.<sup>191</sup>

Burnout is also associated with higher rates of absenteeism, turnover intentions, and turnover.<sup>190,191,196,197</sup> However, burnout is not the only predictor of staff turnover; for example, turnover rates are a useful proxy for staff quality of work life for several reasons.<sup>198</sup> First, turnover is associated with substantial direct and indirect costs, including lost productivity, increased errors, and lost revenue and recruitment costs, with some turnover cost estimates as high as \$17 billion for physicians and \$14 billion for nurses annually.<sup>199-201</sup> Second, research indicates that staff turnover can have a deleterious impact on implementation of evidence-based interventions.<sup>202-205</sup> Finally, consistent with the philosophy of utilizing existing data sources for the CD measures, turnover can be relatively easily extracted from administrative data for operated or contracted programs, and its collection does not place any additional burden on staff. As a large behavioral health system that is both a provider and payer of care, BHD will therefore examine the turnover rates of its internal administrative and clinical staff as well as the turnover of staff in its contracted provider network as its measures for the Staff Quality of Work Life CD.

### Clinical Implications

These metrics can be deployed at any level of the organization. Clinicians may use 1 or more of the measures to track the recovery of individual clients, or in aggregate for their entire caseload. Similarly, managers can use these measures to assess the overall effectiveness of the programs for which they are responsible. Executive leaders can evaluate the impact of several programs or the system of care on the health of a subpopulation of clients with a specific condition, or for all their enrolled members. Further, not all measures need be utilized for every dashboard or evaluative effort. The benefit of a comprehensive set of measures lies in their flexibility—1 or more of the measures may be selected depending on the project being implemented or the interests of the stakeholder.



It is important to note that many of the CDs (and their accompanying measures) are aligned to/consistent with social determinants of health.<sup>206,207</sup> Evidence suggests that social determinants make substantial contributions to the overall health of individuals and populations and may even account for a greater proportion of variance in health outcomes than health care itself.<sup>208</sup> The measures articulated here, therefore, can be used to assess whether and how effectively care provision has addressed these social determinants, as well as the relative impact their resolution may have on other health outcomes (eg, mortality, self-rated health).

These measures can also be used to stratify clients by clinical severity or degree of socioeconomic deprivation. The ability to adjust for risk has many applications in health care, particularly when organizations are attempting to implement value-based purchasing models, such as pay-for-performance contracts or other alternative payment models (population health-based payment models).<sup>209</sup> Indeed, once fully implemented, the CDs and measures will enable BHD to more effectively build and execute different conceptual models of “value” (see references 210 and 211 for examples). We will be able to assess the progress our clients have made in care, the cost associated with that degree of improvement, the experience of those clients receiving that care, and the clinical and social variables that may influence the relative degree of improvement (or lack thereof). Thus, the CDs provide a conceptual and data-driven foundation for the Quadruple Aim and any quality initiatives that either catalyze or augment its implementation.

## Conclusion

This article provides an overview of the CDs selected by BHD to help organize, focus, advance, and track its quality efforts within the framework of the Quadruple Aim. Although items aligned to each of these CDs are offered, the CDs themselves have been broadly conceptualized such that they can flexibly admit a variety of possible items and/or assessments to operationalize each CD and thus have potential applicability to other behavioral health systems, particularly public systems that have state-mandated and other data reporting requirements.

Bearing in mind the burden that growing data collection requirements can have on the provision of quality care and staff work satisfaction and burnout,<sup>10,212</sup> the CDs (and the items selected to represent each) are designed with “stra-

tegic parsimony” in mind. Although the CDs are inclusive in that they cover care quality, cost of care, staff quality of life, and general population health, only CDs and items undergirded by a solid evidence base and high value with regards to BHD’s mission and values, as determined by key stakeholders, were selected. Moreover, BHD attempted to make use of existing data collection and reporting mandates when selecting the final pool of items to reduce the measurement burden on staff and clients. Thus, the final set of CDs and items are designed to be comprehensive yet economical.

The CDs are deeply interrelated. Although each CD may be individually viewed as a valuable metric, improvements in any 1 CD will impact the others (eg, increasing care quality should impact population health, increasing staff quality of life should impact the quality of care). Moreover, this idea of interrelatedness acknowledges the need to view health systems and the populations they serve holistically, in that improvement is not simply the degree of change in any given metric (whether individually or collectively), but rather something more entirely. The concepts of value, quality, and health are complex, multidimensional, and dynamic, and the CDs that comprise these concepts should not be considered independently from one another. The CDs (and items) offered in this article are scalable in that they can be used at different levels of an organization depending on the question or stakeholder, and can be used individually or in combination with one another. Moreover, they are adaptable to a variety of risk-adjusted program, population health, and value-based evaluation models. It is hoped that the process articulated here, and the accompanying literature review, may benefit other public or government-run health systems in their own quality journey to operationalize the Quadruple Aim by developing a set of CDs.

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Corresponding author: Walter Matthew Drymalski, PhD; walter.drymalski@milwaukeecountywi.gov.

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## Quadruple Aim in Behavioral Health Care

### Appendix. Core domains and recommended items/assessments

| Quadruple Aim              | Core Domain                                       | Focus                               | Possible Items/Assessments   | Source and Reference   |  |
|----------------------------|---|-------------------------------------|--|--|--|
| Population Health          | Health Outcomes                                   | Deaths                              | Age at Death<br>Cause of Death   | This item can be a combination of proportion of deaths by cause and age at time of death by cause. It could also be reported by years of potential life lost.  | Administrative data, County Coroner data   |
|                            |   | Self-Reported Health and Well-being | Physical Health  | How would you rate your overall physical health right now?<br>1. Refused 2. Don't Know 3. Poor 4. Fair 5. Good 6. Very Good 7. Excellent   | DeSalvo, Bloser, Reynolds, He, & Muntner, 2006   |
|                            |   |                                     | Mental Health  | How would you rate your overall mental health right now?<br>1. Refused 2. Don't Know 3. Poor 4. Fair 5. Good 6. Very Good 7. Excellent   | Ahmad, Jhaji, Stewart, Burghardt, & Bierman, 2014  |
|                            | Quality of Life                                   |                                     | How would you rate your overall quality of life right now?<br>1. Very poor 2. Poor 3. Neither poor nor good 4. Good 5. Very good | First item from the WHOQOL-BREF (Skevington, Lofty, & O'Connell, 2004)   |  |
|                            | Health Factors                                    | Substance Use                       | Heavy ethanol Use  | In the past 30 days, how often have you had 5 or more drinks (men)/4 or more drinks (women) containing alcohol in one day?   | McNeely et al., 2015; McNeely et al., 2016   |
|                            |   |                                     | Drug Use   | In the past 30 days, how often have you used any drugs, including marijuana, cocaine, crack, heroin, methamphetamines (crystal meth), hallucinogens, ecstasy/MDMA?   |  |
|                            |   |                                     | Prescription Drug Use  | In the past 30 days, how often have you used any prescription medication just for the feeling, more than prescribed, or that were not prescribed to you?   |  |
|                            |   |                                     | Tobacco Use  | In the past 30 days, how often have you used any tobacco product?  |  |
|                            |   | Education/Employment Status         | Education/ Employment Status   | Employment status (variable by organization)   | Administrative data  |
|                            |   | Socioeconomic Status                | Subjective Socioeconomic Status  | Now imagine the top of the ladder represents the best possible financial situation for you, and the bottom of the ladder represents the worst possible financial situation for you. Please indicate where on the ladder you stand right now. | 100 Million Healthier Lives Common Questionnaire for Adults (Stiefel, Riley, Ramaswamy, & Stout, 2016) |
|                            |   | Living Situation                    | Housing Status   | Current living arrangement (variable by organization)  | Administrative data  |
|                            |   | Social Connectedness                | Social Connectedness   | How often do you get the social and emotional support you need?<br>1. Never 2. Rarely 3. Sometimes 4. Usually 5. Always  | 100 Million Healthier Lives Common Questionnaire for Adults (Stiefel, Riley, Ramaswamy, & Stout, 2016) |
|                            |   | Legal Involvement                   | Criminal Justice System Involvement  | Has the individual had any interactions with the criminal justice system in the past 6 months?<br>1. None 2. On Probation 3. Arrests 4. Jailed or Imprisoned 5. On Parole 6. Juvenile Justice System 7. Unknown                              | Administrative data  |
|                            |   | Acute Service Use                   | ER   | Medical ED visits in the last 30 days? AND Psychiatric ED visits in the last 30 days?<br>1. Yes 2. No 1. Yes 2. No   | Bhandari & Wagner, 2006; Short et al., 2009  |
|                            | Hospital  |                                     | Medical inpatient visits in the last 30 days? AND Psychiatric inpatient visits in the last 30 days?<br>1. Yes 2. No 1. Yes 2. No |  |  |
| Detox                      | Detox visits in the last 30 days?<br>1. Yes 2. No |                                     |  |  |  |
| Patient Experience of Care | Safety  | Incident Reports and/or Complaints  | Variable by organization   |  |  |
|                            | Wait Time for Service                             | Wait Time for Service               | Self-Explanatory   | Administrative data  |  |
|                            | Patient Satisfaction                              | Member Satisfaction with Care       | Many satisfaction surveys are available  | Dependent on survey  |  |
| Cost                       | Cost  | Per Member                          | Per member per month costs   | Administrative data  |  |
| Staff Well-being           | Quality of Work Life                              | Internal Retention                  | Internal staff leaving within a given quarter divided by the average number of staff employed per month in the quarter           | Administrative data  |  |
|                            |   | External Retention                  | External staff leaving within a given quarter divided by the average number of staff employed per month in the quarter           | Administrative data  |  |