The BHS (Behavioral Health Screen) is the screening and tracking assessment instrument delivered by the BH-Works browser-based web software. Initiated over a decade ago, the development of the BHS was motivated and guided by clinical training and experience in psychiatry and psychology, the health science literature, and recommendations of national organizations. These include the American Psychiatric Association, American Academy of Pediatrics, Substance Abuse and Mental Health Services Administration, and The Joint Commission.

A key design goal of the BHS was to provide a validated comprehensive yet efficient assessment of psychiatric disorders and associated areas of behavioral and psychosocial problems and risks. To accomplish this, the areas of assessment and number of questions were carefully chosen and prioritized with input from diverse clinicians, including physicians, nurses, social workers, and psychologists. Population prevalence and psychometric capability were considered, and relatively rare or difficult-to-screen for conditions such as bipolar disorder were excluded.

The core psychiatric domains of assessment are Depression, Anxiety, Substance Misuse, Traumatic Stress, and Eating Disorders. The behavioral and psychosocial domains of assessment are Personal, Medical, School and Work, Family, Safety, Sexuality, Nutrition and Eating, Suicidality, Psychosis, and Bullying. The questions for these 14 domains of assessment were derived from multiple sources. The psychiatric domain questions were directly mapped from the diagnostic criteria in American Psychiatric Association Diagnostic and Statistical Manual 4th Edition. The psychiatric domain questions were directly mapped from the diagnostic criteria in American Psychiatric Association Diagnostic and Statistical Manual 4th Edition. The behavioral and psychosocial domain questions were developed from a combination of clinical expertise, focus groups, reference to public domain assessment tools in these areas, and scientific judgement.

The original BHS questions have been repeatedly refined and validated in use for over a decade of experience and study in diverse clinical settings, including emergency departments, primary care practices, crisis centers and mobile teams, and schools, in both urban and rural regions. In the last five years, newer questions have been carefully added to address areas of gender identity, military service status, bullying, cyber-bullying, and access to guns.

BHS and BH-Works have been validated at four levels:

- Psychometric validation: the questions assessing the core psychiatric domains were directly mapped from DSM-IV (depression, anxiety, substance abuse, traumatic stress, and eating disorders) and further validated in comparison to standards across the age range such as the Beck Depression Inventory II, strong measurement dimensionality, and parameter invariance shown using Item Response Theory models [1, 2];
- Operational validation: in diverse primary care and other medical office settings, shown to work with high efficiency and high clinician and staff utility and acceptance [3-5];
- Clinical validation: doubled the rate of detection of critical problems such as severe depression and serious suicide risk, decreased emergency department referrals by 87% [4-6].
- Patient validation: 98% positive ratings from patients on the value of asking these questions.

The clinical utility and value of the BHS tool in practice have been strongly endorsed by a series of evaluations and funding awards from prominent health care organizations. In 2007 HRSA supported testing of BH-Works in the Children’s Hospital of Philadelphia (CHOP) ED. In 2008 the Pennsylvania Department Human Services (DHS) selected BHS for their suicide prevention application to SAMHSA, and SAMHSA awarded funding. In 2010 The Joint Commission strongly commended CHOP for established use of BHS in their ED. In 2011 DHS expanded use of BHS and won another round of funding from SAMHSA. In 2014 DHS, and, after independent rigorous evaluation, the Delaware Department of Health both chose BHS for expanded proposals to SAMHSA, and both were funded.

In 2015 CMS awarded a primary care behavioral health integration proposal, in which BH-Works has major role, to the ‘atom Alliance’, a five-state network consisting of Indiana, Kentucky, Tennessee, Mississippi, and Alabama.

In these program efforts, multi-level systems relationships between providers, provider organizations, public health officials and government offices, community organizations, patients and patient advocates, and others, have emerged as key resources. To model and work with these resources and opportunities, the ‘Behavioral Health Ecosystem’ represents a concept for shared knowledge and effective communication. It is a guiding model for the generation of new knowledge and translation into practice, supported by the BH-Works Platform with three core components: Measurement, Care, and Analytics.
Ongoing Generation of Scientific Knowledge: Suicidality

BHS data continue to be analyzed and result published in peer-reviewed journals. One important area of study is risk factors for suicide.

A paper by Jenkins et al., [7], found that depression and alcohol use were risk factors for suicidal ideation and attempt in youth engaging in non-suicidal self-injury.

In a paper by Shearer et al. [8], we found that those questioning their sexual identity and bisexual females exhibited higher rates of disordered eating symptoms than their lesbian and heterosexual peers. We also looked at mental health symptoms across lesbian, gay, bisexual and questioning (LGBQ) youth more broadly, and found varying levels of symptoms across the LGBQ subgroups, especially for females [9].

A paper by Kodish et al. [10], found that verbal, physical, and cyber bullying were associated with suicidal ideation, and verbal bullying was uniquely related to suicide attempt.

A latent class analysis indicated that response patterns on twenty BHS items differentiated primary care patients who reported suicidal ideation from those who did not, with the strongest indicators being substance abuse, history of sexual assault, same-sex behavior and unsafe sex [11].

A second latent class analysis distinguished six groups that varied on level of suicide risk, with the most severe groups reporting higher levels of depression, traumatic distress, and substance abuse [12].

References (available on request).

