

# Development and implementation of a machine learning model for Behavioral Health Acuity Risk

Suicide prevention through interdisciplinary product development in a clinically integrated health system

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# An innovative solution to a stark challenge

- Suicide is in the **top four leading causes of death** for ages 10 through 44 in the United States <sup>1</sup>
- The economic impact is estimated at more than **\$4.75 billion per year** <sup>2</sup>
- Many decedents of suicide receive some suicide risk assessment or contact with their healthcare provider **prior to suicide** <sup>3</sup>
- Manual screening tools are **limited by patient readiness** to disclose suicidal ideation
- Novant Health data scientists and clinical SMEs partnered to develop the **Behavioral Health Acuity Risk BHAR** model
- Assesses present and historical information to calculate risk **automatically in real-time**
- Care team is provided with an objective tool to **prompt a caring and emotionally aware conversation** about available resources

1. Centers for Disease Control and Prevention. WISQARS Leading Causes of Death Reports, 1981 - 2020. [Online]. 2020 [cited 2022 May 17]. Available from: <https://wisqars.cdc.gov/fatal-leading>.

2. Centers for Disease Prevention and Control. WISQARS Cost of Injury. [Online]. 2020 [cited 2022 5 17]. Available from: <https://wisqars.cdc.gov/cost/>.

3. Smith EG, Kim HM, Ganoczy D, Stano C, Pfeiffer PN, Valenstein M. Suicide Risk Assessment Received Prior to Suicide Death by Veterans Health Administration Patients With a History of Depression. J Clin Psychiatry. 2013 March; 74(3): 226-232.

# Machine learning advances the boundary of risk assessment



# An inclusive approach results in a successful product

- **Trust** and **usability** drive utilization of technology in business settings
- Psychiatry, nursing, emergency medicine, machine learning, and population health experts collaborated to design the BHAR model
- Senior clinical leaders became the champions of the work and cascaded their trust in the BHAR model to frontline caregivers
- Clinical workflows were designed to be streamlined and support the caregiver in this sensitive and often difficult conversation



## Invested clinical champions ensure continued success



- This work was realized through a strong partnership between clinical and data science SMEs
- The BHAR model is fully implemented in our health system, leading to potentially life-saving interventions
- Exploring expansion opportunities beyond emergency department settings
- Targeting rollout to ambulatory network to enhance patient outcomes across various care settings.

*Thank you for your time*

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