



PEDIATRICS
Supporting
PARENTS

Strengthening Children's Social-Emotional Well-Being and Ensuring a Parent-Led Agenda:

*Transforming the Pediatric Well-
Child Visit through Technology*

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About the Help Me Grow National Center

Dedicated to ensuring that early childhood systems maximize the potential of all young children, the Help Me Grow National Center is a program of the Office for Community Child Health at Connecticut Children's in Hartford, Connecticut. The Help Me Grow National Center serves as a national resource to support the implementation of Help Me Grow systems throughout the country. For more information, visit <http://helpmegrownational.org>.

Help Me Grow is a model that works to promote collaboration across child-serving sectors in order to build a more efficient and effective system that promotes the optimal healthy development of young children. When all of the organizations working on behalf of young children work together, we can better prevent or reduce the impact that stress or adversity may have on children and families and increase protective factors that can maximize the well-being of children and families.



Contributors

About Patient Tools, Inc.

Dr. Alan D. Malik is the founder of Patient Tools, Inc. and has been working with screening developers and innovators since the mid-90s. Patient Tools functions as both a product and medical integrator for hundreds of screenings and assessments, interfacing with a large variety of EMRs. Patient Tools implemented the Survey of Well-Being of Young Children initially in 2014 and has been involved with programs like Foundations-for-Success, Assuring Better Child Health and Development, Project LAUNCH, and Race to the Top since the early 2000s.

All of the screening and assessment content that Patient Tools has implemented is available in downloadable packages, and can be sequenced using triggers, prescreens and screening protocols. The IT technology and processes to integrate the innovator products and make them widely scalable is well understood and available.

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Introduction

The present status of pediatric well-child care is characterized by several high-yield elements including: near universal access to children during the critical early years of life; the capacity for child health providers to serve as a trusted advisor to parents in ensuring their children's healthy development; and awareness among the pediatric community of the importance of social, environmental, and family factors in contributing to child health and developmental outcomes. Yet, several challenges must be addressed to effectively utilize the well-child visit as a setting to instill and sustain positive changes in child and family well-being. Few mechanisms exist to promote parental awareness of the wide range of topics to prioritize and address with the provider and a parent-led agenda is the exception, rather than the rule. There continues to be a lack of widespread, universal utilization of comprehensive screening tools among providers that ensure their access to critical information needed to inform clinical decision-making, including developmental status, social-emotional development, emotional connections, and family functioning. Furthermore, the relative recency of the focus on social determinants of health offers few practice-based tools to screen for, respond to, and maintain awareness of critical community-based resources with the potential to impact such social, environmental, and family factors.

Fortunately, tools with the potential to address these challenges do exist. Their widespread implementation in the pediatric setting has been hindered by traditional funding sources that limit the degree to which the tools are developed and refined to address the needs of diverse practice settings; the relative lack of integrated efforts in which the tools are embedded alongside other, complementary technologies with the potential to transform child health services; and limited exploration of the



more nuanced, but arguably more critical, factors that will ultimately impact sustainability, including financing (beyond time-limited grant funding), the need to demonstrate short- and long-term outcomes, intellectual property restraints that could limit or restrict implementation, information technology considerations such as whether there are economies of scale to facilitate greater adoption at less cost, and continued need to vet the tools in accordance with input from providers, parents, and other child-facing services who must directly inform the tool administration, content, and utilization.

The Critical Role of Child Health Services

Our understanding of brain development in the early childhood years, accrued during the 1970s and 1980s, precipitated an explosion in the dissemination of knowledge and attention on early detection and

intervention in the 1990s, which was widely regarded as the , “Decade of the Brain.”^{1,2} This information unquestionably called out the critical influence of the early childhood years on children’s subsequent development, behavior, functioning, and success. With the new millennium, we have come to also greatly appreciate the critical importance of the “biology of adversity” and the role of such factors as toxic stress, adverse childhood experiences,³ and adverse social determinants of health in contributing to poor outcomes for individuals over the lifespan.⁴ We now recognize the extent to which children’s optimal health, development and well-being are each influenced, to a significant extent, by social, environmental, behavioral, and genetic/epigenetic factors. Integrating what research has established regarding the critical importance of early brain and child development, the extent to which various factors (e.g., toxic stress, adverse childhood experiences, positive parenting) may either hinder or facilitate a child’s developmental trajectory, as well as the efficacy and advantages of positive early experiences and family support, it is evident an “all-sectors-in” approach to advancing optimal health and well-being for all children is needed.

Child health care providers are uniquely positioned to identify developmentally-vulnerable children as a result of their near universal access to young children and the directive that well-child care includes a focus on developmental promotion and early detection through regular surveillance and periodic screening.

Child health services is a major sector within which to ensure a focus on developmental promotion, early detection, referral and linkage.

The American Academy of Pediatrics recommends twelve well-child visits during the first three years of life, providing a

critical impetus for parents of infants and young children to develop trusted, longitudinal relationships with their child’s health provider. However, providers often face challenges in identifying early signs of concerns and engaging parents as partners in developmental promotion and early detection. Such challenges include, but are not limited to:

- **Limited Time.** A visit length of approximately 15 minutes forces a paring down of the range of topics that can be covered during a visit. As a result, if a parent/caregiver is not informed, empowered, and positioned to serve as an advocate for specific concerns and priorities, the provider will often take the lead in setting the visit’s agenda.
- **Scope.** The broad list of topics suggested by professional guidelines (i.e., Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents) to address in the well-child visit may overwhelm the provider and preclude their exploration of specific factors and variables relevant to understanding a given child and family’s developmental context. Providers require access to efficient and valid screening tools that maximize their ability to understand a child’s developmental status, their social-emotional functioning, and family risk factors such as parental depression, alcohol use, hunger, domestic violence, etc. While such tools exist, their adoption is challenged by the lack of their effective integration with existing practice-based technologies and workflow.

¹ Nash, M. (2001). Fertile Minds. TIME Magazine. Accessed September 4 2019 from <http://content.time.com/time/magazine/article/0,9171,137214,00.html>.

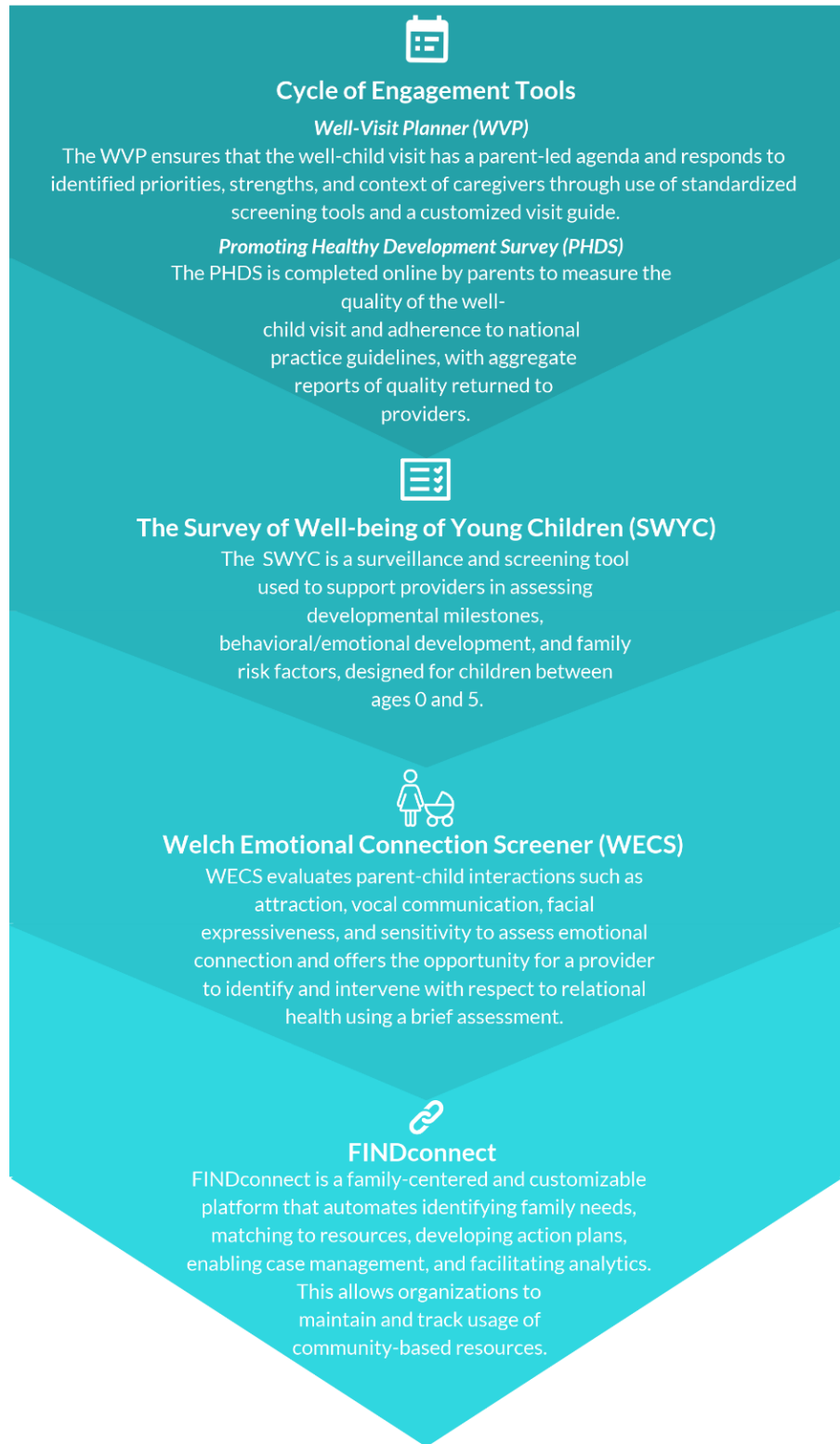
² Institute of Medicine. 2000. From Neurons to Neighborhoods: The Science of Early Childhood Development. Washington, DC: The National Academies Press. <https://doi.org/10.17226/9824>.

³ Kerker, B.D., Zhang, J., Nadeem, E. et al. (2015). Adverse childhood experiences, mental health, chronic medical conditions and development in young children. *Acad Pediatr*, 15:510–517.

⁴ Thompson, R., Flaherty, E.G., English, D.J. et al. (2015). Trajectories of adverse childhood experiences and self-reported health at age 18. *Acad Pediatr*, 15:503–509.

Innovations with the Potential to Strengthen the Well-Child Visit

Innovative tools, measures, and processes are needed to enable the child health provider to play a critical role in strengthening families and promoting children's optimal, healthy development, including social-emotional well-being. Such tools have the potential to amplify the current, limited impact of the well-child visit by ensuring greater effectiveness and efficiency of parent engagement and maximizing the degree to which parents perceive their provider as a trusted advisor. A variety of innovations are available to enable child health providers to better engage parents and ensure a family-led agenda for pediatric visits, to successfully perform developmental promotion and early detection through surveillance and screening, and to ensure linkage of children and their families to community-based programs and services to address parents' concerns, needs, and priorities. At the outset of the PSP effort, several notable examples of such tools and the innovators behind them convened with the goal of exploring the potential for technological



integration and to consider their evolutionary trajectory in the context of future implementation opportunities.

These tools include the Survey of Well-Being of Young Children (SWYC), Cycle of Engagement tools including Well-Visit Planner (WVP) and the Promoting Healthy Development Survey (PHDS), the Welch Emotional Connection Screen (WECS), and FINDconnect.

While there are many longstanding and recent examples of tools designed to expand provider capacity to engage the family and elicit specific concerns, the five tools at the focus of this project collectively represent a constellation of tools at varying stages of development but with prior evidence of feasibility testing and implementation in child health settings, that address complementary topics relevant to the well-visit, and which are under the directive of leadership with interest in exploring how and with what potential outcomes their tool may be embedded in an integrated technological platform.⁵

The purpose of this project was two-fold:

- 1 To assess the degree to which child health care providers and parents mutually desire and perceive benefit from emerging tools that address concepts such as parent engagement with the well-child visit and early relational health.
- 2 To map the process by which an integrated, technological platform that embeds these tools and potentially others could be built, and the potential for such an integrated approach to achieve scale and impact.

Given the broad and high-level nature of our inquiry, the five tools identified above served as a concrete and foundational element upon which to base surveys, interviews, and a technological landscape scan. The implications of our approach require that it be viewed as specific to these five instruments but with a high degree of generalizability to apply to other tools that address parent engagement and children's health and development as embedded within the well-child visit setting.

At the outset, the Help Me Grow National Center sought to understand the current landscape of pediatric practice-based technology and existing and new paradigms focused on driving practice adoption of tools specific to child development, social-emotional health, relational health, and social determinants of health.

Technology in Pediatrics

As technology becomes more prevalent in most industries, so too is there corresponding interest and momentum among medical providers to acquire and utilize technology.⁶ The capacity for more effective and efficient exchange of medical information influences the uptake of electronic medical record (EMR) software, with rates of EMR adoption expanding in recent years.⁶ Nationally, providers report differing perspectives on the benefits of transitioning from traditional paper medical



⁵ While the tools represent a composite of validated screening tools, parent-guided questionnaires, and associated training and implementation tools, for ease of reading the concept of an integrated platform that would merge the five tools is referred to as an "Integrated Pediatric Screening product", or IPS, throughout this report.

⁶ Evans, R. S. (2016). Electronic Health Records: Then, Now, and in the Future. Yearbook of Medical Informatics, Suppl 1(Suppl 1), S48-61. <https://doi.org/10.15265/IYS-2016-s006>

records to an EMR system, though a majority of providers cite clinical benefits associated with improving and streamlining visit documentation, providing patients' improved access to their records, and enabling electronic referrals and prescriptions.^{6,7}

As of 2017, approximately 70% of practicing medical providers reported use of an EMR.⁸ Pediatrics has one of the highest rates of EMR adoption in the United States with 80% of pediatric providers using an EMR in 2018.⁸ Several barriers associated with the selection and implementation of a particular system may stand in the way of universal adoption. The cost of adopting an EMR and the transition from paper or paper/electronic hybrid system can be prohibitive, both in terms of financial cost and also the redirection of resources away from clinical care during periods of implementation or customization.⁷ However, such customizations can facilitate important changes in practice. For example, clinical aids such as computerized clinical decision-making support systems (CCDSS) use an automated alert to flag a particular well-child visit as requiring developmental surveillance and screening due to the child's age or a previously identified concern. In practices with a CCDSS embedded within the EMR, patients were 15 times more likely to receive developmental screening through a standardized tool compared to patients whose provider did not use a CCDSS.⁹ The integration of novel solutions within EMRs is a viable strategy to enable universal early detection and linkage to services that are critical to achieving population health and wellbeing.

The Role of Screening in the Well-Child Visit

Development of brain architecture in the early years of life sets a foundation for learning and interaction across the lifespan. Children undergo rapid developmental changes related to physical, cognitive, and social growth in the first five years of life, so ongoing surveillance and screening provide a critical opportunity for emerging concerns to be detected and for children to be linked to effective programs, services, and supports at an earlier rate.¹⁰



Recognizing the importance of early identification of developmental concerns in contributing to the health and well-being of children and families, in 2006 the American Academy of Pediatrics (AAP) released a Policy Statement providing guidance and recommendations to child health care providers regarding their role in ensuring early identification of concerns. The 2006 Policy Statement provides a central algorithm to guide pediatric practices in addressing developmental concerns in children birth

⁷ Jamoom, E. W., Patel, V., Furukawa, M. F., & King, J. (2014). EHR adopters vs. non-adopters: Impacts of, barriers to, and federal initiatives for EHR adoption. *Healthcare*, 2(1), 33–39. <https://doi.org/10.1016/J.HJDSI.2013.12.004>

⁸ IQVIA. (2018). Physician Office Usage of Electronic Health Records Software: Marketing Insights Report. SK&A, A Cegedim Company, (May), 1–4. Retrieved from https://www.iqvia.com/-/media/iqvia/pdfs/us-location-site/commercial-operations/iqvia-ehr-adoption_2018.pdf

⁹ Carroll, A. E., Bauer, N. S., Dugan, T. M., Anand, V., Saha, C., & Downs, S. M. (2014). Use of a Computerized Decision Aid for Developmental Surveillance and Screening. *JAMA Pediatrics*, 168(9), 815. <https://doi.org/10.1001/jamapediatrics.2014.464>

¹⁰ Center on the Developing Child at Harvard University (2007). A Science-Based Framework for Early Childhood Policy: Using Evidence to Improve Outcomes in Learning, Behavior, and Health for Vulnerable Children. <http://www.developingchild.harvard.edu>

through three years of age.¹¹ Key recommendations embedded in the algorithm include developmental surveillance at every visit, with developmental screening tests administered at the 9-, 18-, and 24- or 30-month well-child visits, as well as when concerns arise.

As one example, the Survey of Well-being of Young Children (SWYC) is a comprehensive screening instrument typically completed by parents with children under five years of age. Outside of the well visit, the SWYC can be used by preschool teachers, school nurses, and other professionals involved in early care and education to screen for developmental milestones.¹² In addition to screening for development, social-emotional development and risk for autism, parents can report other factors that may be influencing their child's health such as parental depression, violence in the home, or substance abuse.

More recently, the child health setting is being considered as a critical venue to address circumstances such as food insecurity, transportation barriers to care, safety, and other social determinants of health known to strongly influence the health and well-being of a particular child and family. Emerging screening tools such as the Hunger Vital Sign and the Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences (PRAPARE) cover a wide range of topics and enable the child health provider to detect and respond to identified concerns.¹³ Given findings that suggest parents and caregivers are more likely to report sensitive issues such as household violence and substance abuse in electronic format, child health providers are encouraged to consider electronic screening to assess needs related to social determinants of health.¹⁴ Beyond creating a mechanism to identify concerns, it is critical that new screening tools (particularly those for social determinants, which deviate from traditional screening for medical problems or diagnoses) are embedded alongside a strategy that ensures effective care coordination, cross-sector collaboration, and capacity to ensure referral and linkage to appropriate services.¹⁵ Tools such as FINDConnect solicit concerns from families regarding specific social and environmental factors and support the provider in identifying and connecting families to beneficial supports in the community.

In addition to child development and behavior, parental mental health, and broader family circumstances, research points to the important role of the parent-child connection in shaping lifelong health and developmental outcomes. The back and forth interaction between a parent or caregiver and child, a process called "serve and return", lays the foundational skills of social and emotional interaction children will use throughout their lifetime.¹⁰ Regular visits to the child health provider can be used to track and monitor the physical development of children as well as their mental and emotional milestones. Tools such as the Welch Emotional Connection Screen serve as validated approaches to assess the emotional connection between mother and child. During the well-child visit, child health providers observe the relationship between mother and child looking specifically at four components: attraction, vocal communication, facial expression, and sensitivity or reciprocity.¹⁶

¹¹ Council on Children With Disabilities, Section on Developmental Behavioral Pediatrics, Bright Futures Steering Committee, Medical Home Initiatives for Children With Special Needs Project Advisory Committee. Identifying infants and young children with developmental disorders in the medical home: An algorithm for developmental surveillance and screening. *Pediatrics*. 2006;118(1):405–420.

¹² United States Department of Health and Human Services. (2014). Birth To 5: Watch Me Thrive! (March). Retrieved from https://www.acf.hhs.gov/sites/default/files/ece/screening_compndium_march2014.pdf

¹³ STAR Center Resources: Screening Tools. American Academy of Pediatrics. Accessed September 12 2019 from <https://screeningtime.org/star-center/#/screening-tools#top>

¹⁴ Gottlieb L., Hessler D., Long D., Amaya A., Adler N. (2014). A randomized trial on screening for social determinants of health: The iScreen study. *Pediatrics*, 134(6), e1611.

¹⁵ Garg A., Boynton-Jarrett R., Dworkin PH. (2016). Avoiding the unintended consequences of screening for social determinants of health. *JAMA*, 316(8):813-814.

¹⁶ Hane, A. A., LaCoursiere, J. N., Mitsuyama, M., Wieman, S., Ludwig, R. J., Kwon, K. Y., ... Welch, M. G. (2019). The Welch Emotional

The efficacy of screening in the well-visit setting is dependent upon many factors, notably a mechanism in the pediatric practice that ensures the process for screening is feasible, integrated well within the practice workflow, and perceived to be of maximal value and minimal inconvenience to providers, office staff, and families. In addition, given the reliance upon input from the parent and caregiver to inform the process of screening, it is critical that parents perceive the child health provider and the well-visit as a safe, trusted setting in which to share concerns and receive guidance. The most recent national estimates for prevalence of developmental screening places the rate of screening, reported by parents, at 31.7%.¹⁷ Thus, despite the longstanding recommendation for developmental screening, the large majority of children are not engaged in the process of screening. This finding is critical to consider as new areas of screening and specific screening tools are recommended within the well-child setting.

Significance of the Provider-Parent Relationship and Parent Engagement

The clinical reasoning required to support developmental monitoring by child health care providers is aided by the core strategies of developmental surveillance, which emphasize a much broader process to assessing child development than can be achieved through a single standardized screening tool.¹⁸ In fact, evidence suggests that a number of factors influence the process of early identification by child health care providers; such factors are not routinely incorporated within developmental screening tools or addressed as part of the developmental screening process. Clinical information and elicitation of parents' appraisals and descriptions, particularly concerns and reports of skills and achievements, together with a longitudinal relationship with the family and child upon which to assess changes over time, can influence the accuracy of clinical reasoning and impact early detection within pediatric primary care.¹⁸



Child health care providers have time-limited exposure to young children; thus, it is critical that the parent provide contextual and supplementary information to help guide the assessment. In contrast to other medical screening tests performed with young children, developmental screenings are directly informed by the parent or caregiver. Screening tools often consist of parent-reported questions, recognizing that the parent is likely to have the most comprehensive knowledge of a child's achievement of developmental

milestones and is best positioned to identify concerns. Parental concerns have been shown to be accurate in alerting to developmental problems, with close relationships observed between parental

Connection Screen: validation of a brief mother-infant relational health screen. *Acta Paediatrica*, 108(4), 615–625.

<https://doi.org/10.1111/apa.14483>

¹⁷ National Survey of Children's Health. Child and Family Health Measures. 2016. Accessed September 12 2019, from <https://www.childhealthdata.org/browse/survey/allstates?q=6581>

¹⁸ Glascoe FP, Dworkin PH. Obstacles to effective developmental surveillance: Errors in clinical reasoning. *Developmental and Behavioral Pediatrics*. 1993;14(5):344-348.

concerns and standardized measures of behavioral and emotional problems.¹⁹ Parental worry is also a significant predictor of accessing services among parents, indicating that concerns often drive parents to seek help, in most cases (87%) with a child health care provider.²⁰

Given that there is often an association between the nature of parental concerns and subsequent diagnosis, child health care providers should incorporate parent concerns as part of a broader process of developmental surveillance.²¹ Risk and protective factors that influence child development as well as parent willingness to recognize or share concerns should be considered, with discussion of child development to occur at a level that suits the cognitive, cultural, and psychological background of the parent and with development viewed within the context of what is known about family and environmental circumstances.²²

Taken together, these findings suggest that systematic inquiry regarding parental concerns and priorities for the visit can support health providers in engaging in effective early identification of developmental and behavioral concerns. Tools that engage parents as partners in the well-visit and which can aid in identifying parent priorities, such as the Well Visit Planner, can assist providers in identifying developmental concerns and link families to services to support their child's health sooner.²³

Project Methodology

Context

In 2017, the Silicon Valley Community Foundation launched Pediatrics Supporting Parents, a 3-year initiative supported by five early childhood funders. The initiative, comprised of several complementary components led by a diverse array of organizations, seeks to identify strategies to strengthen pediatric primary care to foster children's social and emotional development with a focus on nurturing the primary caregiver-child relationship.

In 2019, the Help Me Grow National Center, along with several project partners (see Collaborators), were funded to assess the degree to which pediatric primary care providers, and parents, mutually desire and perceive benefit from emerging tools that address concepts such as parent engagement with the well-child visit and early relational health. Secondly, we sought to better understand the degree to which technology in the well-child visit setting can be a lever to scale such concepts through the embedding of an integrated, modular platform.

The Role of the Help Me Grow National Center

¹⁹ Glascoe FP, MacLean WE, Stone WL. The importance of parents' concerns about their child's behavior. *Clinical Pediatrics*. 1991;30:8-11.

²⁰ Ellingson KD, Briggs-Gowan MJ, Carter AS, Horwitz SM. Parent identification of early emerging child behavior problems: Predictors of sharing parental concerns with health providers. *Archives of Pediatric and Adolescent Medicine*. 2004;158:766-772.

²¹ Glascoe FP, Dworkin PH. The role of parents in the detection of developmental and behavioral problems. *Pediatrics*. 1995;95(6):829-836.

²² Korsch BM. What do patients and parents want to know? What do they need to know? *Pediatrics*. 1984;74:917-919.

²³ The Child & Adolescent Health Measurement Initiative. (2019). Well-Visit Planner. Retrieved September 4, 2019, from <https://www.wellvisitplanner.org/>

The Help Me Grow model supports child health providers by enhancing their effective developmental promotion and early detection activities for all children and families. This support consists of educating and motivating providers to conduct systematic surveillance and screening of young children, as well as enabling facilitated and simple entry to a centralized access point (e.g., telephone, on-line) that serves as a care coordination arm for busy pediatric primary care practices. In doing so, Help Me Grow partners with child health providers to ensure effective linkage of children and families to appropriate programs and services that strengthen families and promote children’s optimal health, development, and well-being. The model facilitates transformation of child health services by embedding practices in a comprehensive, multi-sector, integrated approach to developmental promotion, early detection, referral, and linkage.

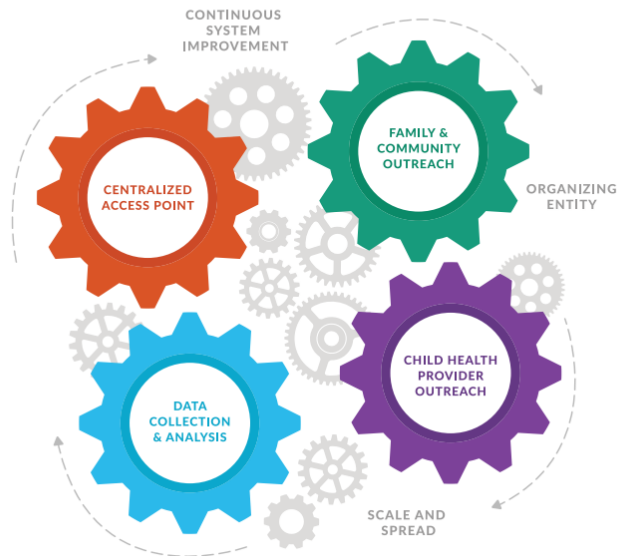
In our efforts to serve as an “integrator” of various initiatives and technologies; to diffuse innovations in support of a comprehensive, integrated approach to developmental promotion, early detection, referral and linkage; and to contribute to comprehensive, early childhood system building and child health services transformation, the Help Me Grow National Center has identified and embraced several key principles that are relevant regardless of an innovation’s specific core components or intended outcomes:

- Innovations are most successfully scaled in the context of a comprehensive systems approach that respects local priorities, cultures, and resources;
- Crafting a clear and concise definition of the innovation is imperative, so as to enable implementation with fidelity and to avoid the risk of diluted effect or confusion among adopters;
- Early attention must be focused on strategies to facilitate sustainability, such as creating effective economies of scale through blending of resources and financing mechanisms;
- Key sectors and stakeholders must be engaged to agree on the most appropriate set of process, efficacy, and outcome measures that speak to feasibility and impact; and
- Available resources must be sufficient to achieve implementation at the desired frequency, intensity, and duration.

Such principles are relevant when considering the potential for success in conceptualizing an integrated, modular intervention designed to transform pediatric practices to maximize family engagement and equip the child health care provider with tools to ensure comprehensive early detection, referral, and linkage for a variety of health, developmental, social, and behavioral factors. These principles served as a guiding framework in creating our project approach.



SYSTEM MODEL



Approach

At the outset of this project, project leads from the Help Me Grow National Center conducted a series of qualitative interviews with model leads representing Well-Visit Planner and Promoting Healthy Development Survey, the Welch Emotional Connection Screen, FINDconnect, and the Survey of Well-Being of Young Children to better understand their historical experiences and lessons learned from seeking to scale novel platforms in the pediatric health setting. Over a period of four months (May through August, 2019), we collectively designed and implemented several complementary project components:

A **parent-facing web-based survey** to solicit important perspectives from families about their current experience with the well-visit, perceived engagement with visit topics, and interest in expanding technology and screening applications

A **provider-facing web-based survey** to solicit the provider perspective on existing clinical realities that both facilitate and impede adoption of tools in the practice setting, provider interest in emerging areas such as relational health and addressing social determinants of health, and receptivity to and priorities for an integrated screening platform

A set of **key stakeholder interviews** to balance individual parent and provider perspectives, provide a systems lens to the types of trends or observations we obtained through surveys, and expand the key concepts we considered in relation to assessing feasibility

A targeted analysis of several existing tools that address these areas, including Well-Visit Planner, the Welch Emotional Connection Screen, FINDconnect, and the Survey of Well-Being of Young Children, in terms of their existing technological structure, **capacity for integration in the well-child visit setting** and with other tools, and possible intellectual property, licensing, or business model constraints that may impact integration potential

The ultimate goal of this project was to systematically address qualitative and quantitative input from parents and providers to move toward a shared conceptualization of an integrated, modular technological intervention with the potential to strengthen the well-child visit in its capacity to address children's social emotional development and promote parent engagement with the well-child visit. Our findings jointly consider the information that was shared through each of the above project components.

Soliciting Parent and Caregiver Perspectives

The parent survey was designed by the Help Me Grow National Center and reviewed and finalized in partnership with project partners (see Collaborators). The survey was brief and designed so as to be a standalone instrument with limited need for background on the project or purpose. The survey target population included parents over the age of 18 with at least one child under the age of 8. Both an English version of the survey and a Spanish translation were distributed. The survey was disseminated through a number of Help Me Grow National Center partners, including Connecticut Children’s Medical Center, the organization within which the Help Me Grow National Center is based, as well as several Help Me Grow affiliate partners of the National Center. Affiliate partners were selected and invited to contribute to the project provided they reached a threshold number of parents and families per month, given the short timeframe of the project. Help Me Grow affiliate leads in the states of New Jersey, Florida, and Michigan participated in the project and engaged parents in their communities (in some cases, specific counties within their communities) to complete the survey.

| Parent/Caregiver Characteristics | |
|---|---------------------|
| Children under 8 | 1.6 children (avg.) |
| Youngest child in the home: | 3.6 years (avg.) |
| Respondent age | 35 years (avg.) |
| Languages spoken in the home: | |
| English | 91% |
| Spanish | 1% |
| Other | 1% |
| Two or more Languages | 1% |
| Arabic, Russian, Polish, Telgu, Korean | 7% |
| Race | |
| White | 55% |
| African American/ Black | 23% |
| Hispanic/ Latino | 15% |
| Asian | 2% |
| American Indian | 0.5% |
| Middle Eastern | 0.5% |
| Guatemalan or Chamorro | 1% |
| Other | 3% |
| Education | |
| 8 th Grade or less | 0% |
| 9 th -12 th grade, no diploma | 3% |
| High School Graduate or GED | 11% |
| Completed a vocational, trade, or business program: | 7% |
| Some College Credit, but no degree | 20% |
| Associate Degree (AA, AS): | 8% |
| Bachelor's Degree (BA, BS, AB): | 27% |
| Master's Degree (MA, MA, MSW, MBA): | 21% |
| Doctorate (PhD, EdD) or Professional Degree (MD, DDS, DVM, JD): | 3% |

In total, 446 surveys were collected from parents across the country during the month of August, 2019.

Soliciting Child Health Provider Perspectives

The provider survey was designed by the Help Me Grow National Center and reviewed and finalized in partnership with project collaborators. While intended to be expedient, the breadth of topics covered in the survey led to an estimated completion time of approximately 20 minutes, which was significant and likely influenced completion rates. In an effort to reach a diverse sample of pediatric providers across the country, the survey was distributed by a number of key Help Me Grow National Center partners and others known to project collaborators. It is estimated that the survey reached at least 10,000 practicing providers; however, the single largest of the channels used

| Provider Characteristics | |
|--|-----|
| Average number of years in practice | 18 |
| Race: | |
| White | 88% |
| African American/ Black | 0% |
| Other | 11% |
| No Response | 1% |
| Community Type: | |
| Rural | 14% |
| Urban | 43% |
| Suburban | 43% |
| Size of Practice | |
| 1-2 pediatricians | 71% |
| >10 pediatricians | 29% |

to distribute the survey alone reached approximately 8,000 of these providers and was a paid service, with associated limitations in reach/likelihood of completion.

In total, 28 surveys were collected from pediatric providers across the country during the month of August, 2019.

Contextualizing Findings through Key Stakeholder Interviews

With surveys providing needed firsthand perspectives from practicing pediatric providers and parents of young children, we additionally sought to capture perspectives of several leading stakeholders in the early childhood field. Such perspectives brought a better understanding of the current fiscal, clinical, and technological landscape into which emerging modular screening platforms may/could be embedded. The Help Me Grow National Center captured qualitative input from fifteen key stakeholders (see Appendix A). Semi-structured interviews were completed during the month of August, and covered a wide range of areas depending on the key stakeholder, degree of experience with the tools represented in the project cohort, and relevant sector (pediatrics, policy, IT, etc.). Interview notes were captured, and relevant themes considered as contextual/supplementary to takeaways from project surveys are presented alongside findings.



A Targeted Analysis of Technological Integration Among Existing Tools

An evaluation led by Patient Tools, Inc. of the five existing tools identified as the focus of this project provided key information as to the scalability of each individual tool, as well as in a scenario in which the tools would be integrated together in a child health setting. This evaluation considered the effectiveness of the tool, integration capabilities, and cost and business capacity of the innovator to support large-scale distribution based on the tool's current design.

To understand effectiveness, it is necessary to understand the systemic context that the tool is addressing. Modeling the system from a generalized view, it is critical to consider the child, parents/guardians, child health providers, public health/services, early childhood providers and community supports. The innovator tools address specific systemic needs, targeting different parts of the systemic model, but their effectiveness ultimately needs to be evaluated from the view of the child.

| Domain | Relevant Considerations |
|----------------------------|--|
| Child | <ul style="list-style-type: none"> • Basic needs related to biology, environment, nurturing • Biopsychosocial factors that impact health, risk, and resiliency |
| Parent/Caregiver | <ul style="list-style-type: none"> • Primary relationship to the child with influence on safety, nurturing, access to services • Retain substantive information about child socially and emotionally • Information sharing guided by trust, culture, literacy, etc. |
| Child Health Provider | <ul style="list-style-type: none"> • Role in early detection and intervention given universal access • Provider as gatekeeper to needed services and resources • Influenced by clinical, operational, and financial factors • Perceptions of standardized screening to offer supplemental information • Prioritization of topics during visit given short time frame • Predominant use of paper screening at odds with IT advancements in electronic medical records |
| Community | <ul style="list-style-type: none"> • Services (e.g. Early Intervention) charged with identification and operate from population perspective • Public health nurses, social workers, early childhood providers, case managers also serve as gatekeepers to needed services and resources • Variable frequency and degree of communication with child health providers |
| Validity and Evidence Base | <ul style="list-style-type: none"> • Tool accuracy and effectiveness • Actionable results |
| Product Integration | <ul style="list-style-type: none"> • Ability to prescreen and trigger certain components of an integrated tool (vs. moving through a sequence of all components together) |
| Medical Integration | <ul style="list-style-type: none"> • Communicability with a practice-based EMR • Influence of privacy/HIPAA policies on transmission of information between systems • Implication of design toward standalone vs remote service |
| Business Capacity | <ul style="list-style-type: none"> • Development plan for tool • Capacity to support implementation • Marketing and business development plans |
| Scalability | <ul style="list-style-type: none"> • Access requirements • Development, licensing, implementation and support costs • Training and support requirements |

Results

Parents' Experience with the Well-Child Visit

Parents reported the topics they remember discussing at their most recent visit, with the most common being physical health (78%), followed by development and reviewing activities their child is able to or starting to accomplish (70%). Less than 10% of parents reported discussing family needs related to food, housing, transportation, or family stressors such as family mental illness or substance abuse.

Parents were also asked to qualitatively describe their current experience with the well-child visit, including both what they enjoy and what they feel is missing from the visit:

What Parents Most Enjoy About Their Visits



What's Missing From Their Visit



Parents shared what motivates them to be excited about and participate in their child’s well-child visit. The majority of parents rated the degree to which they trust their doctor’s advice as the most important factor impacting their engagement with their child’s well-visit care.

| Motivating Factors | Proportion Rating Factor Important |
|---|------------------------------------|
| Trusting my doctor’s advice | 78.2% |
| Liking my doctor | 71.8% |
| Learning more about my child and how he or she is doing | 67.5% |
| Helpful and respectful office staff | 65.6% |
| Getting helpful information to use at home | 55.2% |
| Feeling like my child enjoys the visit | 51.4% |
| Feeling like I know what to expect at each visit | 39.1% |
| Seeing/connecting with other parents at the practice | 7.8% |

Technology and the Pediatric Well-Child Visit

There is growing recognition of the expanding role of technology in health service delivery, including in pediatrics, and this shift influences the degree to which parents themselves gain easy/abundant access to health information through the internet and through app-based platforms. When asked about their perspectives on the implications of this shift for screening tools that have been traditionally administered and reviewed in the practice setting, providers offered differing perspectives.

| | |
|--|--------------|
| Parents should receive access to screening tools that is marketed directly to them | 18.5% |
| Parents' access to screening tools via technology should include involvement from a professional so as to enable the parent to access a trusted provider for support | 67.7% |
| Parents should not be granted access to screening tools until the tools have a level of rigor and can ensure access to health and social supports | 14.8% |

“It would be nice to stay connected with the pediatrician via technology between well visits. When the kids are healthy there are long stretches of time in between visits. It would be nice to hear from the doctor every 3 or 4 months with just a brief “how are things going” survey tailored to the age of my child”

Parent comment

When not at their provider’s office, parents report finding information and resources related to their child’s developmental, social, and emotional health through the following sources:

- Google (79%)
- Social media (41%)
- Parent support groups (31%)
- Local community organizations (30%)

The majority of parents (87%) report that they very or somewhat frequently rely on technology (apps, social media, websites) for information about health and healthcare. And, 37% of parents report that their child’s health care should be using more of this technology to support the well-visit, with 57% of parents reporting the use should be about the same, and only 6% that it should be used less often.

The majority of providers in our respondent pool reported current use of an electronic health record system (96%). The specific EMR vendors cited by providers varied, with 21% reporting use of EPIC, 14% using Allscripts, and the remaining reporting use of ~10 distinct systems. Despite the high proportion of providers with an EMR, 89% report that most screening tools are implemented by paper and pencil methods, 10% in an EMR-dependent electronic method, and 0% through an electronic method that is distinct from the EMR system.

“It would be good to get digital copies of test results or doctor visit results instead of just seeing the doctor and leaving empty handed trying to remember all the information that was discussed. A portal where I could access my child’s information would be ideal”.

Parent comment

Perceived Need for Tools that Maximize Parent Engagement

Providers were surveyed to better understand their interest in an integrated platform designed for implementation in the pediatric setting that offered a variety of features, including:

- Pre-visit planning for parents based on national guidelines, accessible by providers ahead of the visit
- A mechanism to ensure that families arrive to the visit informed about developmental milestones
- A mechanism to ensure families arrive to the visit informed about topics they can discuss with their provider



At baseline, 62% of providers reported being very likely to choose a feature that enables families to be informed about developmental milestones, 58% to choose a feature that enables parents to be informed about topics to discuss with the provider, and only 39% to choose a feature that enabled pre-visit planning for parents. When providers were asked to report how cost, time, and integration with existing practice-based technology would affect their interest in the features, the following themes emerged:

- Time appeared to be the most significant factor, with a much smaller proportion of providers being ‘very likely’ to choose the same features as above (62 to 14%, 58 to 18%, and 39 to 16%) if such features would add between 1 and 5 minutes to the well-visit.
- While less impactful than adding time to the visit, cost and having to adopt a system distinct from their existing EMR led providers to be less interested in adopting a tool to promote a parent-led agenda.

Of providers surveyed, all report that they currently use at least one mechanism to determine parent/caregiver priorities for the well-visit. By far the most common (81%) strategy is to ask the parent/caregiver at the start of the visit, with fewer providers (7%) using a structured questionnaire of some type prior to the visit to elicit questions and priorities.

“I wrote a list of questions down that I had. I also researched any topics that I was curious about beforehand so I could discuss my thoughts with my doctor”.

Parent comment

In adopting a tool that would enable parents to be better informed of topics to address during the well-child visit and to share their top priorities directly with their provider, 67% of providers would prefer this tool be administered during the appointment, such as while in a waiting area, with a small proportion desiring a tool administered prior to the visit, with results provided dually to parents and to the practice.

Of parents surveyed, less than 3% feel somewhat or very unprepared to discuss topics during their most recent well-child visit. Parents attributed their preparation to a variety of factors, including having older

“I like my sons’ physician and trust her very much. I also like that if I have questions she explains everything and does not rush me when I do not understand something”

Parent comment

children that made them more familiar with what to expect, taking steps prior to the visit such as documenting notes and questions, researching topics online, and a general sense of

confidence that they know their child/trust the doctor to ask the right questions.

While few parents reported feeling unprepared, those that did cited such contributing factors as being new to parenting, having a difficult time remembering what to ask about, or things that occurred to them to ask about after the visit.²⁴

Nearly 90% of parents reported having sufficient time to discuss what they'd like to talk about during the child's well-visit. At the same time, more than 80% of parents are interested in a planning tool to complete before the well-visit that would inform their child's pediatrician about things they'd like to discuss during the visit. When asked about the ideal format for such a planning tool, parents reported a wide variety of strategies as being acceptable, with the most preferred approach being a link to an online form emailed to them by their provider, followed by an app that could be downloaded to their phone to access the form. The least preferred method included an online form they needed to search for and access independent of their child's pediatric practice (only 20% of parents suggested this as a preferred method).

Perceived Need for Tools to Strengthen Parent-Child Connection and Positively Impact Children's Social-Emotional Development

A variety of screening tools are currently recommended as part of the pediatric well-child visit. Such screening tools require time, both administrative and clinical, to provide access to, score, interpret, and respond to concerns or flags identified through the screening. Central to an inquiry regarding perceived need and desirability for any screening tool in the well-visit setting is a better understanding of the factors that drive adoption by providers, including the degree to which such tools will be helpful to or positively received by families.

Providers surveyed ranked the following variables as relevant to their decision to implement:

1. Is the screening and possibility of follow-up likely to convey significant benefit to families?
2. Are there known or easily identifiable resources, treatments, or supports for which I can connect families based on the issues or concerns identified through the tool?
3. Is the screening tool easily accessible through my practice workflow (for example, embedded in an EMR)?
4. Am I able to access relevant training and information on the tool and how to interpret results?
5. Does the screening tool yield new information about the family that I might not otherwise know?
6. Is the screening tool recommended as part of AAP Bright Futures recommendations/clinical practice guidelines?
7. Is there potential to receive reimbursement to offset time spent conducting the screening?

²⁴ It should be noted that our survey did not inquire as to an important variable, namely whether caregivers had experience providing care to children with special health care needs. In our key stakeholder interviews, we came to appreciate the distinct experience of such parents and families with the child health care provider; their desire/need to acquire information about their child, particular in the case of complex medical conditions, can often impact their degree of engagement and preparedness overall.

Child Development, Social-Emotional Development, and Social Determinants of Health



The majority of parents surveyed reported it would be either very or somewhat helpful for their provider to assess both child development and social-emotional development as part of the well-visit. However, approximately 15% of parents reported that it would be somewhat or very **unhelpful** to review family factors during the visit, such as whether there is enough food in the home, how the family is getting along, etc. This finding mirrors topics that arose during key stakeholder interviews, such as recent data that suggest parents feel less comfortable discussing social

stressors such as domestic violence, out of concern that raising such topics could engender judgment or involvement of a child welfare agency.²⁵ However, in contrast to prior research conducted with parents specific to screening for social determinants of health,¹⁴ 46% of parents reported that they would be more likely to share private or difficult information with their provider in-person as opposed to an electronic format (such as an app or online form), and only 4% stated they would not share sensitive information.

Providers were surveyed to better understand their interest in an integrated platform designed for implementation in the pediatric setting that offered a variety of features, which providers ranked in terms of their importance:

1. Identification and linkage to relevant community-based services and supports
2. Mechanism to assess parent-child relational health
3. Summary of parent’s report of child development, behavior, and autism symptoms before the visit
4. Mechanism to assess key social determinants of health and related family risk factors
5. Access to population-based data from clinic families on quality of care

Beyond overall interest, the survey inquired as to how known barriers to implementing screening tools, such as cost and inconvenience, would influence the decision to adopt various platform features.

| Question | Proportion of Providers Responding “Very Likely” |
|--|--|
| How likely is the provider to use an IPS feature that provides a summary of parent’s report of child development, behavior, autism? | 58% |

²⁵ Schleifer, D., Diep, A., & Grisham, K. (2019). It’s About Trust: Low-Income Parents’ Perspectives on How Pediatricians Can Screen for Social Determinants of Health. (June), 28. Retrieved from www.uhfnyc.org

| | |
|---|-----|
| How likely is the provider to use this feature if it comes at a nominal cost to the practice? | 50% |
| How likely is the provider to use this feature if it adds 1-5 minutes to the visit? | 32% |
| How likely is the provider to use this feature if it requires an electronic system separate from the EMR? | 32% |

| Question | Proportion of Providers Responding “Very Likely” |
|---|--|
| How likely is the provider to use an IPS feature that assesses key social determinants of health and related family risk factors ? | 54% |
| How likely is the provider to use this feature if it comes at a nominal cost to the practice? | 41% |
| How likely is the provider to use this feature if it adds 1-5 minutes to the visit? | 32% |
| How likely is the provider to use this feature if it requires an electronic system separate from the EMR? | 32% |

Relational Health

A moderate proportion of parents reported they had recently discussed relational health issues with their provider (41%) vs. those that said they had not discussed such issues (55%), with relational health including topics such as child tantrums, behavior problems, and issues with the parent-child relationship. In terms of awareness of the degree of social-emotional connection between a child and parent during the well-child visit, providers were asked to rate their awareness on a scale from 1 to 100: responses ranged from a low of 0 to a high of 80, with an average of 28. In terms of provider’s level of confidence in assessing parent-child emotional connection during the well-child visit, providers reported a low of 4 to a high of 80, with an average of only 34, suggesting providers could benefit from training and support in assessing parent-child emotional connection. While only 21% of providers report currently using a tool to assess parent-child relational health, 89% report interest in being trained to assess parent-child relational health in the clinic provided there was a quick and validated assessment tool that was predictive of long-term child development.

Ninety-six percent of parents surveyed would be very or somewhat interested in feedback from their provider regarding important tips on how to strengthen their connection with their child. However, only 25% of providers reported currently having access to quick, effective, and evidence-based strategies to offer patients during the clinic to help strengthen parent-child emotional connection.

| Question | Proportion of Providers Responding “Very Likely” |
|---|--|
| How likely is the provider to use an IPS feature that assesses parent-child relational health? | 64% |
| How likely is the provider to use this feature if it comes at a nominal cost to the practice? | 33% |
| How likely is the provider to use this feature if it adds 1-5 minutes to the visit? | 29% |
| How likely is the provider to use this feature if it requires an electronic system separate from the EMR? | 29% |

Value Proposition for an Integrated, Modular Screening Platform

The results above suggest that there is a high level of baseline interest among providers for an integrated modular screening platform that enables parents to arrive to the visit informed about important development milestones and armed with information that enables them to ensure important priority areas and questions are discussed. Asked specifically about their interest in electronic access to an integrated platform of screening tools that collectively addresses parent priorities for the visit, child development, social-emotional development, emotional connection, and family needs and stressors, 79% of providers report being very or somewhat likely to adopt.

Not surprisingly, such interest is impacted by whether the adoption of the tool would require the use of financial resources, add time to an otherwise already extremely limited visit length, or require adoption of a platform external to an existing EMR. For nearly every single feature of a platform, time appeared to be the most significant potential barrier, with a requirement for external electronic systems a close second. Whether such a platform came at modest cost to the practice does not seem to be a significant obstacle to adoption, though is worthy of consideration.



Beyond barriers, there are several other factors that influence practices’ likely adoption of new or newly-packaged tools which are relevant to future design considerations. Providers report the following attributes in terms of their influence on their decision to implement an integrated platform, ranked from greatest to least significant:

1. That the platform “speaks to” their practice-based EMR, allowing, for example, results from the screening tools to be imported directly into their clinical data systems

2. That the platform is designed in a way that office staff outside of the clinical provider(s) could be responsible for its implementation and use
3. That providers had access to training and support in adopting the platform in their practice
4. That other pediatricians had tried the platform and found it useful
5. That the platform works “off the shelf” and is also modular, allowing providers to choose to implement certain portions of the platform over others

Far less important to the majority of providers’ decision to implement was whether they could be reimbursed for the activities performed using the platform (23% of providers reported that this was the least important factor influencing their decision) and whether they could customize the platform to incorporate local practice information (32% reported this as the least important factor). The survey enabled practices to volunteer other important factors and providers named attributes such as ease of use, availability in other languages, and maintenance of patient privacy as other important variables.

The decision to implement is also not driven entirely by the provider. Other stakeholders identified as playing an important role in vetting the decision to adopt an integrated platform included the larger health system of which the practice was a part (specifically clinical and non-clinical administrative leadership of the health system), practice staff, and patients of the practice.

Technical Approach to an Integrated Platform

A detailed analysis of the technical features of each of the five tools at the focus of this analysis was completed by Patient Tools, Inc., assessing product progress and design under three broad categories: Feasibility, Implementation/EMR Integration, and Business Plans. Results are summarized here; detailed findings are described in Appendix B.

The SWYC is targeted at the child and their family environment with measures around development, social-emotional and environmental issues. It also has triggers for autism and maternal depression, meeting guidelines for AAP and U.S. Preventative Services Task Force early childhood related screening.

The SWYC is positioned well for both product and medical integration (it is already embedded in the WVP, Patient Tools, and currently being implemented in the Epic EMR). It is available in a publishable format at no cost, and is already set up to trigger other domains when needed. It could potentially benefit from configurable domain (development, social-emotional, family environment, autism, maternal depression) enables and prescreen triggers, and more refined actionable results. Plans for in-depth probes by domain and human-centered design will further increase the utility of the product.

The WECS addresses the relatively new domain of relational health, which crosses over to some extent with social-emotional and behavioral health, as well as potentially an indicator of autism as early as 4 months. The provider or staff must be trained to observe the parent and child interacting and count/score how many times actions like smiles, etc. occur. The target observation period is 3 minutes which is an investment in staff time/cost to administer the screening.

The screening itself cannot be integrated directly with other products, but there is a WECS-P that can be used as a prescreen triggering when to administer the full WECS. While administering the WECS-P and WECS has no license fee, there is a 2-3hr eTraining course that needs to be completed and will have a one-time fee.

The WVP/PHDS are targeted at the parent/guardian and medical providers, with measures/questions around family engagement, parental needs, family education and provider quality improvement. The SWYC is embedded in the WVP and a Visit Guide report is produced as the actionable result.

The WVP/PHDS product has three levels of integration; public, tailored and interfaced and is only offered as a remote service. The public version is free (no connection to medical IT), the tailored version will be approximately \$500 and the interfaced version approximately \$500 per year per instance plus setup, support and maintenance fees (API interface with EMR).

Product development and support capacity would need to be developed and wide scalability through a single channel is a fundamental issue. It is recommended that the innovator creates separate WVP and PHDS standalone, publishable products (assuming the complexity is not too great) or question-by-question API accessible if needed. This would allow EMRs and other medical integrators managed access and would be a good alternative to requiring medical integration through the product.

FINDconnect targets unmet basic needs, trauma and resiliency, administering an Opportunity Assessment to referred clients, evaluating and connecting the client with community services and resources. Community services and resources have separate access to set themselves up in the system and navigators also have access to the system to help manage the client. FINDconnect is a software product where each community must procure hosting/support, recruit services and resources to set themselves up in the system, and employ/train navigators supporting the system.

The license fee for FINDconnect is \$1000 per year per community instance. Each instance is local to the community but medical integration requires remote service access through an API interface managing referral and demographic information. Optional training is offered as well as customization.

Potential product improvements would be to 1) create a multi-community instance of the software and offer the tool as a service hosted in a server cluster with high reliability and enhanced security. An additional nominal fee per community instance would be profitable to host and a significant cost savings and hurdle removed for the communities that use the service. Additionally, 2) develop standardized screenings to prescreen into referring to FINDconnect would be helpful for product integration.

The innovator products cover a diverse range of systemic need with little overlap, forming the basis for a systemically effective integrated product. **The potential to create an integrated product combining these five tools is high, and together they cover a wide range of domains central to increasing parent engagement with the well-child visit and addressing children’s social emotional development.** With modest investments in an enabling technical infrastructure, the tools could be adapted to serve as a single product to pediatric practices that requires a single implementation instance and an open architecture to pursue EMR integration. With sufficient attention to human-centered design of and marketing for an integrated product, there is likely high yield in terms of child health provider uptake and downstream impact on the delivery of child health services.

Systemic Considerations Relevant to an Integrated Platform

Extrinsic Facilitators and Barriers to an IPS Product

Key stakeholder interviews elucidated several themes with the potential to influence adoption.

Training

While residency training for general pediatrics is shifting and is beginning to both recognize and embrace a focus on prevention and promotion, the overall medical model remains oriented toward disease treatment and on the diagnoses and interventions for clinical conditions rather than social ones. As a result, training often lags behind broader recognition in the field of the importance of factors such as social determinants of health and the important influence of the social-emotional and mental health of the child and their family members.

Practice Guidelines

The Bright Futures/American Academy of Pediatrics Recommendations for Preventive Pediatric Health Care provide evidence-informed guidance for well-child visits, including a specific schedule for screenings and assessments for infancy through adolescence. While not mandating set practices for all providers, the guidelines do serve to 1) highlight that a particular area, such as maternal depression or social determinants of health, has, through review of evidence and consensus been determined to be a priority for the visit and 2) provide helpful supporting documents to providers to support uptake of new or changing recommendations.

Incentives to Adopt New Practices

With the advent of new practices, there is often corresponding administrative funds available to support modifications to the well-child visit. For example, with the increased call for pediatrics to address maternal depression through implementing a validated screen, EPSDT (Early Periodic Screening, Detection, and Treatment) funds were made available to support activities that promote screenings among Medicaid providers and training them how to incorporate screening and treatment into the well-child visit. Such administrative funds are accessible as “experience in states has shown that... communication to providers about screening tools, Medicaid billing codes, referral options and other information is central for successful uptake and continued use.”²⁶

Practice Autonomy

While there are large, membership-driven organizations such as the American Academy of Pediatrics that engage child health providers and embrace nascent research and policy from the field, pediatric practices nevertheless operate relatively autonomously. This is particularly apparent in the case of both adoption and customization of practice-based technology such as the EMR. With a wide variety of EMR vendors, practices can and do choose to implement a broad array of tools. In turn, as

²⁶ Reimbursement Efforts to Address Depression Among Pregnant and Postpartum Women, Colorado Department of Public Health and the Environment, November 2013. https://www.colorado.gov/pacific/sites/default/files/PF_Reimbursement-Efforts-to-Address-Depression-Among-Pregnant-and-Postpartum-Women.pdf

they realize the obvious limitations of a base/foundational model of an EMR and seek to modify it, they are typically independently pursuing such customization, with associated time and resource costs.

Source of Innovation

A major area of innovation that arose in many of our interviews was identifying and responding to social determinants of health – this is emerging in both the adult and pediatric landscape. As a result, there are several emerging platforms being designed that maximize provider capacity to screen and refer for a variety of conditions, including food insecurity and intimate partner violence. While there may be examples of such solutions in existing, popular EMR vendors, the majority of named solutions in the social determinants of health realm were standalone tools not affiliated with an EMR vendor. This indicates the market conditions are suitable for innovation to take place independent of the EMR, provided options exist to allow for bidirectional communication, such as through an API.

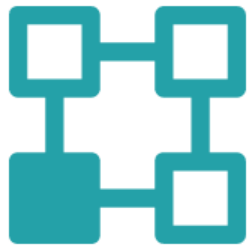
Bargaining Power

In our discussions, it became clear that while the market may favor several leading EMR vendors in terms of their retaining more overall market share, it does not necessarily follow that practices with those EMR systems face a path/queue/complexity any less cumbersome when seeking to enhance their system, as most changes are made through an instance-by-instance (practice-by-practice) approach, rather than for all specific vendor users at one time.

The Role of the Broader Early Childhood System

A focus on surveillance and screening stems from recognition of what effective early identification can achieve: referral and linkage to appropriate services that ensure young children reach their optimal developmental trajectory. In isolation, screening at best alerts parents to potential concerns that can continue to be revisited in subsequent well-child visits or in other settings and, at worst, cause further concern or anxiety on the part of parents without any guidance regarding appropriate action steps. In order to maximize the capacity for early detection to ensure early intervention, it is critical that screening be viewed as one component of an integrated, comprehensive approach to early detection, referral and linkage.

This premise is at the core of the Help Me Grow model, which has, since its inception in Hartford, Connecticut in 1997, sought to expand beyond an isolated focus on developmental screening to ensure that young children at-risk for developmental or behavioral concerns receive access to the services and supports that maximize protective factors and enable them to thrive. In an effort to promote a cross-sector, integrated approach to early detection, referral, and linkage, Help Me Grow communities in Connecticut and now more than 30 other states seek to build strong and effective bidirectional relationships with child health care providers, home visiting, early learning settings, early intervention, and many other sectors. In Help Me Grow communities, families or providers can leverage the model as a single point of entry to services and supports for child development, as well as many other topics. In the busy pediatric practice setting, where it can be challenging to maintain updated inventories of community-based resources as well as to facilitating ongoing care coordination, referral to services, and follow-up to determine successful connection, Help Me Grow can serve as a critical resource and extension of the practice setting.



Calls for increased cross-sector collaboration within the early childhood system abound, with growing acknowledgment of the critical role that sectors such as home visiting and early learning play in supporting child and family well-being.

This is coupled with long-standing recognition of the current limitations of the well-child visit to address all recommended practices. A number of promising examples draw upon such settings as extensions of the pediatric practice in addressing children's health and well-being and may maximize the likelihood that systematic sharing of information and a more integrated approach can yield optimal rates of early detection:

- The development of community-based screening registries that serve as a single repository of screening results for a large and potentially universal population of young children. A wide variety of providers can access screening registries, including child health care providers.

In Vermont, child health providers can access a Universal Developmental Screening registry and view screening results of existing patients, enter screening results for new patients, and securely share results with other entities relevant to the child/family. Screens that can be captured in the registry include the ASQ, ASQ-SE, and M-CHAT, and information stored in the registry includes actions taken as a result of screening results.²⁷

In Orange County, California, the registry serves a similar function in linking child health and community-based providers to a centralized portal that includes results of ASQ, ASQ-SE, PEDS, and the M-CHAT. Providers can make direct referrals to Help Me Grow through the registry and/or note other referrals specific to each child.²⁸

- The development of incentives for collaboration across settings that maximize efficiency and effectiveness across the system.

In Oregon, health and early learning settings share a common developmental screening metric to enable a statewide pay-for-performance approach. Medicaid claims and regional data are assessed to identify areas with low rates of developmental screenings and to enable targeted follow-up.²⁹

Also in Oregon, novel reimbursement strategies enable the child health provider to bill for the interpretation and discussion of screening results for screens conducted elsewhere, such as in an early learning setting.³⁰

These approaches are promising and suggest that there is considerable opportunity to expand the settings in which families are engaged in discussions related to their child's health and wellbeing, including using such settings to administer screening tools. If settings such as early learning, home visiting, and Help Me Grow can work to engage families alongside recommended age intervals to promote access to key screening tools and work with families to organize their priorities for the well-child visit, such preemptive activities can ensure that during the well-child visit, the provider and family are set up for a maximally meaningful visit that narrows in on parent priorities and concerns. Providers can review, interpret, and discuss screening results, areas of concern, and potential follow-up, and can do so in a sequence informed by parent input. Currently, such activities are often sporadic and inconsistent, occurring at random intervals not linked to the child's known periodicity schedule, but rather if/as families access the relevant service. This is a missed opportunity, given how routinized the child well-visit is within child health services and how, with some structure, it could be possible to deploy

²⁷ Help Me Grow Vermont. (n.d.). Vermont's Developmental Screening Registry | Vermont Department of Health. Retrieved September 9, 2019, from 2019 website: <https://www.healthvermont.gov/family/babies/vermonts-developmental-screening-registry>

²⁸ Help Me Grow Orange County. (n.d.). Orange County Children's Screening Registry. <https://www.helpmegrowoc.org/developmental-screening-registry.html>

²⁹ Silow-Carroll, S., Rodin, D., & Pham, A. (2018). Interagency, Cross-Sector Collaboration to Improve Care for Vulnerable Children: Lessons from Six State Initiatives

³⁰ Oregon Health Authority. (2015). Developmental Screening for Young Children Guidance Document Oregon Health Plan.

an integrated screening package alongside family encounters with a variety of community-based settings. This complementary approach would, as above, serve as an important supplement to the activities of the pediatric well-visit, enabling the provider to focus in on areas of concern and needed follow-up. Most importantly, with a tech-enabled integrated screening platform, there is increased potential for passive and more effective information sharing across settings. As screening registries and novel reimbursement strategies grow in prevalence and sophistication, an integrated screening platform in the pediatric setting has the potential to be leveraged by a much wider array of child-serving sectors with corresponding returns in impact and universal reach.

Implications

Our findings support both the need and the demand for tools that can strengthen pediatric primary care capacity to maximize parent engagement with the well-child visit and promote children’s optimal social-emotional development. Frequent well-child visits represent one of the few nearly universal points of contact for all young children and a source of trust and support for the family. Further, the periodicity and reliability of the well-child visit schedule and the relative lack of acute and pressing concerns that arise during the visit indicate it is an opportune venue in which to maximize an emphasis on developmental promotion and prevention, rather than an exclusive focus on interventions for diseases, disorders, and delays.



Even in the presence of such need and demand, several themes arose during our surveys and interviews that must inform the best approach to design, implement, and scale novel tools that focus on strengthening the well-child visit to promote children's optimal health, development, and well-being. Providers report being most likely to adopt a screening tool when it conveys significant benefit to families. While providers demonstrate high interest in an integrated, modular platform for screening, such interest wanes when the implementation of such tools have time commitments as modest as 1-5 minutes or require requisite workflow configurations outside of existing electronic health record capacity. Successful implementation, spread, and scale of such tools demand the resolution of technical, logistical, and related issues.

Existing systemic drivers of practice change, such as reimbursement and clinical practice guidelines, are likely necessary, but not sufficient, to spur adoption of new tools by practices. The fact that a particular screening tool is reimbursable may signal that the tool has passed a critical threshold of evidence and/or that it is regarded as efficacious by experts in the field. However, providers report that reimbursement alone does not ensure significant value for patients or overcome the resource or logistical constraints to compel adoption. The same is true for the inclusion of a tool in clinical practice guidelines: such recognition can suggest a solid evidence base and/or substantial vetting by committees focused on reviewing feasibility and benefit, but do not necessarily lead to full adoption by a particular provider or practice.

Despite these challenges, innovators will continue to develop individual tools that address critical areas related to children’s health and well-being. With few exceptions, these tools are most frequently developed by leading experts in the child health field from academic institutions and non-profit organizations who typically leverage grants, gifts, and discretionary funds to pursue the development,

validation, and diffusion of such tools. Innovators from such settings focus on such issues as proof of concept, psychometric properties, and efficacy, often reporting findings in the academic, peer-reviewed literature. However, this development pipeline is often challenged to “go to scale.” For example, academic validation studies do not typically encompass issues relating to the implementation, dissemination, and scaling of the innovations. As a result, such tools are likely to be less quickly adapted and adopted than innovations that develop under a more commercial enterprise where ample resources enable high levels of marketing, customization, and distribution.

The current era of health care reform, with its emphasis on a changing business model prioritizing population health and well-being, demands a transformation of child health services for such care to be relevant and sustainable. Our findings support the eagerness of families and pediatric providers to enhance well-child visits to address families' priorities and strengthen their developmental promotion capacity. Surveys suggest the importance of enabling the pediatrician to work more efficiently and effectively, not "doing more" but rather "doing better." For example, screening for social-emotional concerns is viewed as more feasible and worthwhile when such concerns are identified in the context of a comprehensive, integrated system that ensures that families' needs are addressed through efficient and effective referral and linkage to community-based programs and services.

Pediatric screening tools, such as those proposed for the Pediatrics Supporting Parents initiative, have a strong potential for facilitating such practice change. For such tools, the traditional pipeline of pilot and feasibility studies followed by validation in new settings and with expanded target populations may well lead to incremental adoption in select, early adopter primary care settings. This process can be significantly augmented by attention to such systemic drivers as public policy, payment reform, and changes to medical training. **Yet truly transformational change requires a new, better solution, in which both the tools themselves and the practices that adopt them can benefit from an over-arching system of supports and resources.** An integrated screening platform implemented in the context of a comprehensive, integrated system such as Help Me Grow could enable key economies of scale that would overcome existing barriers and drive adoption. Such a platform can 1) integrate multiple tools, each with the capacity to expand provider knowledge about the child and family, 2) allow the encounter to be guided by specific pre-screens and “triggers” that reflect family-driven priorities and maximize limited visit time, 3) enable electronic information sharing with relevant sectors and services, and 4) maintain knowledge of and facilitate access to relevant community-based supports.

Our findings suggest several specific areas of further investigation and activity are merited to best maximize parent engagement with the well-child visit and promote children’s optimal social-emotional development:

1

Lead developers of tools such as the Well-Visit Planner, the Survey of Well-Being of Young Children, the Welch Emotional Connection Screen, and FINDconnect should ensure key issues of greatest importance to end users: known benefit of the screen, feasibility within existing workflow, capacity to respond to diverse cultures and languages, and assurance of a clear and feasible path to treatment or service options for identified concerns. Considerations such as ensuring feasibility in diverse practices (family medicine, community health center, etc.) and on enabling tool adoption for families with low-literacy skills and that speak languages other than English are critical to ensuring universal adoption.

2

Opportunities for individual tools to go to scale, or reach adoption in a wide number of settings over a brief period of time, are limited. Traditional pipelines for development of novel screening platforms may benefit from leveraging and/or directly partnering with entities with expertise and experience in product development, marketing, and spread.

3

The brief amount of time available during the well-child visit exacerbates the difficulty in attempting to address all recommended content. Both providers and parents share the desire for a parent-led agenda. Securing a front-end element to the well-child visit that focuses on identifying parent priorities in a standardized manner enables the provider to tailor administration of relevant visit content and screening tools. In this way, such screening tools would operate as intended, by serving as a starting point for discussion and aiding the provider in identifying where further follow-up and support is warranted.

4

As previously noted, as providers are most likely to adopt tools that enable them to fully address and respond to identified priorities, tools should either inherently enable or be integrated with approaches that facilitate linkage, referral, and follow-up. Such approaches may be a tool (e.g., FINDconnect), practice-based interventions (e.g., HealthySteps), or a community-based solution (e.g., Help Me Grow).

Our findings highlight **the unique and timely opportunity to transform the pediatric well-child visit through the development of an Integrated Pediatric Screening (IPS) product that merges several leading tools focused on maximizing parent engagement with the well-child visit and promoting children's social-emotional development.** We believe that the IPS product has the potential to radically transform the landscape of child health services:

For Parents

An integrated platform could enable parents to receive tailored guidance from specific tools associated with each well-child visit, share their priorities and concerns, and track action steps and follow-up in response to identified priorities and needs. While technology is not a panacea, it does facilitate access to parent-held data and appropriately recognizes

For Pediatric Practices

parents' as the true owners of the health information so critical to informing the provider and health encounter.

Currently, individual screening tools are typically implemented on an individualized, practice-by-practice basis. Furthermore, practices typically consider adding new tools one at a time. For each tool, practices must consider and evaluate such factors as evidence base, configuration with workflow, potential benefit to families, degree of acceptability by families and staff, and cost and reimbursement. An integrated platform could change this paradigm by creating and maintaining a clear threshold for any included tool, saving practices' time, energy, and resources and providing "front-end" assurances as to the value-add and vetting all components of the platform. Further, in light of most practices reporting use of a paper-based approach to screening despite employing electronic health records, an integrated platform offers the opportunity for providers to pursue a workable interface with their practice-based EMRs for a fraction of the resources it would take to do so for each tool in isolation.

For Tool Developers

An integrated platform creates critical economies of scale for the leads behind novel tools designed to enhance the well-child visit. An integrated platform achieves collective bargaining power for opportunities such as licensing, shared implementation infrastructure, and marketing and distribution. Most importantly, an integrated platform can be facilitated with the support of a single entity with expertise in information technology and practice-based workflow, alleviating the individual leads of newly developed tools of this burden.

Recommendations for an Integrated Pediatric Screening Product

Develop an Open, Integrated Pediatric Screening (IPS) Product.

Our findings suggest a prime opportunity to develop and market a novel Integrated Pediatric Screening (IPS) product with the capacity to embed FINDconnect, PHDS, SWYC, WECS, and WVP, among other tools, that are **configurable elements of a single product**. Such a screening product would, to our knowledge, be the first to offer child health providers the opportunity to adopt an integrated, customizable platform that is: designed for effectiveness at the level of the child, parent, and provider; offers medical integration and the capacity to interface with the EMR; and includes intentional parameters to address issues related to innovator intellectual property and cost. It would also, given its exclusive focus on pediatrics, be designed to dually maximize parent engagement with the child health provider and to promote children's optimal social-emotional health



and well-being. In an effort to ensure cross-sector oversight, including end-user input into the design, testing and scalability, a consortium would serve to jointly market the IPS product and maintain IPS product membership and compliance. The costs associated with developing a prototype of the tool, guiding consortium, and marketing plan are detailed in Appendix C.

A process should be led which includes the developers of specific tools, as well as other experts (e.g., pediatricians, child psychologists, and medical and product integrators) to develop standards for the design of IPS components. Such standards would be used to improve individual tools and be a basis for vetting and inclusion of other products in the future. For example, criteria such as evidence-base, psychometric properties, impact on subsequent service referral, etc., may determine a threshold to expand the IPS to include other relevant tools. Development of the IPS product would consist of **three primary phases**:

Phase I: Determine Integration Features for an IPS Product that Accommodates Provider and Parent Choice.

The IPS will enable configurations for specific medical settings that increase the likelihood of adoption by a diverse array of pediatric practices (FQHC, integrated network, etc.). In this instance, configuration would allow, for example, Practice A to elect to adopt three of four modular screening components, while the same IPS could be adopted by Practice B that elects to adopt all four screening components.

Given the length of time that would be required to administer *all* tools included in an IPS, the product would benefit from and be designed to embed a **prescreen**. A prescreen includes a subset of questions that determine, where appropriate, the need to trigger subsequent screening tools. The prescreen represents an important opportunity for future research and inquiry within the practice setting to determine how to effectively leverage the prescreen in conjunction with a front-end assessment of parent priorities for the visit, such as through the Well-Visit Planner.

Lastly, the platform would be designed in such a way that each IPS component would generate an actionable result in the form of a flag and report (this includes result scores for the parent and provider, score interpretation and optional trending and item responses). An IPS would similarly offer the opportunity for integrated reporting, with providers receiving results in conjunction with several screens. Such a process would maximize the provider's ability to interpret screening results in the context of all that is known about the child and family (e.g., interpret maternal depression alongside family risk factors).

Determine Integration Features for an IPS Product that Accommodate EMRs.

For inclusion in the IPS product, each individual tool would ideally be available in a publishable, standalone format. Publishable, standalone format ensures copyrighted questions, administration logic, scoring logic, reporting requirements and validation dataset, all of which could be directly implemented in an EMR or into the EMR through a third party. If the component product is too complex to be published and maintain versioning, then the product would instead be offered through a service where the interface is managed. This service would enable the same result in terms of information sharing, but would avoid any need for protected health information (PHI) to go outside

the practice setting into which the IPS is embedded. In the case of third party services, an oversight consortium would help set standards and license third parties in the distribution of the IPS product.

Implement and Test the Product.

Given that individual tools such as SWYC, WECS, etc., are at varying stages of development, a portion of this effort would be focused on expanding the capacity for individual tools to meet criteria required for integration. These may be more or less substantive depending on the tool and ultimately set the stage for broader testing of the integrated product.

Testing of the IPS would involve feasibility testing of an initial prototype. Subsequent to the prototype test, a national pilot, planned in partnership with the consortium, would enable testing in pediatric primary care settings of varying size, sophistication with EMR technology, and patient demographics and utilization patterns, to assess generalizability and identify needed improvements to facilitate wider uptake.

Develop and Implement a Joint Marketing Approach to the IPS Product.

The barriers to achieving successful implementation of a particular tool in a specific pediatric practice setting are often technological or relate to cost and resource constraints. However, the barriers to achieving widespread uptake of a tool, once technical requirements are tested and streamlined, are often the result of a lack of a competitive, comprehensive, and multi-pronged marketing strategy. In Appendix B, information from the tools included in this review indicate that the innovators rely on diffusion options such as peer-reviewed publications, word of mouth, or alignment with related initiatives. In other instances, tools may consider entering into formal relationships in which they relinquish copyright and may receive a portion of profits as their tool is marketed to others through an assessment vendor (e.g., Pearson Assessments or Brookes Publishing). Such an arrangement can be a viable approach when innovators do not have the resources or time to market and sell their tools on an individual basis.



As with any shared approach, a joint marketing effort offers the opportunity for economies of scale through, firstly, the sharing of resource costs associated with obtaining marketing support (i.e., time and effort of a partner to support the rollout of an IPS product would be substantively less than to support the rollout of each individual tool in isolation). In addition, at the individual tool level, a marketing strategy requires engaging and understanding the needs and priorities of target audience(s), in this case providers and parents. Through the marketing of a combined IPS product platform, the understanding of the systemic issues associated with reaching medical providers will again be shared. Creation of an IPS product brand targeted at pediatrics can include such items as developing a common integrated product

website, marketing, and licensing sales. The combined expertise and experience of the innovators will attract buy-in and engagement of other relevant entities, potentially including organizations such as the American Academy of Pediatrics, Zero to Three, Help Me Grow, and a growing emergence of pediatric-based interventions that would similarly benefit from access to an IPS product as they engage and support family well-being and children's social-emotional development.

Ultimately, an IPS product has the potential to transform child health supervision and the process by which providers leverage screening tools as part of a comprehensive, integrated approach to developmental promotion, early detection, referral and linkage. The development and subsequent marketing of a IPS product for pediatrics is a critical step in ensuring that effective strategies for maximizing parent engagement and promoting children's social-emotional development reach scale and impact in the pediatric setting.

Final Thoughts

In our efforts to determine the desirability and feasibility of an integrated, technological platform to transform the well-child visit, engage parents, and promote children's optimal social-emotional development, we began our work by considering the critical concepts that we view as essential in informing the diffusion of any potential innovations. Our consideration of these concepts informed our data gathering, including many of our specific questions of innovators, parents, providers, and topic experts. As we now share our final recommendations, we are inclined to consider whether the described Integrated Pediatric Screening (IPS) product is consistent with our critical concepts. Indeed, we are reassured to note the synergy and conclude that our process and methodology remained well aligned with elements deemed critical to ensuring children's optimal health, development, and well-being through the diffusion of innovation.

We note that our endorsed IPS product addresses many critical elements of a comprehensive, integrated approach to developmental promotion, early detection, referral and linkage, as well as strengthening families to promote children's optimal health, development, and well-being. These include, but are not limited to:

1. Promote a universal approach with particular focus on vulnerable children at-risk for adverse health, developmental, and behavioral outcomes to maximize value and impact.
2. Embed developmental surveillance and screening into the full spectrum of services that support developmental promotion, early detection, and referral and linkage.
3. Ensure that early detection leads to assessment and intervention.
4. Strengthen the effectiveness of primary care child health services to make an optimal contribution to children's healthy development.
5. Embrace evidence-based, strength-building, and health promoting frameworks (e.g., Strengthening Families Protective Factors Framework) in all programs, systems, and policy work.
6. Encourage and support innovation and the diffusion of innovation, with the resources to design, test, and disseminate evidence-based strategies to achieve scale, impact, and cost savings.

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Appendix A

Key Stakeholder Interview Participants

| | |
|-----------------------------|--|
| Abby Alter, MPA | Senior Associate for Early Childhood Initiatives Child Health and Development Institute, Inc. |
| Charles Bruner, PhD | National Resource Network Manager, Integrated Care for Kids Model Founder, Child and Family Policy Center of Iowa |
| Hector de Leon, MD | Pediatric Primary Care Service Line Lead Colorado Permanent Medical Group |
| Patricia Garcia, MD | Resident Education in Advocacy and Community Health at the University of Connecticut Pediatric Residency Program Connecticut Children's Medical Center |
| Garth Harries, JD | Executive Director, Co-Founder Sparkler Learning |
| Lisa Honigfeld, PhD | Vice President for Health Initiatives Child Health and Development Institute, Inc. |
| Tiffany Howard | Community Outreach Program Coordinator Help Me Grow South Carolina Bradshaw Institute for Community Child Health and Advocacy |
| Julia Levy | Director of Product and Play Sparkler Learning |
| Dr. Alan Malik | President Patient Tools, Inc. |
| Paul Meyer, JD | CEO, The Commons Project Creator of Text4 Baby App |
| Donna Cohen Ross | Independent Consultant on Public Health Coverage Policy and Programs |
| Jill Sells, MD, FAAP | Director of Reach Out and Read Washington State Chairperson, American Academy of Pediatrics Council on Early Childhood |
| Mark Schaefer, PhD | Director, Healthcare Innovation Connecticut Office of Health Strategy |
| Lisa Schalla, EdD | Executive Director at Fundación Punta de Mita |
| Melissa Vickers, MEd | Program Director Family Voices |
| David Willis, MD | Senior Fellow Center for the Study of Social Policy |

Jane Witowski, MA Program Manager; Help Me Grow South Carolina
Manager of Children's Advocacy Programs and Healthy Child
Development

Appendix B

Feasibility

| Topic | SWYC | WECS | WVP | PHDS | FINNConnect |
|---|--|---|--|---|---|
| Systemic Need Being Addressed | Development, Social-Emotional, Autism, Family Environment, Maternal Depression | Relational Health (potentially autism earlier) | Family Engagement, Parental needs, embeds SWYC | Family education, Provider QI | Unmet basic needs, trauma and resiliency |
| Validation Study | NIMH study/article in process, comparable with PEDS, ASQ | Varying ages filling 0-5, varying observation periods | RCTs | Comprised of validated tools (CSHCN, NSECH, etc.) | Randomized trials – basis for CMS program |
| Evidence-Based (Effectiveness study/Guidelines) | AAP, USPSTF guidelines | AAP | AAP Bright Futures | NQF, multiple studies | Continuing research studies |
| Normative Resolution Level | Measures (item planned) | Future | Future | Future | Future |
| Population Norms and Trends | Planned | Future | Future | Future | Future |
| Actionable Results (Gatekeeper/clinical decision support) | Larger flag rates by design (not intended to trigger referral) | Green, grey, red result; brief interventions, referrals | Visit guide | QI feedback to Providers | Resource connections, action plan, referrals |
| Time to Complete | 12+ min | 3 min | 9 min | 15 min | 3+ min |
| Scalability Issues | | eLearning training required | Access - product level dependent: Public, Tailored, Interfaced (support structure), Standalone | Included with WVP | Tech platform only, must provide IT server/support, recruit resources and users (navigator, home visiting nurses, etc.) |
| Cost | Free | Free administration but charge for training & materials | Public free, Tailored (approx. \$500/yr/instance), Interfaced (support fees), Standalone | Included with WVP | \$1000 annual license per community instance, training (optional), customization (quoted) |

Implementation/EMR Integration

| Topic | SWYC | WECS | WVP | PHDS | FINNConnect |
|---|------------------|------------------|------------------------------------|---------|---|
| User Implemented, Website, or API-Based | User implemented | User implemented | Website, API-based EMR integration | Website | Community instance, API-based EMR integration |

| | | | | | |
|------------------------------------|------------|---------------------------------|-------------------------------|------------|--|
| Remote Service Offered or Required | No | No | Yes | Yes | Yes |
| Training Required | No | Yes | No | No | Optional |
| Workflows Supported | User-based | User-based (staff administered) | Pre-visit, in-office optional | Post-visit | Referral to FINDconnect (Opportunity Assessment) |
| Embedded in EMR | Yes | No | Not recommended | No | No |
| EMR Interface | N/A | N/A | Possible | Possible | Scheduling/Demographics |
| EMR Results Type | N/A | N/A | PDF, notes, discrete | N/A | Referrals |
| Patient Portal Interface | N/A | N/A | Possible | Possible | N/A |
| HIPAA Security Implemented | N/A | N/A | Yes | N/A | User-based |
| IT Security Audit Concerns | N/A | N/A | Not tested | N/A | User-based |

Business Plan

| Topic | SWYC | WECS | WVP | PHDS | FINDConnect |
|---|---|--|--|-------------------------|---|
| Intellectual Property Copyright Ownership | Tufts Medical Center | Columbia University | OHSU | Bethell/Innovate Health | UCSF under direction of Dayna Long, MD |
| Intellectual Property Licensing | Freely available | Freely available | Reasonable; contingent on OHSU | Reasonable | Annual license \$1000 per community instance |
| Product Plan | Dynamic administration, triggered in-depth probes by domain, embed in multiple systems, human centered design | Validation/development complete by June 2020, disseminate and scale training and brief interventions, WECS-P as pre-screener | Public, Tailored, Interfaced, Standalone (packaged or API-based) | Include with WVP | Setup instances/support, continue to develop the product/knowledge base |
| Marketing Plan | Research papers, word of mouth, integrate with other products and systems/EMRs | Research papers, word of mouth | Word of mouth, need funding to assess further | Include with WVP | Word of mouth, integrate with other products |
| Business Plan – 1, 2, 5 years | Super lean, connect with other products and platforms, widely disseminate | Widely disseminate and build training business | Non-profit, widely disseminate, need funding to assess further | Include with WVP | Widely disseminate and support as needed |

Appendix C

Estimated Costs of Implementation Phase

| | | |
|---|--------|--------|
| Develop IPS product | | \$425k |
| Design IPS product and integration requirements | | \$30k |
| Implement IPS requirements/recommendations with each Innovator | | \$345k |
| SWYC | \$50k | |
| WECS | \$50k | |
| MVP/PHDS | \$120k | |
| FINDconnect | \$75k | |
| Implement and test IPS prototype in different settings | | \$50k |
| Implement IPS Joint Marketing | | \$575k |
| Develop consortium membership and operational structure | | \$25k |
| Develop IPS marketing plan including national pilot | | \$75k |
| Vet and manage medical integrators and consortium member products | | \$75k |
| Implement national pilot | | \$175k |
| Execute marketing plan | | \$225k |