ConnectedHealthInitiative

February 29, 2024

Commissioner Robert Califf
U.S. Food and Drug Administration
Center for Devices and Radiological Health
10903 New Hampshire Ave
Silver Spring, Maryland 20993-0002

RE: ***Connected Health Initiative Comments to the Food and Drug Administration's Request for Comments on Digital Health Technologies for Detecting Prediabetes and Undiagnosed Type 2 Diabetes***

Dear Commissioner Califf:

The Connected Health Initiative (CHI) writes to provide input to the Food and Drug Administration's (FDA's) Center for Devices and Radiological Health (CDRH) on the use of digital health technologies (DHTs), including those enabled by artificial intelligence/machine learning (AI/ML), to transform the way health care is delivered in patients' homes with respect to the detection of prediabetes and undiagnosed diabetes, especially in diverse populations, particularly racial and ethnic minorities.[1]

CHI is the leading effort by stakeholders across the connected health ecosystem to responsibly encourage the use of digital health innovations and support an environment in which patients and consumers can see improvements in their health. We seek essential policy changes that will help all Americans benefit from an information and communications technology-enabled American healthcare system. For more information, see www.connectedhi.com.

CHI is a longtime active advocate for the increased use of new and innovative digital technologies in both the prevention and treatment of disease and we appreciate the FDA's consistent collaboration on digital health-related technologies to responsibly streamline their pathway to the market. Digital health tools, increasingly powered by AI/ML, leverage patient-generated health data (PGHD) and include cloud-enabled wireless remote monitoring solutions, software-as-a-medical device (SaMD) to support clinical decision-making, and chronic and acute care management. The use of these tools is also vital in supporting unserved and underserved populations' access to prevention, diagnosis, and treatment of diabetes.

[1] https://www.fda.gov/medical-devices/digital-health-center-excellence/cdrh-seeks-public-comment-digital-health-technologies-detecting-prediabetes-and-undiagnosed-type-2.

Already a robust evidence base supports the use of DHTs in diabetes detection, offering vital tools in the assessment of daily activity (activity tracker, heart rate, electrocardiogram, sleep quality), evaluation of eating habits (evaluation of meal time, frequency, total food intake, and calorie pursuing automation), and weight reduction/diabetes prevention (obesity management applications, online diabetes prevention program interventions).[2] Recent studies have also demonstrated the ability of DHTs to improve anthropometric and metabolic parameters, as well as a holistically healthier lifestyle, for adults at increased risk of type 2 diabetes.[3] AI/ML specifically has shown incredible potential for early detection of diabetes,[4] with research even demonstrating the potential of voice analysis as a prescreening or monitoring tool for type 2 diabetes through examining the differences in voice recordings between nondiabetic and diabetic individuals.[5]

To contribute to this evidence base, CHI has created its Digital Health Evidence Resource (https://connectedhi.com/resources/digital-health-evidence-resource/), a clinician-vetted aggregation of high-quality clinical studies demonstration the use of cutting-edge DHTs in detecting and treating a range of chronic and acute illnesses.[6] We welcome FDA's use of this resource to support its efforts in realizing the full potential of DHTs in diabetes detection, and more generally to inform its efforts in digital health.

Building on our longstanding collaboration with CDRH, our views above as well as across related FDA requests for comment and draft guidances, we offer the following recommendations for your consideration:

- **Support the Digital Health Center of Excellence:** CHI supports the creation of the FDA's Digital Health Center of Excellence (CoE) as the central place within the agency for the advancement of digital health technology such as mobile health devices, software as a medical device (SaMD), wearable medical devices, and technologies used to study medical products. We urge you to prioritize the Digital Health CoE as it continues to build capacity and expertise.

  Digital health policy is most appropriately dealt with by the Digital Health CoE with CDRH. CHI, therefore, remains concerned with the Center for Drug Evaluation and Research's (CDER) proposed approach to the Prescription Drug-Use-Related Software (PDURS) that departs from the CDRH work to modernize

[2] Rhee SY, Kim C, Shin DW, Steinhubl SR. Present and Future of Digital Health in Diabetes and Metabolic Disease. Diabetes Metab J. 2020 Dec;44(6):819-827. doi: 10.4093/dmj.2020.0088. Epub 2020 Dec 23. PMID: 33389956; PMCID: PMC7801756.

[3] Suhaniya N.S. Samarasinghe, Alexander D. Miras. Type 2 diabetes prevention goes digital. Published November 01, 2022. DOI:https://doi.org/10.1016/j.lanepe.2022.100538.

[4] Pyrros, A., Borstelmann, S.M., Mantravadi, R. *et al.* Opportunistic detection of type 2 diabetes using deep learning from frontal chest radiographs. *Nat Commun* **14**, 4039 (2023). https://doi.org/10.1038/s41467-023-39631-x.

[5] Jaycee M. Kaufman, MSc, Anirudh Thommandram, MASc, Yan Fossat, MSc. Acoustic Analysis and Prediction of Type 2 Diabetes Mellitus Using Smartphone-Recorded Voice Segments. Published: October 17, 2023. DOI:https://doi.org/10.1016/j.mcpdig.2023.08.005.

[6] https://connectedhi.com/resources/digital-health-evidence-resource/.

the FDA's approach to the regulation of SaMD. We recommend that PDURS policy development be primarily led by the Digital Health CoE to ensure alignment with the widely-supported approach developed by CDRH for SaMD.

- **Improve the Medical Device Regulatory Process While Protecting Patient Safety:** CHI commends the FDA's risk-based approach to the regulation of medical devices. Specifically, CHI applauds the FDA's use of enforcement discretion for low-risk devices. We support the FDA pursuing all opportunities to modernize and streamline the medical device approval process, particularly for SaMD. For Americans to benefit from the latest advancements in medical devices, there must be enhancements to the FDA's approval process so there is a reduction in time-to-market while still ensuring patient safety and caregiver trust. The FDA has made significant progress in crafting the Software Pre-Certification Pilot Program (in which CHI members participate) based on extensive public input at multiple stages, public workshops, and the experiences from the pilot program. It is essential that the FDA continue to support and build on its significant investment in this important effort under your administration, laying the groundwork for a full Software Pre-Certification Program. CHI commits to support you moving the Software Pre-Certification Pilot Program forward in order to effectively and responsibly speed time-to-market for trusted developers of SaMD.

  CHI also commends FDA's continued development of digital health-related guidance documents and urges for continued consultations with affected stakeholders as they are developed.

- **Responsibly Leverage Artificial Intelligence and Machine Learning-Enabled Technology to American Patients:** Artificial/augmented intelligence (AI) and machine learning (ML), powered by streams of data and advanced algorithms, have incredible potential to improve healthcare, prevent hospitalizations, reduce complications, and increase patient engagement. Yet, applications of AI in healthcare have also given rise to a variety of potential challenges for policymakers to consider, including quality assurance, adaptiveness, ethics, oversight, notice/consent, and data bias. The FDA must take a leading role in responsibly bringing AI medical devices to the marketplace, and we support FDA's continued leadership to develop a governance framework for AI meeting the definition of a medical device under the Federal Food, Drug, and Cosmetic Act (FD&C Act).

  As part of its commitment to responsibly advance AI in healthcare, CHI has assembled a Health AI Task Force consisting of a range of innovators and thought leaders. CHI's AI Task Force has developed a range of resources, including a position piece supporting AI's role in healthcare, a set of principles addressing how policy should approach the role of AI in healthcare, and a

terminology document targeted at policymakers.[7] Even more recently, CHI's AI Task Force has developed good machine learning practices, specifically for AI development and risk management of AI meeting FDA's definition of a medical device,[8] as well as recommendations on ways to improve transparency for caregivers, patients, and others necessary for the appropriate uptake of AI tools across the care continuum.[9] We urge FDA to build on these digital health community consensus recommendations, and to directly address the role of AI in new standalone guidance providing a scalable, risk-based approach be taken when handling regulatory and enforcement discretion.

- **Fully Leverage Real-World Data (RWD) and Real-World Evidence (RWE) in FDA Processes and Decision-Making:** CHI stands in agreement with the FDA's public acknowledgement that RWD and RWE can and should play an important role in the FDA's efforts to address patient protection at the supplemental phase, monitor post-market safety and adverse events, and to make regulatory decisions. CHI members widely use RWD and RWE to support product design, clinical trials, and studies to innovate. The use of RWD and RWE has been critical to the response to the ongoing public health emergency. We encourage FDA to fully leverage this important data by engaging our members in its processes, particularly in the supplemental and post-market phases. Noting our appreciation for FDA's ongoing efforts with respect to RWD and RWE, FDA should prioritize widespread changes to processes and policies when it comes to using RWD and RWE to make timely informed decisions.
- **Advance Interoperable Data Exchange:** CHI supports FDA's efforts to ensure the safe, secure, and effective exchange using de-identified data between devices, products, technologies, and systems. We believe that FDA can and should lead in collaborative efforts addressing medical device interoperability between all stakeholders through collaboration with other federal agencies.
- **Support the Use of Cloud Computing to Support Ubiquitous Patient Care and Improved FDA Oversight:** FDA policies should reflect that cloud computing enables secure, ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Cloud computing allows organizations to leverage servers and access computer system resources—such as computing power, storage, and network power—to meet their changing technology needs and are increasingly relied upon throughout the healthcare ecosystem. The capabilities of cloud computing are necessary tools for advancing FDA's interests and goals in its strategy.

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[7] The CHI Health AI Task Force's deliverables are accessible at https://actonline.org/2019/02/06/why-does-healthcare-need-ai-connected-health-initiative-aims-to-answer-why/.

[8] CHI's good machine learning practices are available at https://bit.ly/3gcar1e.

[9] CHI's recommendations on necessary actions and commitments to enhance transparency for healthcare AI are available at https://bit.ly/3Gd6cxs.

- **Continue the Development of Cybersecurity Best Practices for Medical Devices:** CHI supports FDA's continued efforts to guide medical device makers in addressing the cybersecurity threats faced by SaMD and software in a medical device (SiMD). We commend FDA's efforts to encourage the timely sharing of threat indicators between both the public and private sector so that new threats may be addressed rapidly and effectively. We encourage you to continue this work while ensuring that the distribution of critical security updates is not delayed by overly burdensome reporting requirements.
- **Maintain International Digital Health Policy Leadership:** CHI supports FDA's ongoing efforts to address emerging technology issues with other regulators[10] and within the International Medical Device Regulatory Forum (IMDRF), producing important frameworks for regulatory approaches that utilize a risk-based and scalable approach (such as the IMDRF's *Software as a Medical Device (SaMD): Clinical Evaluation*[11]). As our members' new technologies begin to enter regulatory processes, FDA's leadership in correlating this arena to existing domestic law and regulation is needed more than ever. We encourage you to continue the FDA's engagement in the IMDRF, and for FDA to clarify IMDRF guidance and positions where consistent with U.S. law.
- **Leverage Public-Private Partnerships:** CHI also appreciates FDA's commitment to driving innovation and patient protection by leveraging the public-private partnership model and welcomes such engagement. For example, we welcome FDA's participation in a new CHI dialogue on digital health and quality assurance aimed at bringing the ecosystem closer together in responsibly advancing the use of connected digital health tools, which will also feature digital health innovators, providers, payors, and patients that will share needs and expectations about new digital health technologies and what needs to be demonstrated to drive adoption in health systems and plans.
- **A Coordinated Approach for FDA to Emerging Technologies:** Consistent with the above, CHI supports the FDA Centers' coordination and alignment consistent with CDRH's approach to emerging technologies such as AI. Because CDRH oversees market entry for AI-based SaMD across a wide range of conditions and provides iterative and leading guidance on AI and ML (e.g., the avoidance of automation bias in the context of clinical decision support[12]), we encourage full alignment with CDRH's approach across all relevant centers. CDRH's Digital Health Center of Excellence continues to leverage total product lifecycle oversight to further the potential that AI has to deliver safe and effective software functionality that improves patients' quality of care.[13] Even more

[10] *E.g.*, https://www.fda.gov/news-events/press-announcements/fda-brief-fda-collaborates-health-canada-and-uks-mhra-foster-good-machine-learning-practice.

[11] http://www.imdrf.org/docs/imdrf/final/technical/imdrf-tech-170921-samd-n41-clinical-evaluation_1.pdf.

[12] https://www.fda.gov/media/109618/download.

[13] https://www.fda.gov/media/122535/download; https://www.fda.gov/news-events/press-announcements/fda-releases-artificial-intelligencemachine-learning-action-plan.

recently, FDA has proposed new guidance addressing what information should be included in a Predetermined Change Control Plan that may be provided in a marketing submission for machine learning-enabled device software functions,[14] on which CHI has provided supportive comments.[15] Misalignment or divergence from CDRH's approach to AI would lend to confusion and conflicting approaches within the health AI space.

- ***Factors should be considered to effectively institute patient care that includes home-based care***

Consistent with our views expressed above, we recommend that factors the FDA should support in its efforts to effectively institute patient care that includes home-based care map to the "quadruple aim" framework. Built on the Institute for Healthcare Improvement's "triple aim,"[16] a widely accepted compass to optimize health system performance,[17] the quadruple aim focuses on four key metrics for optimizing health systems to meet the needs a wide range of key stakeholders and communities. The four areas are (1) enhancing population health; (2) improving patient experience, satisfaction, and health outcomes; (3) better clinician and healthcare team experience and satisfaction; and (4) lowered overall costs of healthcare.

- ***Ways that digital health technologies can (a) foster the conduct of clinical trials remotely and (b) support local or home-based healthcare models***

We urge FDA to consider detailed views CHI has recently provided on draft guidance regarding innovation in clinical trials,[18] decentralizing clinical trials,[19] and clinical trial diversity.[20]

- ***How FDA can facilitate individuals accessing medical technologies in remote locations when they are unable or unwilling to access care in clinical settings?***

[14] https://www.fda.gov/regulatory-information/search-fda-guidance-documents/marketing-submission-recommendations-predetermined-change-control-plan-artificial.

[15] https://www.regulations.gov/comment/FDA-2022-D-2628-0032.

[16] http://www.ihi.org/engage/initiatives/tripleaim/pages/default.aspx.

[17] Thomas Bodenheimer, MD and Christine Sinsky, MD From Triple to Quadruple Aim: Care of the Patient Requires Care of the Provider, Ann Fam Med November/December 2014 vol. 12 no. 6 573-576.

[18] See Appendix A.

[19] See Appendix B.

[20] See Appendix C.

FDA is encouraged to leverage public-private partnerships and patient/consumer facing efforts to promote individuals accessing medical technologies in remote locations when they are unable or unwilling to access care in clinical settings.

For example, FDA should partner with other federal agencies working to advance equitable broadband connectivity, including the Federal Communications Commission (FCC), which is working to support the goals of the FCC's Rural Health Care Fund under its Universal Service Fund and the National Telecommunications and Information Administration (NTIA), which is currently administering a broadband infrastructure and digital literacy program per the Infrastructure Investment and Jobs Act with all states and territories to support building broadband infrastructure for unserved and underserved communities to ensure equitable access to the digital economy, including in the context of healthcare. We encourage FDA to review CHI's detailed views submitted to NTIA on its Infrastructure Investment and Jobs Act (IIJA) implementation.[21]

- ***Processes and medical procedures, including diagnostics, that would be ideal for transitioning from a hospital and/or healthcare setting to non-clinical care settings, for example, home use or school/work use*; *medical technologies that could be ideal to transition to use in non-clinical settings and aspects of those technologies could potentially benefit from modifications to optimize use in non-clinical settings; and design attributes and user needs would facilitate the use of medical technologies, including diagnostic and therapeutic devices, for use in a non-clinical setting, for example home use.***

A broad range of digital health tools and services, across preventative and treatment use cases, are ideal for transitioning from a hospital and/or healthcare setting to non-clinical care settings, including home use or school/work use. Data and clinical evidence from a variety of use cases continue to demonstrate how the connected health technologies available today—whether called "telehealth," "mHealth," "store and forward," "remote patient monitoring," "remote physiologic monitoring," "communication technology-based services," or other similar terms—improve patient care, prevent hospitalizations, reduce complications, and improve patient engagement. These benefits are particularly impactful for the chronically ill. Connected health tools, including wireless health products, mobile medical devices, software as a medical device, mobile medical apps, and cloud-based portals and dashboards, can fundamentally improve and transform American healthcare.[22] Despite the proven benefits of connected health technology to the American healthcare system, statutory restrictions and CMS regulatory-level policy decisions, among other constraints, inhibit the use of these solutions.

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[21] See Appendix D.

[22] We urge CMS to leverage CHI's new Digital Health Evidence Resource, which consists of clinician-vetted evidence and studies speaking to the efficacy of digital health tools, which is available at https://connectedhi.com/resources/digital-health-evidence-resource/.

Notably, FDA should support the use of health data and patient-generated health data (PGHD) through AI. There are various applications of AI systems in healthcare such as research, health administration and operations, population health, practice delivery improvement, and direct clinical care. Government policies must be put into place to support building infrastructure, preparing personnel and training, as well as developing, validating, and maintaining AI systems with an eye toward ensuring value. Policies must incent a pathway for the voluntary adoption and integration of AI systems into clinical practice as well as other applications under existing payment models. To support these goals, CHI has developed the following resources, with which we urge CDRH to align its approach to AI:

- CHI Policy Principles for AI in Healthcare: https://connectedhi.com/wp-content/uploads/2022/02/Policy-Principles-for-AI.pdf
- CHI Health AI Good Machine Learning Practices: https://connectedhi.com/wp-content/uploads/2022/04/CHIAITaskForceGMLPs.pdf
- CHI Recommendations for Advancing Transparency for Artificial Intelligence in the Healthcare Ecosystem: https://connectedhi.com/wp-content/uploads/2022/02/AdvancingTransparencyforArtificialIntelligenceintheHealthcareEcosystem.pdf

With respect to SaMD AI, we urge FDA to align its strategy with the following priorities:

1. **Research:** FDA should support and facilitate research and development of AI by prioritizing and providing sufficient funding while also ensuring adequate incentives (e.g., streamlined availability of data to developers) are in place to encourage private and non-profit sector research. Transparency research should be a priority and involve collaboration among all affected stakeholders who must responsibly address the ethical, social, economic, and legal implications that may result from AI applications.

2. **Quality Assurance and Oversight**: FDA should utilize risk-based approaches to ensure that the use of AI aligns with the recognized standards of safety, efficacy, and equity. Providers, technology developers and vendors, and other stakeholders all benefit from understanding the distribution of risk and liability in building, testing, and using AI tools. Policy frameworks addressing liability should ensure the appropriate distribution and mitigation of risk and liability. Specifically, those in the value chain with the ability to minimize risks based on their knowledge and ability to mitigate should have appropriate incentives to do so. Some recommended guidelines include:
    - Ensuring AI is safe, efficacious, and equitable.
    - Supporting that algorithms, datasets, and decisions are appropriately auditable.

- Encouraging AI developers to consistently utilize rigorous quality assurance procedures and enabling them to document their methods and results.
- Requiring those developing, offering, or testing AI systems to provide truthful and easy to understand representations regarding intended use and risks that would be reasonably understood by those intended, as well as expected, to use the AI solution.
- Ensuring that adverse events are timely reported to relevant oversight bodies for appropriate investigation and corrective action.

3. **Thoughtful Design:** FDA should require design of AI systems that are informed by real-world workflows, human-centered design and usability principles, and end user needs. AI systems solutions should facilitate a transition to changes in the delivery of goods and services that benefit consumers and businesses. The design, development, and success of AI should leverage collaboration and dialogue among users, AI technology developers, and other stakeholders in order to have all perspectives reflected in AI solutions.

4. **Access and Affordability:** FDA should ensure AI systems are accessible and affordable. Significant resources may be required to scale systems. Policymakers should take steps to remedy the uneven distribution of resources and access and put policies in place that incent investment in building infrastructure, preparing personnel and training, as well as developing, validating, and maintaining AI systems with an eye toward ensuring value.

5. **Ethics:** The success of AI depends on ethical use. FDA policies will need to promote many of the existing and emerging ethical norms for broader adherence by AI technologists, innovators, computer scientists, and those who use such systems. FDA should:
    - Ensure that AI solutions align with all relevant ethical obligations, from design to development to use.
    - Encourage the development of new ethical guidelines to address emerging issues with the use of AI, as needed.
    - Maintain consistency with international conventions on human rights.
    - Ensure that AI is inclusive such that AI solutions beneficial to consumers are developed across socioeconomic, age, gender, geographic origin, and other groupings.
    - Reflect that AI tools may reveal extremely sensitive and private information about a user and ensure that laws protect such information from being used to discriminate against certain consumers.

6. **Modernized Privacy and Security Frameworks:** While the types of data items analyzed by AI and other technologies are not new, this analysis will provide greater potential utility of those data items to other individuals, entities, and machines. Thus, there are many new uses for, and ways to analyze, the collected data. This raises privacy issues and questions surrounding consent to

use data in a particular way (e.g., research, commercial product/service development). It also offers the potential for more powerful and granular access controls for consumers. Accordingly, any policy framework should address the topics of privacy, consent, and modern technological capabilities as a part of the policy development process. Policy frameworks must be coordinated and scalable while assuring that an individual's data is properly protected, while also allowing the flow of information and responsible evolution of AI. This information is necessary to provide and promote high-quality AI applications. Finally, with proper protections in place, policy frameworks should also promote data access, including open access to appropriate machine-readable public data, development of a culture of securely sharing data with external partners, and explicit communication of allowable use with periodic review of informed consent.

7. **Collaboration and Interoperability:** FDA should enable eased data access and use through creating a culture of cooperation, trust, and openness among policymakers, AI technology developers and users, and the public.

8. **Bias:** The bias inherent in all data, as well as errors, will remain one of the more pressing issues with AI systems that utilize machine learning techniques in particular. Any regulatory action should address data provenance and bias issues present in the development and uses of AI solutions. FDA should:
    - Require the identification, disclosure, and mitigation of bias while encouraging access to databases and promoting inclusion and diversity.
    - Ensure that data bias does not cause harm to users or consumers.

9. **Education:** FDA should support education for the advancement of AI, promote examples that demonstrate the success of AI, and encourage stakeholder engagements to keep frameworks responsive to emerging opportunities and challenges.
    - Consumers should be educated as to the use of AI in the service they are using.
    - Academic education should include curriculum that will advance the understanding of and ability to use AI solutions.

- ***Digital health technology design attributes that could better facilitate their use by diverse patient populations outside of a clinical setting; and other factors are important to consider which may improve use and acceptance of different digital health technologies by diverse patient populations (for example, older adults, non-English speakers, lower literacy)***

Consistent with our views provided to FDA on key proposed guidance updates, including with respect to diversity in clinical trials,[23] we support and promote an equity

[23] See Appendix C.

"by design" approach that would consider design attributes for diverse populations from the earliest stages of product development.

- ***Potential methods and strategies for evidence generation and data analysis could facilitate the regulatory review of medical technologies intended to be used in non-clinical settings, for example home use or school/work use***

CHI encourages FDA to consider its views on RWD and RWE that were developed in response to drat guidance.[24]

[24] See Appendix E.

CHI appreciates the opportunity to submit its comments to the FDA and urges its thoughtful consideration of the above input.

Sincerely,

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