Recent FDA Developments and Opportunities

A myriad of recent regulatory and policy developments at the Food and Drug Administration (FDA) have created new and accelerated pathways for novel and innovative therapies, which promise significant opportunities for life sciences investors. Investors should consider opportunities related to the developers and manufacturers of the therapies in the sectors described below, as well as in entities acting as service providers in connection with the development and production of these products.

Sector	Recent Development	Impact	Investment Opportunities
Regenerative Medicine	November 2017: FDA released a new comprehensive policy framework for regenerative medicine in connection with its implementation of the regenerative medicine provisions of the 21st Century Cures Act May 2018: Federal prosecutors in California and Florida filed actions to enjoin two companies from providing stem cell treatments for serious diseases without proof of safety and efficacy	• Clarifies FDA's intended exercise of regulatory authority over novel cellular and tissue-based therapies • Announces an expedited regulatory pathway for novel cellular and tissue-based therapies • Suggests a model of collaborative development of regenerative medicine therapies • Promises enforcement against bad actors and a 36-month period of enforcement discretion for low-risk therapies	• Opportunity for investment in platforms for the collaborative development of stem cell therapies and other regenerative medicine products • Opportunity for consolidation of, and investment in, physician practices engaged in regenerative medicine therapies to enable them to seek approval of FDA-regulated regenerative medicine therapies • Opportunity to leverage data required for FDA approval to improve the reimbursement environment for regenerative medicine therapies
Personalized Medicine	April 2018: FDA releases two new final guidance documents on Next Generation Sequencing (NGS) in vitro diagnostics (IVDs), addressing considerations for design and development of such products as well as use of public genetic variant databases to support clinical validity	• Makes recommendations for the design and development of NGS IVDs intended to aid in the diagnosis of symptomatic individuals with suspected germline diseases or conditions (those resulting from a heritable condition) • States intention to consider classifying certain NGS-based IVDs for germline conditions in Class II through the de novo 510(k) process, and possibly to also exempt some NGS-based IVDs from 510(k) premarket notification requirements	• Opportunity for investment in NGS-based IVD manufacturers and in clinical laboratories developing NGS-based laboratory developed tests (LDTs) with greater clarity about FDA expectations for the quality and accuracy of such tests • Opportunity for investment in data analytics platforms and other digital health technology companies developing interpretive tools for the NGS-based testing market

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		• Recommends routes for establishing and justifying an algorithm for variant annotation and filtering in order to produce test results	
Gene Therapy	August 2017: FDA approves Kymriah®, the first gene therapy product, followed quickly by approval of two other gene therapy products May 2018: FDA Commissioner Scott Gottlieb announced FDA's plans to release a comprehensive policy framework for the clinical development of gene therapies, starting with products that are intended to treat hemophilia	• Promises opportunities for the accelerated approval of gene therapy products balanced with strict post-marketing data generation requirements • Projected to address manufacturing and clinical issues specific to gene therapy products • Expected to provide further guidance, including potential accelerated approval endpoints, for specific diseases	• Opportunities for investment in developers of gene therapy products and their components, as well as medical devices and other equipment utilized in connection with cellular and gene therapies • Potential opportunities for investment in entities with strong post-market research capabilities as accelerated approval results in a shift in volume away from pre-market research (e.g., registries, real-world evidence (RWE))
Digital Health	December 2017: FDA released three digital health policy documents, including guidance on clinical decision support software (CDS) in connection with its implementation of the framework set forth in the 21st Century Cures Act April 2018: FDA expands its Digital Health Innovation Action Plan with two new policy documents, a working framework for FDA's Digital Health Software Precertification Pilot program, and guidance on FDA's regulation of	• Clarifies how FDA intends to regulate certain categories of CDS and patient decision support software • Updates FDA's Mobile Medical Applications and wellness product guidances consistent with FDA's interpretation of limitations on medical devices within its authority under the 21st Century Cures Act • Adopts and expands on international principles for evaluating the safety, effectiveness, and performance of software used as a medical device (SaMD) • Outlines a framework by which FDA will implement its voluntary pilot precertification	• Opportunities for investment in developers of wellness applications and some CDS technologies with greater certainty that they will not be subject to FDA regulation • Opportunities for consolidation of, and investment in, developers of innovative FDA-regulated digital health technologies to support the implementation of processes sufficient to qualify for pre-certification opportunities at the conclusion of the pilot • Potential opportunities for growth in contract research organizations (CROs)

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	digital health products with both FDA-regulated and unregulated functions May 2018: FDA announced an innovation challenge to spur development of novel digital health and diagnostic technologies intended for the detection, treatment, and prevention of addiction and treatment of pain; proposals will be accepted between June 1, 2018, and September 30, 2018	program to enable select pre-certifying companies to avoid pre-market review of low-risk devices and utilize a more streamlined review process for their SaMD products • Clarifies when and how FDA intends to assess the impact of non-regulated functions on the safety and effectiveness of device functions of a multi-function device subject to FDA review • Provides a breakthrough designation and heightened FDA interactions to support developers of technologies for addiction and pain indications that submit a proposal and are selected by FDA	and service providers with capabilities for assisting software developers to qualify for pre-certification • Potential window of opportunity for investment in technologies for addiction and pain indications that may enjoy the benefits of accelerated FDA clearance or approval
Artificial Intelligence	February 2018: FDA authorizes marketing of AI-based clinical decision support device that independently alerts a specialist if CT result indicates potential stroke in a patient April 2018: FDA Commissioner announces plans to develop a new regulatory framework to facilitate development of novel AI based technologies April 2018: FDA granted marketing authorization for an AI-based device to screen for diabetic retinopathy and that does not require clinician interpretation.	• Although FDA framework not completely developed, FDA has expressed strong interest in the advancement of AI technologies, and has been willing to rely on retrospective data (i.e., has not required prospective randomized clinical studies) to achieve marketing authorization • AI-based technology could significantly expand access to and efficiency of care, e.g., by enabling physicians to better identify those patients needing specialists and decreasing time to specialist access	• Opportunities for investment in developers of AI-based diagnostic products and their components, as well as medical devices and other equipment utilized in connection with AI

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Drug Compounding (Outsourcing Facilities)	January 2018: FDA released its 2018 Compounding Policy Priorities Plan, including guidance on how FDA intends to regulate compounding from bulk drug substances, implement risk-based manufacturing standards for outsourcing facilities, restrict compounded drug products that are essentially copies of approved drugs, and partner with state regulatory authorities to oversee compounding pharmacy operations March 2018: FDA released draft guidance on the evaluation of bulk drug substances nominated for inclusion on the 503(B) bulks list Q3- Q4 2018: FDA is expected to release a Notice of Proposed Rulemaking proposing new regulations on current good manufacturing practices (cGMPs) for outsourcing facilities	• Revises draft guidance detailing FDA's interim, risk-based approach to applying cGMP requirements to outsourcing facilities while regulations are developed, providing flexibility intended to encourage registration as an outsourcing facility • Details FDA's interpretation of the statutory prohibition on compounding drugs that are essentially copies of FDA-approved drug products • Provides additional clarity on processes by which FDA intends to evaluate products for placement on the 503(B) bulks list • Anticipated to clarify FDA regulations governing cGMP standards for outsourcing facilities	• Opportunity for consolidation of, and investment in, new and existing drug-compounding pharmacies, including 503(B) outsourcing facilities, with increased certainty regarding the impact of FDA oversight on their operations and the products that may be compounded • Potential opportunities for investment in producers of drug products for which competition from compounded products will be limited by FDA's more restrictive approach to regulating products eligible for compounding, as set forth in the plan
Development of Drugs Intended to Treat Opioid Addiction	April 17, 2018: FDA and the National Institute of Drug Abuse (NIDA) hosted a public meeting on Patient-Focused Drug Development for Opioid Use Disorder (OUD) April 2018: FDA released a draft guidance document focused on drug development and clinical trial design	• Outlines available pathways for approval and recommendations for addressing clinical trial design challenges that are intended to encourage the development of medication-assisted treatments for OUD • Suggests that forthcoming developments in FDA policy and guidance will continue to streamline drug development and approval	• Opportunity to invest in manufacturers and developers of novel therapies to treat OUD and similar substance use disorders • Opportunities to consolidate and invest in substance use disorder treatment facilities to support additional demand for treatment with medication-assisted therapies

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	issues relevant to the study of sustained-release "depot" buprenorphine products and announced its intention to issue further guidance that will provide a framework for the development of novel clinical endpoints that can form the basis of approval of additional medication-assisted therapies for OUD	processes for products used in the medication-assisted treatment of OUD	• Opportunities to invest in clinical research services providers with capabilities in human abuse liability testing and other clinical trial designs applicable to investigational treatments for substance use disorders
Drug Development (Benefit-Risk Assessment)	March 2018: As part of FDA's implementation of PDUFA VI and the 21st Century Cures Act, FDA issued an update to its Benefit-Risk Framework to further incorporate patient experience into the agency's regulatory decision-making process	• Provides a roadmap for enhancing the Benefit-Risk Framework, which will assist FDA in developing guidance on how patient experience data can be used to inform the drug evaluation process • Suggests that FDA is moving toward increasing transparency of its decisions and streamlining the process for collecting patient and stakeholder input • Proposes initiating pilot programs in collaboration with the medical community	• Opportunities for investment in CROs and other service providers with expertise in patient engagement and the collection and analysis of patient experience data

