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Clinical Decision Support Software: Draft Guidance for Industry and Food and Drug Administration Staff

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Webinar Objectives

- Share the FDA's current thinking on Clinical Decision Support (CDS), including which CDS software functions are considered devices

- Explain the FDA's risk-based approach to CDS software functions that remain devices

Webinar Agenda

- Background

    o 21st Century Cures Act

    o Changes from Previous Draft CDS Guidance

    o International Medical Device Regulators Forum (IMDRF) Framework

    o What is Clinical Decision Support (CDS)

- Summary of Draft Guidance: Clinical Decision Support Software

    o Device CDS vs Non-Device CDS Software Functions

    o Risk Framework for Device CDS

- Questions and Answers

Functionality Focused Approach to Software

Platform Independent	Promote Innovation	Promote Patient Engagement	Protect Patient Safety

Functionality Focused	Narrowly Tailored

Risk Based

21st Century Cures Act:
Building on FDA's Digital Health Policy

FDA

Recognition of low risk Digital Health products

Codification of some existing enforcement discretion policies

Applying a least burdensome approach for device regulation

21st Century Cures Act (Section 3060) Codifies FDA Policies

Amended the definition of "device" in the Federal Food, Drug, and Cosmetic Act to **exclude** certain software functions intended for...

FDA policies affected/codified

(A) Administrative support;

FDASIA Categories of Health IT
Administrative Functionality

(B) General Wellness;

FDA Policy for Low-Risk General Wellness Products

(C) Electronic Patient Records

FDASIA Categories of Health IT
Health Management Functionality

(D) Transfer, Store, Convert formats, Display related information;

Medical Device Data System (MDDS)

(E) Clinical Decision Support

Policy for Clinical Decision Support Software included in
Health Management Functionality

21st Century Cures Criteria for Non-Device Clinical Decision Support (CDS)

The Cures Act excludes certain CDS software functions from device definition **if all four of these Criteria are met:**

1) **NOT intended to acquire, process, or analyze** a medical image or a signal from an in vitro diagnostic device or a pattern or signal from a signal acquisition system;

2) intended for the purpose of **displaying, analyzing, or printing medical information about a patient or other medical information** (such as peer-reviewed clinical studies and clinical practice guidelines);

3) intended for the purpose of **supporting or providing recommendations to a health care professional** about prevention, diagnosis, or treatment of a disease or condition; and

4) intended for the purpose of enabling a health care professional to **independently review the basis** for such recommendations that such software presents so that it is **not the intent that such health care professional rely primarily** on any of such recommendations to make a clinical diagnosis or treatment decision regarding an individual patient.

The Cures Act provides that a Software Function will NOT be Excluded from the Device Definition if:

- Used in the manufacture and transfusion of blood and blood components to assist in the prevention of disease in humans;

- Determined by the Secretary of Health and Human Services that it would be reasonably likely to have serious adverse health consequences

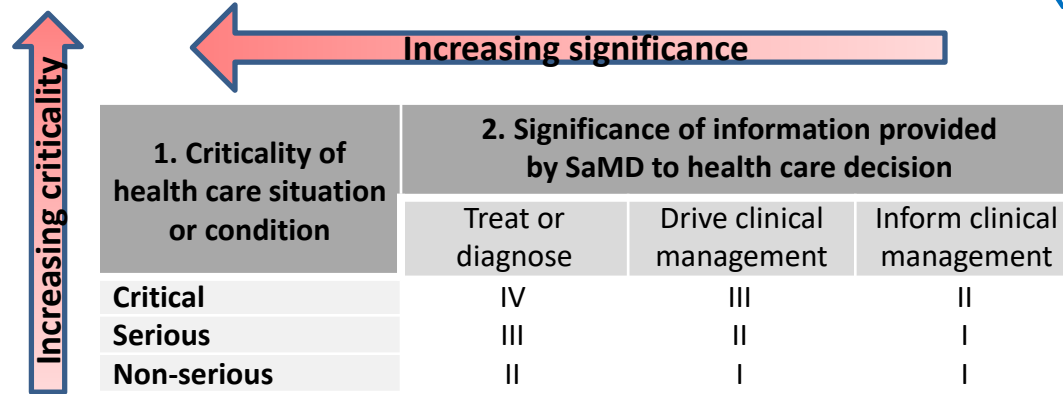# Incorporating Feedback on Previous Draft CDS Guidance

- On December 8, 2017, the FDA published a draft guidance titled "Clinical and Patient Decision Support Software"
  - Sought to provide clarity on the scope of the FDA's oversight of clinical decision support software intended for healthcare professionals, and patient decision support software intended for patients and caregivers who are not healthcare professionals.

- The FDA is re-issuing as draft guidance in response to comments from industry, who requested the FDA incorporate a risk-based approach for the regulation of CDS software that remain devices.
- The FDA is now seeking public comment on the draft guidance

Changes from Previous Draft CDS Guidance

- Proposing to use a risk-based approach to regulation of Device CDS informed by the International Medical Device Regulators Forum (IMDRF) Framework

- No longer proposing to use separate category for Patient Decision Support Software

- Providing clarification in interpretation of Cures criteria for exclusion from device definition

IMDRF Risk Stratification of Software as a Medical Device (SaMD)

FDA

Increasing significance →

↑ **Increasing criticality**

1. Criticality of health care situation or condition	2. Significance of information provided by SaMD to health care decision		
	Treat or diagnose	Drive clinical management	Inform clinical management
Critical	IV	III	II
Serious	III	II	I
Non-serious	II	I	I

1. Criticality of health care situation or condition

↑ **Increasing**

- **Critical situation or condition**
  - where accurate and/or timely diagnosis or treatment action is vital to avoid death, long-term disability or other serious deterioration of health of an individual patient or to mitigate impact to public health.
- **Serious situation or condition**
  - where accurate diagnosis or treatment is of vital importance to avoid unnecessary interventions
- **Non-Serious situation or condition**
  - where an accurate diagnosis and treatment is important but not critical for interventions

2. Significance of information

↑ **Increasing**

- **To treat or to diagnose**
  - To provide therapy to a human body;
  - To diagnose/screen/detect a disease or condition
- **To drive clinical management**
  - To aid in treatment by providing enhanced support to safe and effective use of medicinal products or a medical device.
  - To aid in diagnosis to help predict risk of disease/ condition or in making a definitive diagnosis.
  - To triage/ identify early signs of disease or condition.
- **To inform clinical management**
  - To inform of options
  - To provide clinical information by aggregating relevant information

What is Clinical Decision Support (CDS)?

- **Clinical Decision Support (CDS)** is a tool that provides health care professionals and patients with knowledge and person-specific information, intelligently filtered or presented at appropriate times, to enhance health and health care.[1]

- **CDS** includes:[2]
    - computerized alerts and reminders for providers and patients;
    - clinical guidelines;
    - condition-specific order sets;
    - focused patient data reports and summaries;
    - documentation templates;
    - diagnostic support;
    - contextually relevant reference information.

[1]FDASIA Health IT Report, April 2014, available at https://www.fda.gov/about-fda/cdrh-reports/fdasia-health-it-report.
[2]See Office of the National Coordinator for Health Information Technology, "What is Clinical Decision Support (CDS)?" at https://www.healthit.gov/topic/safety/clinical-decision-support.

Draft CDS Guidance

FDA

Clinical Decision Support Software: Draft Guidance for Industry and FDA Staff,
when finalized, will describe the FDA's regulatory approach to CDS software functions,
including the changes to the FD&C Act made by the 21st Century Cures Act,
and leveraging the IMDRF framework for SaMD.

21st Century Cures Act (Cures Act) Amended the Federal Food, Drug, and Cosmetic Act (FD&C Act) definition of "device," **removing certain software function** (December 2016)

The International Medical Device Regulators Forum (IMDRF) Introduced a framework for software as a medical device (SaMD), including a **foundational approach to SaMD risk categorization** (September 2014)

Summary of Criteria for Device CDS & Non-Device CDS

Is the Intended User a Health Care Professional? [part of criteria (3) and (4)]	Can the User Independently Review the Basis?* [part of criterion (4)]	Is it Device CDS?
Yes	Yes	No, it is Non-Device CDS because it meets all of section 520(o)(1)(E) criteria
	No	Yes, it is Device CDS
No, it is a patient or caregiver	Yes	Yes, it is Device CDS
	No	Yes, it is Device CDS

*"Can the User Independent Review the Basis?" asks whether the function is intended for the purpose of enabling the user to independently review the basis for the recommendations so that it is not the intent that user relies primarily on any such recommendation (part of criterion (4)).

Criterion 1: Draft Interpretation

NOT intended to acquire, process, or analyze a medical image or a signal from an in vitro diagnostic device or a pattern or signal from a signal acquisition system

- We generally consider **physiological signals** to include those signals that require use of either:

  - **An in vitro diagnostic device**, which typically includes an electrochemical or photometric response generated by an assay and instrument that may be further processed by software to generate a clinical test result, **or**

  - **A signal acquisition system** that measures a parameter from within, attached to, or external to the body for a medical purpose and often includes:

    - **use of sensors** (for example, electrocardiogram (ECG) leads) along with electronics and software function that is used for signal generation (for example, ECG);

    - **collections of samples or specimens**, such as tissue, blood, or other fluids (for example, conducting a pathological study using software, such as digital pathology); **or**

    - **use of radiological imaging systems** (for example, computed tomography (CT) and a software function for image generation).

Physiological Signal Acquisition Systems Examples

- Presently, most physiological signal acquisition systems are intended to monitor physiological signals for medical purposes and, therefore, are considered medical devices,

- But some physiological signal acquisition systems are NOT a device:

  - Activity monitors that measure physiological parameters **NOT specifically intended or marketed for a purpose identified in the device definition.**

  - Software functions that measure physiological parameters **for purposes of biometrics identification**, such as retinal image analysis for secure access to a facility, are not devices.

- We encourage manufacturers to engage with the FDA if a physiological signal acquisition system previously only considered for a medical purpose is intended to be used for a non-medical purpose.

Criterion 2: Draft Interpretation

Intended for the purpose of displaying, analyzing, or printing medical information about a patient or other medical information

- demographic information;

- symptoms;

- test results;

- medical device outputs (such as heart rate or blood pressure);

- patient discharge summaries; or

- medical information (such as clinical practice guidelines, peer-reviewed clinical studies, textbooks, approved drug or medical device labeling, and government agency recommendations).

(section 520(o)(1)(E)(i) of the FD&C Act);

Criterion 3: Draft Interpretation

Intended for the purpose of supporting or providing recommendations to a health care professional about prevention, diagnosis, or treatment of a disease or condition

- Evidence-based tool to support health care professional decision-making
- **Informing** treatment options or diagnostic tests for a patient.
  - Collate or develop recommendations based on an analysis of patient-specific information to a health care professional, who may then use this information to make a decision about the care of a patient (for example, treatment), along with other information and factors of which the health care professional is aware.

NOT treating a patient, determining a patient's treatment, or providing a definitive diagnosis for a patient

(section 520(o)(1)(E)(ii) of the FD&C Act);

Criterion 4: Draft Interpretation

Intended for the purpose of enabling a health care professional to independently review the basis for such recommendations that such software presents so that it is not the intent that such health care professional rely primarily on any of such recommendations to make a clinical diagnosis or treatment decision regarding an individual patient

The FDA interprets this provision to mean that Manufacturers of Non-Device CDS should describe their software functions in clear language, including:

1. The purpose or intended use of the software function;
2. The intended user (for example, ultrasound technicians, vascular surgeons);
3. The inputs used to generate the recommendation (for example, patient age and sex); and
4. **The basis for rendering a recommendation.**
   - Underlying data used to develop the algorithm;
   - Plain language descriptions of the logic or rationale used by an algorithm; and
   - The sources supporting the recommendation or the basis for the recommendation should be:
     - identified and available to the intended user, and
     - understandable by the intended user

Regardless of the complexity of the software and whether or not it is proprietary

(section 520(o)(1)(E)(iii) of the FD&C Act).

Applying IMDRF Risk Framework to CDS

FDA

Increasing significance ⟵

↑ Increasing criticality

Criticality of health care situation or condition	Significance of information provided by SaMD to health care decision		
	Treat or diagnose	Drive clinical management	Inform clinical management
Critical	IV	III	II
Serious	III	II	I
Non-serious	II	I	I

CDS functions may
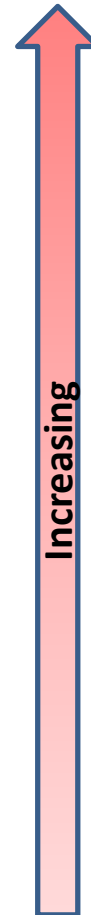
"**inform clinical management**"

Applying IMDRF Risk Framework to CDS

FDA

1. Criticality of context

Increasing

- **Critical situation or condition**
  - where accurate and/or timely diagnosis or treatment action is vital to avoid death, long-term disability or other serious deterioration of health of an individual patient or to mitigating impact to public health.

- **Serious situation or condition**
  - where accurate diagnosis or treatment is of vital importance to avoid unnecessary interventions

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2. Significance of information

Increasing

- **To treat or to diagnose**
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- **To drive clinical management**
  - To aid in treatment by providing enhanced support to safe and effective use of medicinal products or a medical device.
  - To aid in making a definitive diagnosis.
  - To triage/ identify early signs of disease or condition.

- **To Inform clinical management**
  - -- To inform of options
  - -- To provide clinical information by aggregating relevant information

Risk-based Policy for CDS using IMDRF Framework

FDA

Table 3. IMDRF type (I to IV) of SaMD products by state of healthcare condition and significance of information provided by the products to healthcare decision.[8]

State of Healthcare situation or condition	Significance of information provided by SaMD to healthcare decision		
	Treat or diagnose	Drive clinical management	Inform clinical management
Critical	IV	III	II
Serious	III	II	I
Non-serious	II	I	I

Summary of Regulatory Policy for CDS Software Functions

IMDRF Risk Categorization	Can the User Independently Review the Basis?*	Intended User is HCP FDA Regulation		Intended User is Patients or Caregivers FDA Regulation
Inform x Critical	Yes	Not a Device		Oversight Focus
	No	Oversight Focus		Oversight Focus
Inform x Serious	Yes	Not a Device		Oversight Focus
	No	Oversight Focus		Oversight Focus
Inform x Non-Serious	Yes	Not a Device		Enforcement Discretion**
	No	Enforcement Discretion**		Oversight Focus

Risk-based Policy for CDS using IMDRF Framework

FDA

IMDRF Risk Categorization	Can the User Independently Review the Basis?*	Intended User is HCP — FDA Regulation		Intended User is Patient / Caregiver — FDA Regulation
Inform x Critical	No	Oversight Focus		Oversight Focus
	Yes	Not a Device		Oversight Focus
Inform x Serious	No	Oversight Focus		Oversight Focus
	Yes	Not a Device		Oversight Focus
Inform x Non-Serious	No	Enforcement Discretion**		Oversight Focus
	Yes	Not a Device		Enforcement Discretion**

*"Can the User Independent Review the Basis?" asks whether the function is intended for the purpose of enabling the user to independently review the basis for the recommendations so that it is not the intent that user relies primarily on any such recommendation (part of criterion (4)).

**"Enforcement Discretion" indicates that, at this time and based on our current understanding of the risks of these devices, FDA does not intend to enforce compliance with applicable device requirements.

Risk-based Policy for CDS using IMDRF Framework
Intended User is Health Care Professional

FDA

IMDRF Risk Categorization	Can the User Independently Review the Basis?*	Intended User is HCP FDA Regulation
Inform x Critical	No	Oversight Focus
	Yes	Not a Device
Inform x Serious	No	Oversight Focus
	Yes	Not a Device
Inform x Non-Serious	No	Enforcement Discretion**
	Yes	Not a Device

EXAMPLE

OVERSIGHT FOCUS: Machine learning algorithm, for which the logic and inputs are not explained, that identifies hospitalized, type 1 diabetic patients at increased risk of postoperative cardiovascular events.

NOT A DEVICE: If the HCP could evaluate the basis for the software's recommendations, because the logic and data inputs for the machine learning algorithm and criteria for risk of cardiovascular events were explained and available to the HCP, then this software would be considered Non-Device CDS

*"Can the User Independent Review the Basis?" asks whether the function is intended for the purpose of enabling the user to independently review the basis for the recommendations so that it is not the intent that user relies primarily on any such recommendation (part of criterion (4)).

**"Enforcement Discretion" indicates that, at this time and based on our current understanding of the risks of these devices, FDA does not intend to enforce compliance with applicable device requirements.

Risk-based Policy for CDS using IMDRF Framework
Intended User is Patient/ Caregiver

FDA

IMDRF Risk Categorization	Can the User Independently Review the Basis?*	Intended User is Patient / Caregiver FDA Regulation
Inform **x** **Critical**	No	Oversight Focus
	Yes	Oversight Focus
Inform **x** **Serious**	No	Oversight Focus
	Yes	Oversight Focus
Inform **x** **Non-Serious**	No	Oversight Focus
	Yes	Enforcement Discretion**

EXAMPLE

OVERSIGHT FOCUS:
Software intended for patients that provides a questionnaire to assess a patient's level of stress and anxiety (prior to any diagnosis of general anxiety disorder) and recommends treatment options based on the output of the assessment.

ENFORCEMENT DISCRETION:
If the patient could understand the software's recommendation, for example, if the software provided the basis of the recommendation that is understandable to the patient of how the questionnaire assesses stress and anxiety, and how the recommendation is based on peer-reviewed publications and/or clinical practice guidelines and the patient's answers, then this software would be under enforcement discretion.

*"Can the User Independent Review the Basis?" asks whether the function is intended for the purpose of enabling the user to independently review the basis for the recommendations so that it is not the intent that user relies primarily on any such recommendation (part of criterion (4)).

**"Enforcement Discretion" indicates that, at this time and based on our current understanding of the risks of these devices, FDA does not intend to enforce compliance with applicable device requirements.

Alarms and Alerts Examples

OVERSIGHT FOCUS

- Software intended to **generate an alarm or an alert to notify a caregiver of a life-threatening condition, such as stroke, and the caregiver relies primarily on this alarm or alert to make a treatment decision**.
  - **Device function**, because it is intended to analyze a medical signal and to aid in treatment
  - This example is of an alarm or an alert that a caregiver relies on to make a treatment decision **remains the focus of FDA's regulatory oversight**, because it is high risk.

ENFORCEMENT DISCRETION

- Software intended to analyze or **interpret laboratory test or other device data and results to flag patient results based on specific clinical parameters** (e.g., out of range test results where the reference ranges are predetermined by the lab) provided that the analysis performed by the software is not intended for immediate clinical action and does not represent a unique interpretation function but rather **summarizes standard interpretation of individual variables that healthcare practitioners could do themselves**.
  - **Device function**, because it is intended to analyze a medical signal.
  - **FDA does not currently intend to enforce compliance with the applicable device requirements** of the FD&C Act **for this flag/notification** software function, because it is low risk – if not a unique interpretation function and not intended for immediate clinical action.

Resources

Documents discussed in this webinar:

- [Clinical Decision Support Software: Draft Guidance for Industry and Food and Drug Administration Staff](#)
- [International Medical Device Regulators Forum: "Software as a Medical Device: Possible Framework for Risk Categorization and Corresponding Considerations](#)

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Stakeholder Feedback Requested

FDA

- Please submit comments and suggestions regarding this draft guidance by December 26, 2019.

- Submit electronic comments to www.regulations.gov. Identify all comments with the docket number FDA-2017-D-6569.
  - If unable to submit comments online, please mail written comments to Dockets Management, Food and Drug Administration, 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852.

Although you can comment on any guidance at any time (see 21 CFR 10.115(g)(5)), in order to ensure that the FDA considers your comment on a draft guidance before it begins work on the final version of the guidance, submit comments on the draft guidance before the closure date.

Questions?

For Digital Health questions: digitalhealth@fda.hhs.gov

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http://www.fda.gov/training/cdrhlearn
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