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Utilizing Real-World Data for Sports Data Collection with CDISC Standards

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Meet the Speaker

Hyun-Moon, Kim

Title: PD(R&D Program Director)

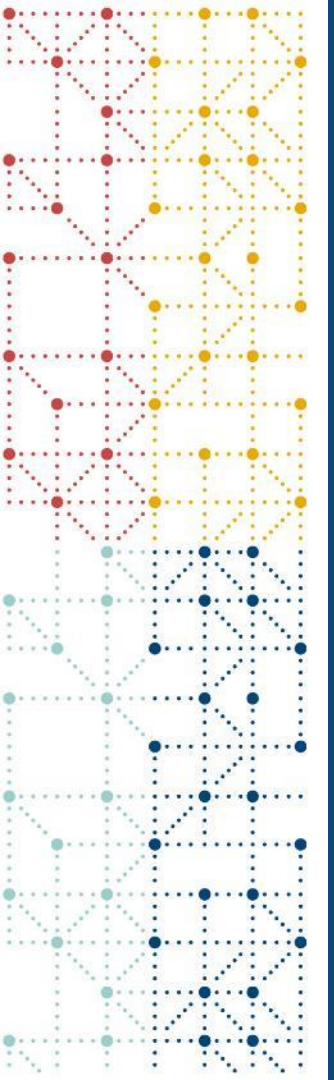
Organization: MCST-KOCCA

Kim Hyun-moon is the R&D program director of the Ministry of Culture, Sports and Tourism. In particular, he is in charge of sports technology and is also in charge of planning medical technologies related to digital therapeutics in connection with content.

As a culture technology PD, he is planning and working on various projects related to the intelligence and precision of sports R&D based on data. In addition, the digitization of sports mileage is being promoted through the analysis of exercise amount and exercise effectiveness based on standard data such as CDISC and Meta Data..

Agenda

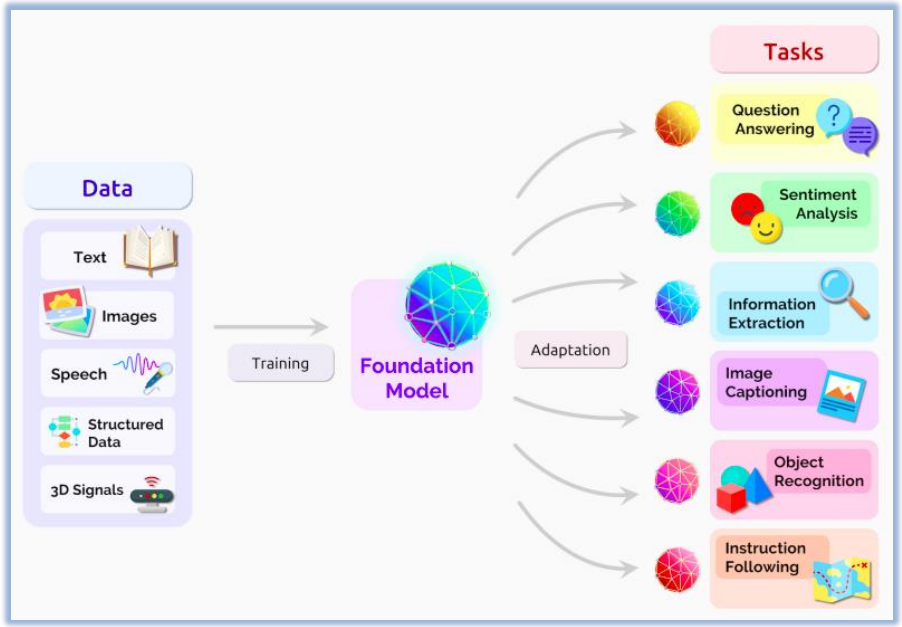
1. LM(Language Model) Background
2. CDISC & Sports big data Strategy of the MCST for Promoting Sports health care & data industry



LM(Language Model) Background

LLM(Large Language Model)

Foundation Model (ex; ChatGPT)-based generation service AI



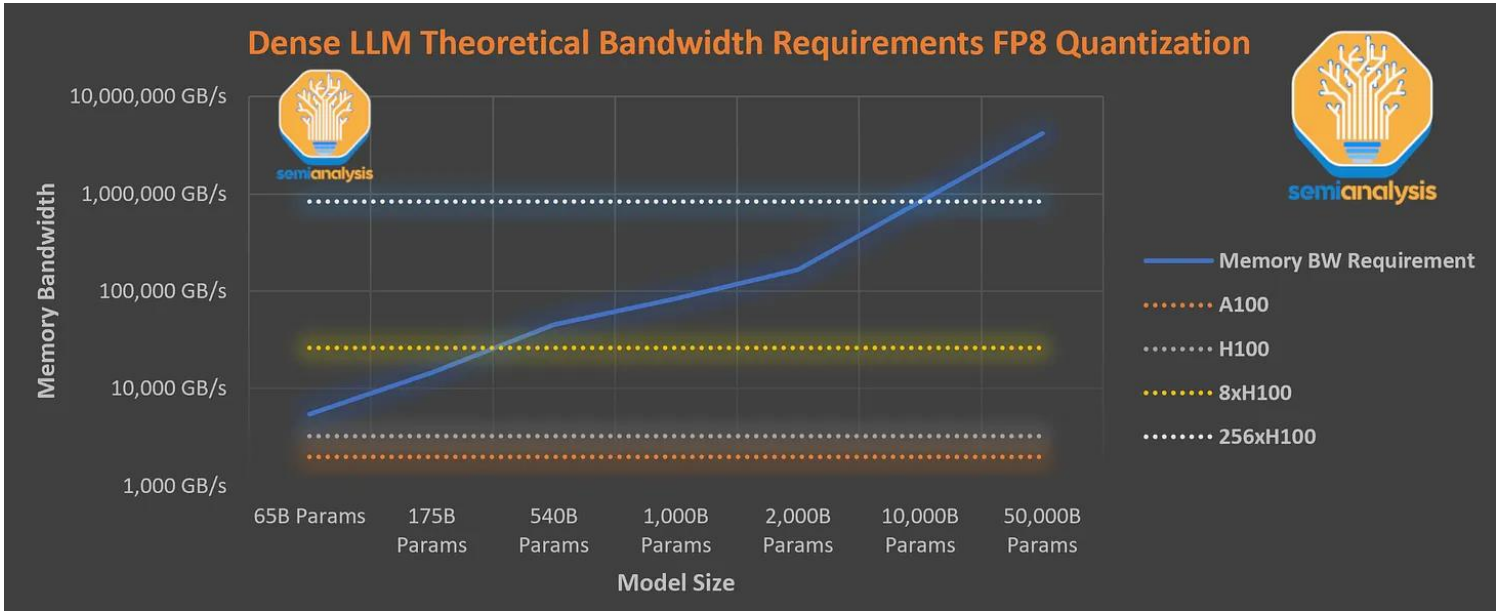
Generative AI Wave

- How to use AI in the industry
- For field-specific purpose data
- Efficiency and individual data-driven learning

LLM(Large Language Model)

Why ChatGPT rely on the Mixture of Experts architecture

→ frontier models require trillions of parameters and require GPUs for inference



LM(Language Model)

Specialized Generative AI

Horizontal AI

- Accounting — Hypatos
- Customer service — haptik
- Marketing — Jasper
- Sales development — regie.ai
- Sales — salesforce Sales GPT

Vertical AI

- Entertainment localization — deepdub.ai
- Entertainment VFX — Vanity AI
- Healthcare — Hippocratic AI (Do No Harm)
- Pharma — Insilico Medicine

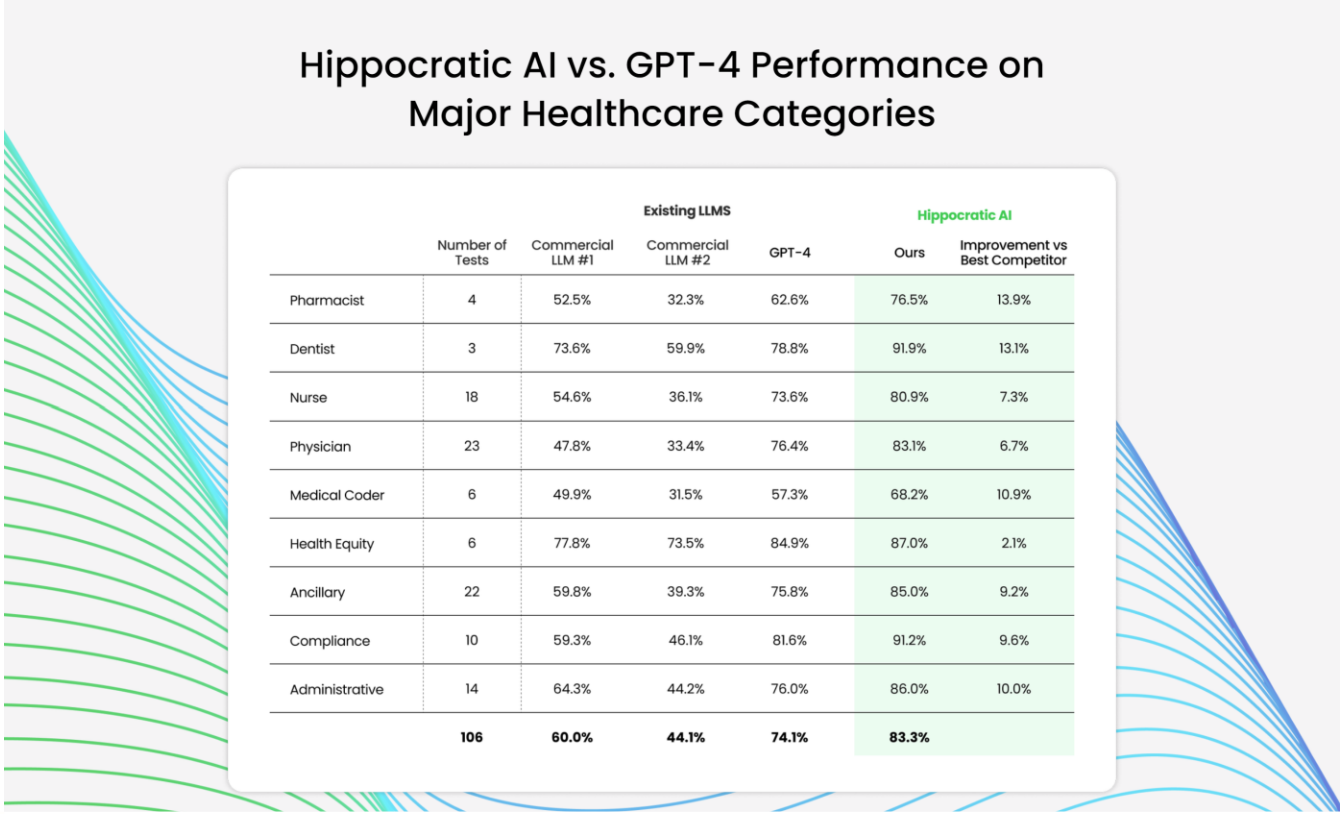
Common AI

- Automation & integration — workato
- Enterprise search — sinequa

Notes: Inclusion criteria: Public claim to have added generative AI features in this specific domain.
Not comprehensive.

AIMultiple

VFLM(Vertical Function Language Model)



Hippocratic AI vs. GPT-4 Performance on Major Healthcare Categories

		Existing LLMS			Hippocratic AI	
	Number of Tests	Commercial LLM #1	Commercial LLM #2	GPT-4	Ours	Improvement vs Best Competitor
Pharmacist	4	52.5%	32.3%	62.6%	76.5%	13.9%
Dentist	3	73.6%	59.9%	78.8%	91.9%	13.1%
Nurse	18	54.6%	36.1%	73.6%	80.9%	7.3%
Physician	23	47.8%	33.4%	76.4%	83.1%	6.7%
Medical Coder	6	49.9%	31.5%	57.3%	68.2%	10.9%
Health Equity	6	77.8%	73.5%	84.9%	87.0%	2.1%
Ancillary	22	59.8%	39.3%	75.8%	85.0%	9.2%
Compliance	10	59.3%	46.1%	81.6%	91.2%	9.6%
Administrative	14	64.3%	44.2%	76.0%	86.0%	10.0%
	106	**60.0%**	**44.1%**	**74.1%**	**83.3%**	

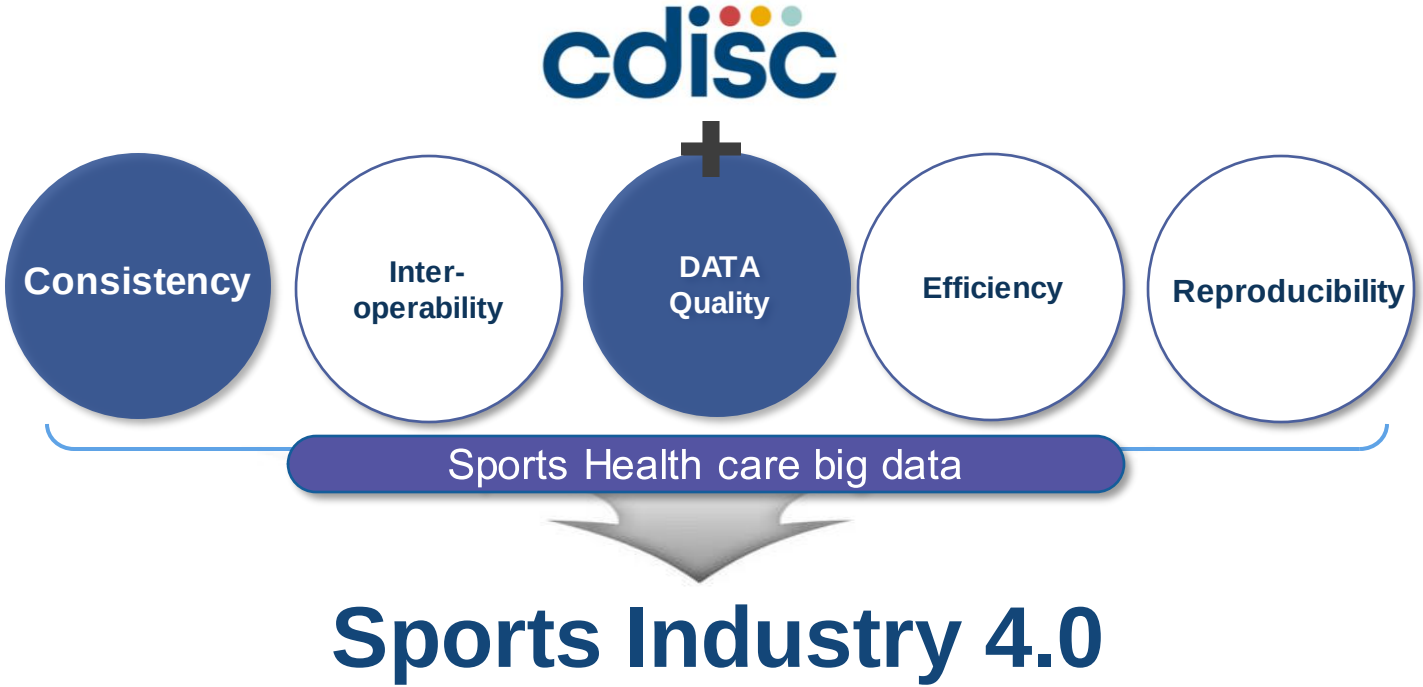
Yes!! VFLM(Vertical Function Language Model)
No!!! LLM(Large Language Model)

VFLM, not LLM, for explainable AI services
Standard Data model is the foundation of the VFLM AI service

- **Consistency**: Standards ensure that the data used to train the model is consistent. This is crucial because inconsistent data can lead to a model that performs poorly or is biased.
- **Interoperability**: Standards allow different datasets to be combined and used together. This is particularly important for large language models, which often require vast amounts of data from various sources.
- **Quality**: Standards help maintain the quality of the data. High-quality data is essential for training a model that is accurate and reliable.
- **Efficiency**: Standards can make the process of collecting and preparing data more efficient. This can save time and resources, which is especially important when dealing with large amounts of data.
- **Reproducibility**: Standards make it easier for others to reproduce the results of the model. This is important for verifying the model's performance and for further research and development.

Sports big data for sports industry 4.0

CDISC standards are needed to build sports health big data and LLM



CDISC & Sports big data Strategy: Promoting Sports health care industry

Sports health care

Sports Health Care, associated with sports medicine, is a field that focuses on maintaining and improving health through sports and physical activity.

- **Prevention and Treatment of Injuries**: Sports Health Care professionals work to prevent and treat sports-related injuries. This includes assessment, diagnosis, treatment planning and implementation, surgery, and post-operative care.
- **Physical Fitness**: Sports medicine deals with physical fitness and the treatment and prevention of injuries related to sports and exercise. It's a distinct field of health care that emerged in the late 20th century.
- **Health Promotion**: The World Health Organization (WHO) has a Sport for Health Programme that promotes participation in sports and works with the sports community to advance health for all. The program aims to raise awareness and stimulate sports environments to promote health and well-being.
- **Physical Activity**: Regular physical activity helps prevent and treat noncommunicable diseases (NCDs) such as heart disease, stroke, diabetes, and breast and colon cancer. It also helps prevent hypertension, overweight, obesity, and can improve mental health, quality of life, and well-being.

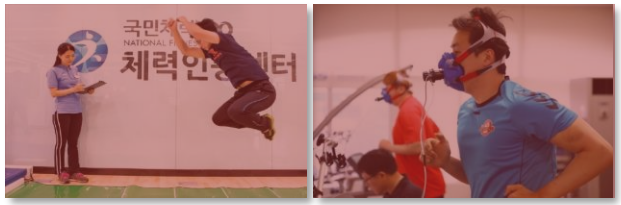
Sports health care & data resources

Sports data is being collected through major institutions..

analog collection → uselsess data

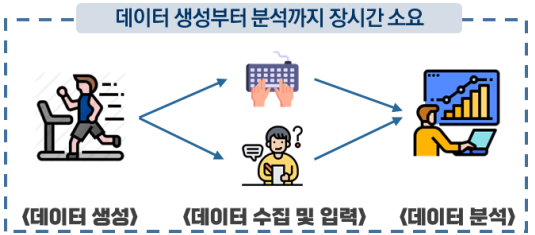
collecting and building a physical fitness DB for athletes and the public

수집 대상	수집 데이터	수집 방식	진 단
산 업	✓기초 정보 (기업현황, 경기 정보 등)	리서치 조사	✓단순 통계 데이터
국 민	✓기초체력 정보	수기 수집	✓데이터 수집 취약 ✓디지털화수준 매우 낮음
엘 리 트 (+ 지역 체육인)	✓전문체력 정보 (경기력 관련)	아날로그 (수기 방식)	✓데이터 기술 외산 의존 ↑ ✓데이터 활용방안 제한적



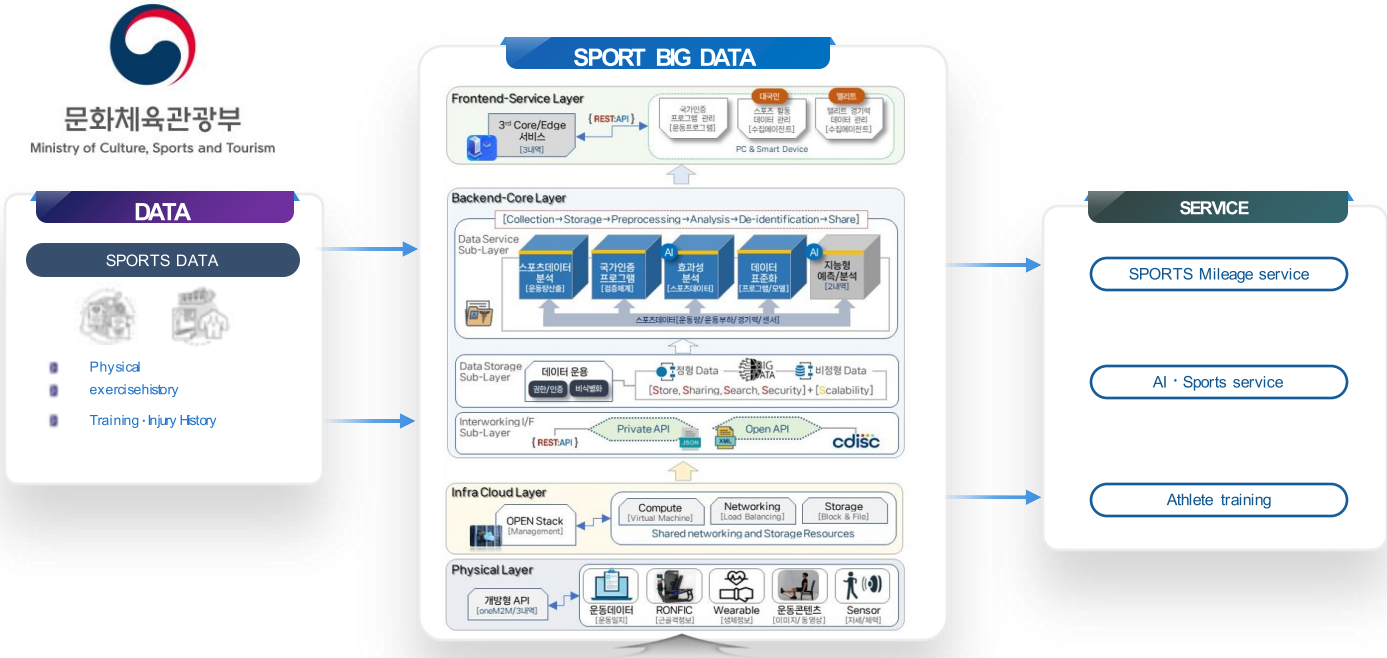
Low level of digitization, Closed data

- Collect data by handwriting



- Low data usage

Sports big data concept



data standardization

evaluation, testing, assembly, and use of the equipments, facilities, and protective gears utilized in sports and recreational activities.

Sports big data concept

Main objective

Sports data ecosystem for industy

01

sports big data Platform

Promotion of sports activities

02

Sports standard

DATA Infra for fostering Elite Athletes

03

Elite sports standard & framework for Fostering Elite Athletes

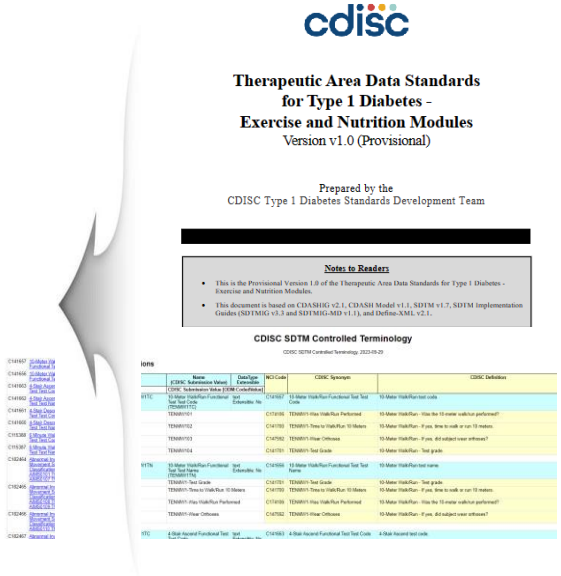
세부 과제

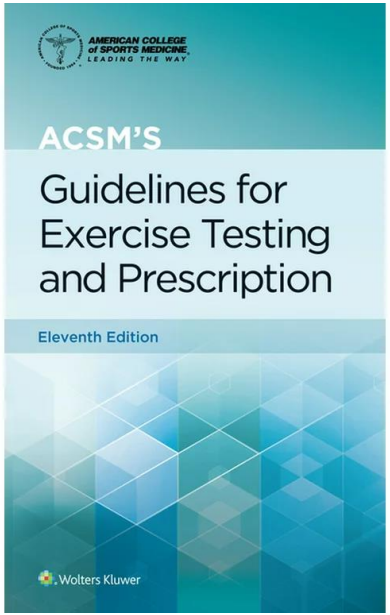
sports open big data technology	SPORTS data collection technology	Elite sports data collection& analysis
AI analysis	Korean exercise intensitymodel, national certification exercise program	framework for Elite sports

Sports data standard concept

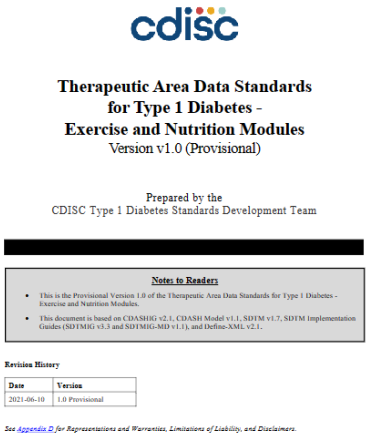
SPORTS BIG DATA

data standardization





CDISC Exercise module



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Therapeutic Area Data Standards for Type 1 Diabetes - Exercise and Nutrition Modules
Version v1.0 (Provisional)

Prepared by the
CDISC Type 1 Diabetes Standards Development Team

Notes to Readers

- This is the Provisional Version 1.0 of the Therapeutic Area Data Standards for Type 1 Diabetes - Exercise and Nutrition Modules.
- This document is based on CDASHIG v2.1, CDASH Model v1.1, SDTM v1.7, SDTM Implementation Guides (SDTMIG v3.3 and SDTMIG-MD v1.1), and Define-XML v2.1.

Revision History

Date	Version
2021-06-10	1.0 Provisional

See Appendix D for Representations and Warranties, Limitations of Liability, and Disclaimers.

- CDISC Therapeutic Area Data Standards for Type 1 Diabetes - Exercise and Nutrition Modules include information on the level of exercise performed by the subject, such as the type of exercise (e.g., cardio, interval, strength), frequency of exercise, and duration of a single exercise session

- In addition, the guide provides information on how to represent data obtained from wearable devices measuring exercise parameters. This may include data on the intensity of exercise, which can be expressed in absolute or relative terms

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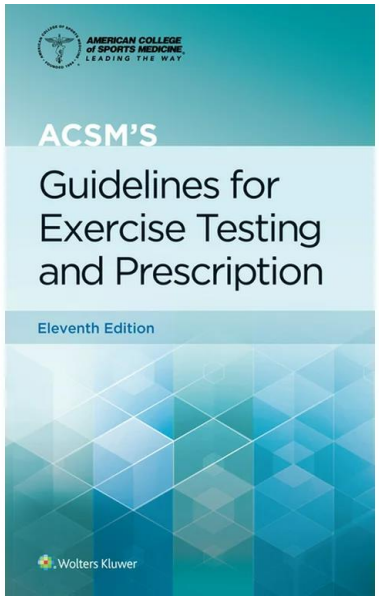
ACSM Guidline



- The American College of Sports Medicine (ACSM) is a professional organization that promotes and integrates scientific research, education, and practical applications of sports medicine and exercise science to maintain and enhance physical performance, fitness, health, and quality of life.

- ACSM's Guidelines for Exercise Testing and Prescription delivers scientifically based standards on exercise testing and prescription to the certification candidate, the professional, and the student. This manual gives succinct summaries of recommended procedures for exercise testing and exercise prescription in healthy and diseased patient

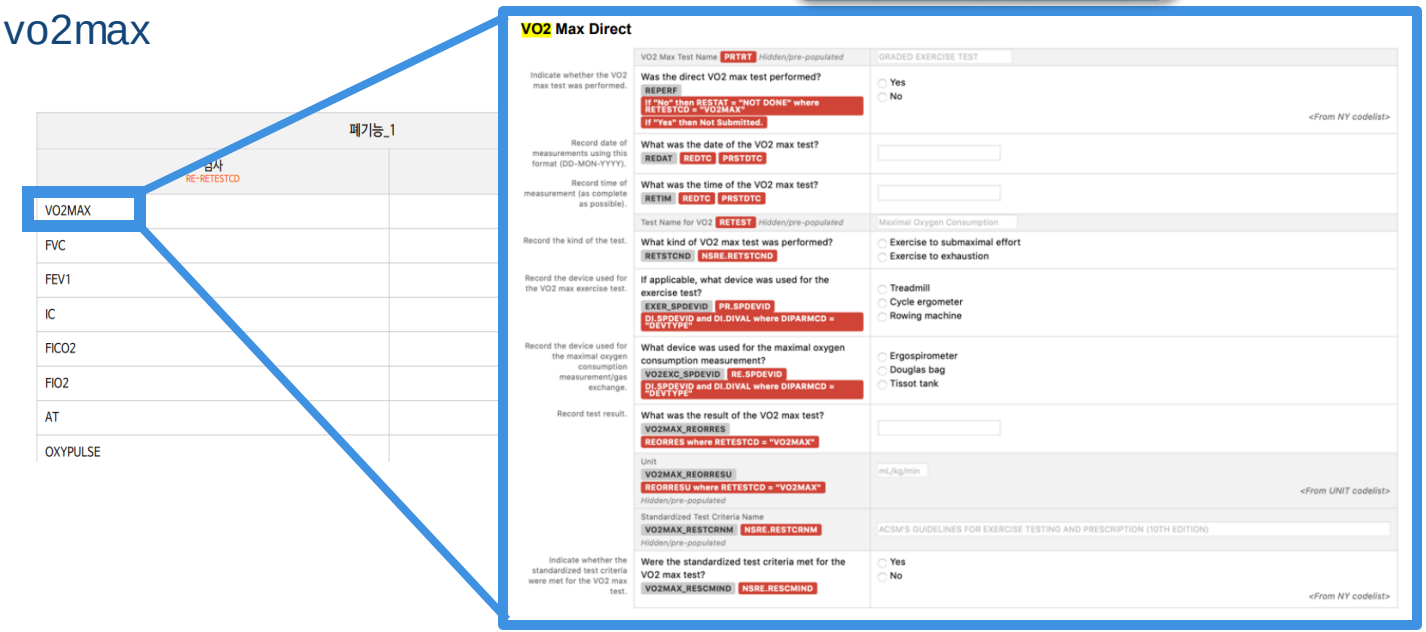
CDISC & ACSM for sports data standard

- ACSM provides guidelines for exercise prescription and testing, CDISC provides a standardized framework for collecting and managing data related to exercise and nutrition in clinical trials.
- ACSM & CDISC help to improve the efficiency and accuracy of Sports data collection & tabulation.
- ACSM & CDISC is important roles in promoting and advancing the **field of sports medicine and exercise data science.**

- We ensure accurate and reliable sports data collection in National R&D Programs: Community-Based Rehabilitation

ex) vo2max

ACSM & CDISC



Strategies of Sports big data & standard R&D

Pre R&D
Cross-team Collaboration & planning

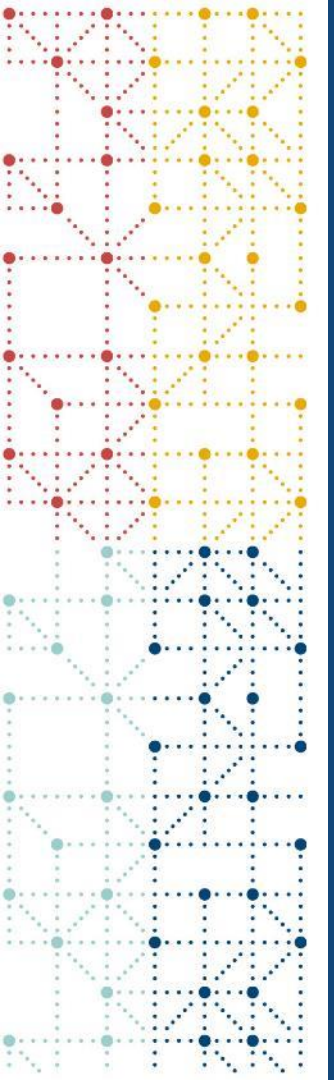
- Create data standards requires collaboration across different teams (sports, medical & data science)
- define the fields to collect, their relationships, data types, validation rules, and how these map to other system

R&D
Documentation Development & Implementation

- create technical documents such as schemas, specifications, models, and vocabularies
- implemented, ensuring data integrity and interoperability
- consider the standards of the systems and tech you integrate with1

SERVICE R&D
Review & service test

- review and update to ensure they remain relevant and effective
- Service on test bed (such as AI, data API service)



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Clear data. Clear impact.

Thank you!