

Navigating Future Practice: Technology

Registered dietitian nutritionists (RDNs) and nutrition and dietetic technicians, registered (NDTRs) can use technology to lead in a more connected future, both locally and globally. This brief describes technological developments and trends that may impact current and future nutrition and dietetics practice, as well as implications for how credentialed nutrition and dietetics practitioners will thrive in a new technological landscape.

In this brief, technology is defined broadly to include both hardware and software, the systems that connect them, the data sets that populate them, and the ways people develop and apply these tools to meet the needs of end-users. Across the profession, all practitioners are affected by technological advancements that are changing the very nature of food systems, the ways people live and work, and the ways people provide and access food, nutrition information, and healthcare. In addition to leveraging and helping clients navigate new technologies, RDNs and NDTRs can bring nutrition expertise to the development of new tools, support data integrity, and ensure that technologies enhance rather than detract from human nutrition and health equity.

Forecasts & Trends

What are examples of ways technology can be used in nutrition practice, now and in the future?



Real-time sharing of visual and other types of data collected through hardware (such as drones or sensors) to communicate information about crop growth or food temperature, ripeness, or safety.



Mechanical and digital automation (e.g., robots using machine learning algorithms) to harvest, sort, process, or package foods in ways that minimize waste and maximize nutrient value.



Embracing new forms of communication and providing virtual patient care (e.g., telenutrition) to enable more flexibility for both patients and providers, including in resource-constrained settings in the United States and globally.



Facilitating dynamic integration of the latest standards, protocols, and quality assurance tools for communicating diet orders between clinical providers (including RDNs and NDTRs) and foodservice staff.



Using connected devices to generate, share, and analyze large volumes of data for real-time forecasting and prediction.



Making nutrition recommendations relevant to both individual and population health by using a variety of data sources including those related to genetics, dietary patterns, health status, food environments, and the microbiome.



Evaluating and choosing apps and devices (including wearables) and interpreting user-generated data related to dietary intake, biomarkers, behaviors, or health outcomes.



Developing tools (including apps) that facilitate food choice, access to nutrition information, an improved shopping or food preparation experience.



Using QR codes to provide information about product origins, food safety data, or nutrient composition.

Key Terms

The examples provided in the **Forecasts & Trends** above are powered by technologies that enable connectivity, pattern identification, and prediction. Key terms related to these concepts are described below. To learn more, view the Academy's [resources on technology](#), including the Nutrition Informatics DPG.

Connectivity

- The **Internet of Things** refers to the connectivity between the multitude of internet-connected devices.
- Related to this, **cloud computing** allows servers, storage, and software to be hosted on the internet ("the cloud"), rather than needing to be physically connected via hardware.
- **Ubiquitous computing (or ambient computing)** refers to the idea that a multitude of connected devices can enable our surroundings to sense and respond to human presence and needs.
- Together, these developments enable real-time generation of and access to more information from more places.

Artificial Intelligence and Machine Learning

- Mathematical equations have long been used to identify patterns in data. What is more recent is the widespread availability of processing power to quickly identify patterns in increasingly large volumes of visual, textual, auditory, or other forms of data (referred to as **big data**).
- **Artificial intelligence (AI)** refers to the way machines can demonstrate intelligence; for example, using algorithms to understand human speech.
- **Machine learning (ML)** refers to the way algorithms can improve with experience; for example, models can use example data that have been labeled by humans ("training data") and then learn from these data to make additional classifications on their own ("test data").

Implications for Practice

How will RDNs and NDTRs thrive in a changing technological landscape?

RDNs and NDTRs of the future will:

Learn and continually update knowledge and skills related to technology.

- **Maintain awareness** of new tools available to patients, providers, and businesses.
- **Evaluate** which new technologies reflect the best available evidence or generate meaningful data, how they might change the care plan, and potential benefits and risks related to health, equity, privacy, and other considerations.
- **Define technological needs** and bringing nutrition and dietetics expertise to the development of new technologies.

Promote digital fluency: learn the language of technology and share it with others.

- **Provide students and dietetic interns** with the foundational knowledge and applied skills to use new tools.
- **Help clients**—including individuals, institutions, and populations—choose and use new technologies in ways that reflect the best evidence available.

Lead the development of new technologies.

- **Bring nutrition expertise** and knowledge of the social, behavioral, and economic realities of end-users to the development of tools that promote nutritional status, population health, or sustainable food systems.

Generate, manage, and interpret an evolving data-driven evidence base.

- **Generate data** and ensure that data are organized, valid, useful, transparent, accessible, and usable.
- **Analyze data** and tap into a diverse array of analytical insights that complement each other. Traditional methods (such as experimental studies) and newer analytic methods (such as complex machine learning algorithms made possible by the advancement of computational power) both have unique strengths, important limitations, and can reveal novel insights.
- **Visualize data** by leveraging new tools to tell the story of data in a compelling way for different audiences.

Advocate for equitable access to and impacts of technology.

- **Advocating for better access** to infrastructure (e.g., broadband internet) and tools (e.g., internet-connected devices), especially in low resource settings both nationally and globally, so that people can equitably access information and services.
- **Ensuring diverse representation** of people (e.g., in development teams and user communities) and data (e.g., in machine learning training data). Mechanical and digital automation rely on algorithms, and these algorithms are subject to the same biases—known as algorithmic biases—present in the humans who code them.

Opportunities and Risks

What future *opportunities* open up if RDNs and NDTRs embrace or lead new technologies?

- Maintaining relevance with clients and allied professionals who continue to use technology in new ways.
- Embracing tools that can decrease human error and increase patient safety, guide data-driven decisions for organizations or public policy, enable greater preparedness and emergency response, and make nutrition services more accessible to more people (e.g., digital access to federal nutrition programs).
- Advocating for interoperability standards to ensure new technological developments support the specific needs of nutrition practice in a variety of settings.
- Emphasizing the value of human qualities: The automation of lower-order tasks increases the relative value of creativity, collaboration, critical thinking, and systems thinking.

What are the *risks* of not keeping up with or shaping new technologies?

- Nutrition and dietetics practitioners may miss opportunities for efficiency in their practice, research, education, and policy work.
- Platforms that communicate nutrition information to the public—including new tools, apps, or social media content—may not reflect evidence-based messaging.
- Tools that impact nutrition may be developed by other professions that have technological but not nutrition expertise.
- Tools for clinical settings may not be tailored to the needs of RDNs and NDTRs, or may be incompatible with systems commonly used in nutrition practice.
- Technology may not be incorporated into practice in ways that consider health equity by taking into account the social determinants of health; cultural relevance; ethics; privacy, security, and legal issues; and the diverse needs of end-users.



This is the second in a series of briefs from the **Academy of Nutrition and Dietetics Council on Future Practice** describing change drivers that will affect the future of the profession. This brief is intended to familiarize readers with technology and its implications, so that readers can share this knowledge with their organizations. Learn more about environmental scanning for change drivers and trends [here](#).