## AI definitions

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<th>Term</th>
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<tr>
<td>Artificial intelligence (AI)</td>
<td>Technology that mimics human thought processes.</td>
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| Data                                      | Elements such as measures and symbols used to create information. The different forms of data frequently are defined by:  
  • **Volume**: the amount of healthcare data that needs to be stored, managed, processed, and protected  
  • **Velocity**: the speed at which new data are generated  
  • **Variety**: the different forms of health data collected and used  
  • **Veracity**: the level of certainty or trustworthiness of the data due to inconsistency and incompleteness.  
  “Big data” encompasses data that exceed human comprehension, exist at a **volume** unmanageable by standard computer systems, and arrive at a **velocity** not under the investigator’s control. Big data often include a **variety** of types whose **veracity** is hard to determine. | • Unit-level reports for nurse managers  
• Month-by-month comparisons of outcomes or finances  
• Interactive risk charts  
• Disease (e.g., diabetes, heart disease) prediction  
• Early sepsis detection  
• Automated diagnosis from medical images (e.g., tumor recognition and staging)  
• Drug discovery  
• Disease outbreak detection  
• Personalized healthcare through genomics (e.g., drug therapy)  
• Diagnosis confirmation  
• Clinical ontology/terminology development  
• Automated content/qualitative analysis  
• Use of Twitter data to detect flu outbreaks  
• Food tray delivery  
• Patient chatbots for triage  
• Sanitation |
| Data science                              | The systematic study of the organization and use of digital data to discover new knowledge, accelerate discovery, and improve decision-making. Health data science is the study of generating data-driven solutions to complex real-world health problems, at the intersection of statistics, computer science, and healthcare. |                                                                                                           |
| Predictive analytics                      | A type of data analysis used in data science to predict an outcome for an individual or a group. Big data provide a rich array of elements and variables to develop more comprehensive and complex predictive models for probability of disease state, health and illness status, and health trajectories. |                                                                                                           |
| Term                                      | Definition                                                                 |                                                                                                           |
| Data visualization                        | An approach to creating knowledge from big data that uses figures, graphs, and other illustrations (e.g., bubble charts, quilt plots). |                                                                                                           |
| Machine learning                          | Machine learning is a type of AI that uses algorithms to analyze raw data and develop computer instructions to achieve objectives such as making predictions, recognizing speeches, translating text, and playing games. | • Disease (e.g., diabetes, heart disease) prediction  
• Early sepsis detection |
| Deep learning                             | Deep learning is a subfield of machine learning. A deep learning model is designed to reach the same conclusions as a traditional machine learning algorithm but does so with much less human input. To achieve this, deep learning applications use a layered structure of model elements called an artificial neural network. | • Automated diagnosis from medical images (e.g., tumor recognition and staging)  
• Drug discovery  
• Disease outbreak detection  
• Personalized healthcare through genomics (e.g., drug therapy)  
• Diagnosis confirmation  
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| Neural networks                           | Neural networks are composed of algorithms modeled after human thought processes. These networks are used to recognize patterns from large amounts of data, whether it’s alphanumeric or images. |                                                                                                           |
| Natural language processing               | This machine learning field focuses on developing computer algorithms that process and analyze unstructured text or speech data. |                                                                                                           |
| Robots, robotics, and robotic process automation | Robots are programmed, in their most simple design, to perform elementary tasks by following step-by-step instructions in assembly lines and manufacturing factories. More advanced robotics can be shaped in the form of unmanned autonomous vehicles, drones, chatbots, smart assistants, or social robots. Robotics combine hardware with intelligent software powered by data to perform a task that requires a certain level of intelligence. Such tasks include orientation, motion, interaction with other robots (machine-to-machine interaction), interaction with humans (e.g., social robots and smart assistants). | • Diagnosis confirmation  
• Clinical ontology/terminology development  
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