



HIMSS TIGER Interprofessional Community

Global Informatics Definitions

Statement of Purpose

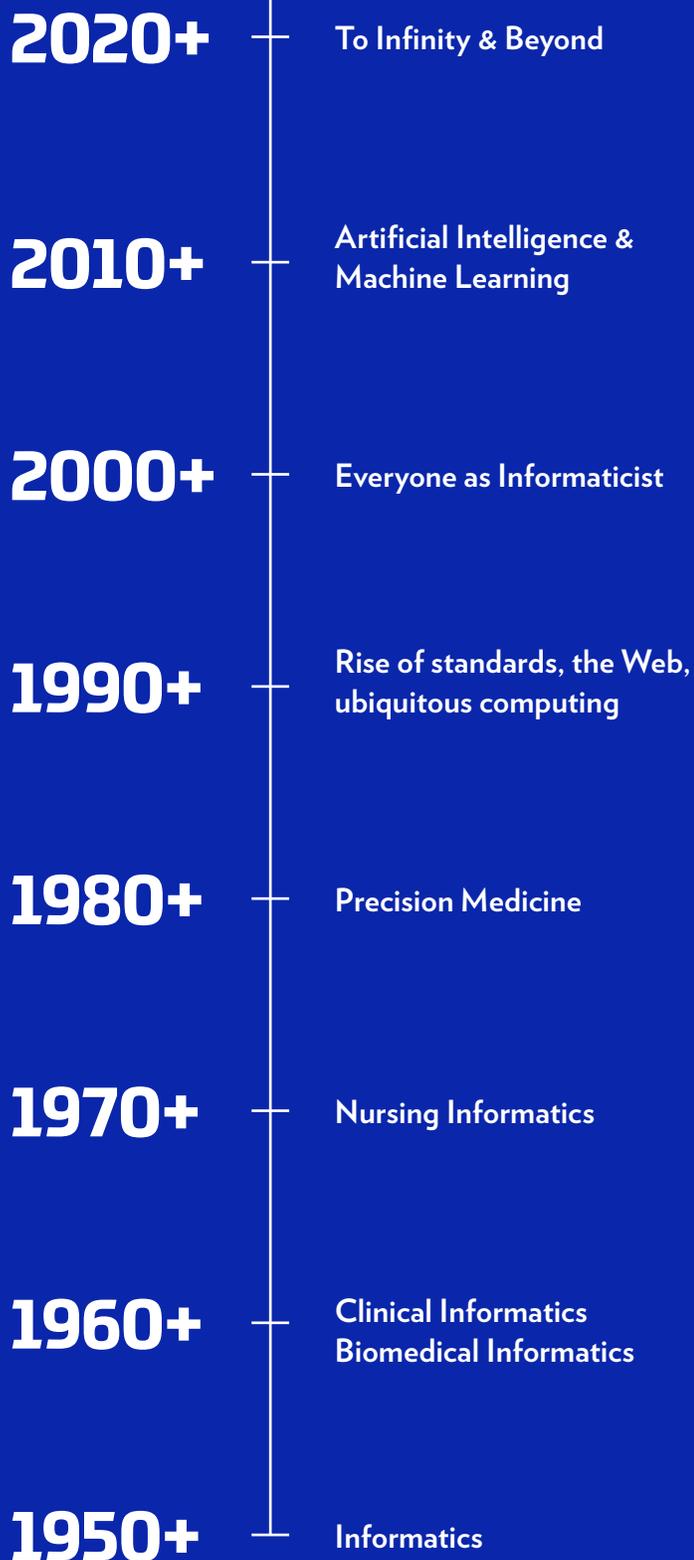
The purpose of this document is to define core global health informatics terminology. The carefully selected definitions and documentation provide context to their use by the global [HIMSS TIGER \(Technology Informatics Guiding Education Reform\) Initiative's Interprofessional Community](#).

This document also seeks to be inclusive of global terminology needs within the Informatics field. As the TIGER community and healthcare workforce continue to grow and expand on a global scale, it is important to include definitions relating to informatics that extend beyond geographic borders and regions. Therefore, it is necessary to include varying terms referenced for similar concepts applied locally, regionally and nationally to maximize the integration of informatics into seamless practice, education, research, and resource development on a global level.

This document was last updated in May 2020 by the TIGER International Task Force who reviewed the previous version, infused new definitions and concepts, re-confirmed sources, and verified the currency of the definitions. We acknowledge that as the field of informatics continues to mature, so will the terms defined within this document. As the field evolves, our intention is to have this resource mirror those changes to serve as a helpful reference tool for those learning about both informatics and informatics competencies. You'll find these terms referenced on landing pages, in official documents, and within the [TIGER Virtual Learning Environment \(VLE\)](#).

*Taken from R. Kurzweil's book, *The Singularity is Near*, singularity is defined as "a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed. Although neither utopian nor dystopian, this epoch will transform the concepts that we rely on to give meaning to our lives, from our business models to the cycle of human life, including death itself."

Informatics Timeline



Justification for Updating Informatics Definition Terms

Written by Hank Fanberg, MBA, FHIMSS, University of New Orleans

Before health informatics there was informatics, the science of information. At its core, informatics is a means to solving problems through the use of computing and information science. In the 1970s, those who used science, engineering and technology in medicine recognized the need to agree on a term for this still emerging discipline. The International Federation for Information Processing's (IFIP) Technical Committee Number 4 took up the challenge. The term they recommended was *informatics*.

This word is relatively new and global in scale. Its earliest appearance is credited to the German computer scientist Karl Steinbuch in the title of a paper published in 1957.ⁱ The word also appears in French, Russian, Spanish and English around the same time. For many of these countries, the word informatics was a synonym for computer science. Informatics is usually used as a compound term (i.e. business informatics, environmental informatics) and extends far beyond healthcare. The first widely used informatics compound term in the English-speaking world was medical informatics.ⁱⁱ

According to Collenⁱⁱⁱ the English term “medical informatics” first appeared in 1974 in the IFIP Medical Informatics Monograph Series, Volume 1, *Education in Informatics of Health Personnel*. It proposed that “medical informatics” be defined as “computer and information science, engineering and technology in all fields of health and medicine, including research, education and practice.”

The Association of American Medical Colleges

(AAMC) stated that “Medical informatics is a developing body of knowledge and a set of techniques concerning the organizational management of information in support of medical research, education, and patient care. Medical informatics combines medical science with several technologies and disciplines in the information and computer sciences and provides methodologies by which these can contribute to better use of the medical knowledge base and ultimately to better medical care.”^{iv}

The field of medical informatics, however, was not static. Within ten years they revisited its definition and scope.

Perhaps this is not all that different from where we find ourselves today. Health care, medicine, computer science and informatics continues to develop and evolve, requiring the thoughtful reflection of if and how the discipline has changed and to evaluate its tools and scope. Fifty years ago, hospitals were not focused on population health nor were they performing community wide health needs assessments. The capabilities of the computer industry were still forthcoming - pervasive networking, powerful and affordable computing and communications along with the portability factor of mobile devices – and the Internet, while technically in existence, was still in nascent form. Today, health care has embraced Artificial Intelligence, Virtual Reality, Augmented Reality, blockchain, clinical decision support, robotics, digital health and more. It is from this vantage point that the definitions of the various health informatics disciplines were reviewed. And will continue to be reviewed as that intersection of science, technology and the healing arts continues to evolve.

ⁱ Widrow, B. et al. Eulogy. IEEE Computational Intelligence Society August 2005 p. 5

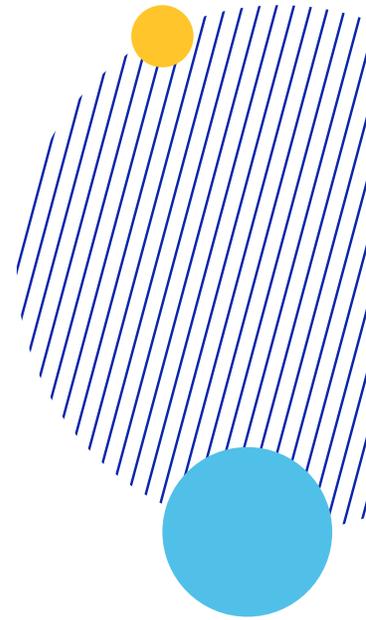
ⁱⁱ Fourman, M. Informatics. July 2002. Division of Informatics, University of Edinburgh. A 2002 literature review for informatics compounds showed medical informatics as the most frequently used term followed in order by health informatics, museum informatics, nursing informatics, geoinformatics, etc.

ⁱⁱⁱ Collen MF: Origins of medical informatics. In Medical informatics [Special Issue]. West J Med 1986 Dec; 145:778-785

^{iv} Medical Education in the Information Age. Proceedings of Symposium on Medical Informatics, March 1985. Washington, DC, Association of American Medical Colleges, 198

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Informatics Definitions

Ambient intelligence is an emerging discipline that brings intelligence to our everyday environments and makes those environments sensitive to us [humans]. Ambient intelligence research builds upon advances in sensors and sensor networks, pervasive computing, and artificial intelligence.

Source: [ScienceDirect](#)

Ambient intelligence represents a new generation of user-centered computing environments and systems. These solutions aim to find new ways to better integrate information technology into everyday life devices and activities.

Source: [Espinilla, M., Villarreal, V., & McChesney, I. \(2019\). Ubiquitous Computing and Ambient Intelligence.](#)

Bioinformatics is a hybrid science that links biological data with techniques for information storage, distribution, and analysis to support multiple areas of scientific research, including biomedicine. As an interdisciplinary field of science, bioinformatics combines biology, computer science, information engineering, mathematics and statistics to analyze and interpret biological data. Bioinformatics is fed by high-throughput data-generating experiments, including genomic sequence determinations and measurements of gene expression patterns.

Source: [Lesk, A. M. \(2013\). Bioinformatics. Encyclopaedia Britannica](#)

Biomedical informatics (BMI) is the branch of health informatics that uses data to help clinicians, researchers and scientists improve human health and provide healthcare. Biomedical informatics is an evolving discipline that has grown along with advances in biomedicine, which applies the principles of the natural sciences, especially

biology and biochemistry, to medicine and healthcare. While not solely tied to computers and information technology, biomedical informatics has become more reliant on software, artificial intelligence and cloud computing with the rise of the biotechnology industry and the widespread digitization of personal health data.

Source: [Biomedical Informatics, SearchHealthIT](#)

Clinical Informatics is the subspecialty of all medical specialties that transforms health care by analyzing, designing, implementing, and evaluating information and communication systems to improve patient care, enhance access to care, advance individual and population health outcomes, and strengthen the clinician-patient relationship.

Source: [Accreditation Council for Graduate Medical Education \(ACGME\)](#)

Clinical Research Informatics is the rapidly evolving sub-discipline within biomedical informatics that focuses on developing new informatics theories, tools, and solutions to accelerate the full transnational continuum: basic research to clinical trials, clinical trials to academic health center practice, diffusion and implementation to community practice, and 'real world' outcomes.

Source: [Clinical research informatics: A conceptual perspective](#)

Clinical Surveillance is a systematic, goal-directed process that trends physiological changes in patients, interprets the clinical implications of those changes, and alerts clinicians for timely interventions.

Source: [Online Journal of Nursing Informatics \(OJNI\)](#)

Consumer health informatics (CHI) is the study of consumer information needs and healthcare technologies, as well as the implementation of methods of making information accessible to consumers.

Source: [Consumer Health Informatics: Empowering Healthy-Lifestyle-Seekers Through mHealth.](#)

Dental informatics refers to the application of computer and information science to improve dental practice, research, education, and management.

Source: [The Future of Dental Informatics](#)

Digital health connects and empowers people and populations to manage health and wellness, augmented by accessible and supportive provider teams working within flexible, integrated, interoperable and digitally-enabled care environments that strategically leverage digital tools, technologies and services to transform care delivery.

Source: [HIMSS.org](#)

eHealth (e-health) is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.

Source: [G. Eysenbach, JMIR Publications](#)

Global Health Informatics is a growing multidisciplinary field that combines research methods and applications of technology to improve [global] healthcare systems and outcomes.

Source: [Dr. Yuri Quintana of Harvard University](#)

Health informatics is the interdisciplinary study of the design, development, adoption, and application of information technology (IT) - based innovations in healthcare services delivery, management, and planning.

Source: [U.S. National Library of Medicine](#)

Health informatics is the discipline that researches, formulates, designs, develops, implements, and evaluates information-related concepts, methods, and tools (e.g., information and communication technology (ICT)) to support clinical care, research, health services administration, and education.

Source: [Health Information Exchange as a Profession](#)

Imaging informatics also sometimes referred to as radiology informatics or medical imaging informatics, concerns how medical images are used and exchanged throughout complex healthcare systems. This subspecialty has gained wide acceptance and is often seen as a mission-critical function in healthcare. Virtually every healthcare clinical discipline depends on imaging informatics.

Source: [American Board of Imaging Informatics](#)

Medical informatics is the field that concerns itself with the cognitive, information processing, and communication tasks of medical practice, education, and research, including the information science and the technology to support these tasks.

Source: [Greenes, R. A., & Shortliffe, E. H. \(1990\). Medical informatics: an emerging academic discipline and institutional priority. JAMA, 263\(8\), 1114-1120.](#)

Nursing informatics (NI) is the specialty that integrates nursing science with multiple information management and analytical sciences to identify, define, manage, and communicate data, information, knowledge, and wisdom in nursing practice. NI supports nurses, consumers, patients, the interprofessional healthcare team and other stakeholders in their decision-making in all roles and settings to achieve desired outcomes. This support is accomplished through the use of information structures, information processes and information technology.

Source: [Nursing Informatics: Scope and Standards of Practice, 2nd Edition, ANA 2015](#)

Nursing informatics (NI) focuses on finding ways to improve information management and communications in nursing to improve efficiency, reduce costs and enhance the quality of patient care.

Source: [Nursing Informatics as a Specialization in India: Present and Future](#)

Nutrition informatics is the effective retrieval, organization, storage and optimum use of information, data and knowledge for food and nutrition related problem solving and decision-making. Informatics is supported by the use of information standards, processes and technology.

Source: [Academy of Nutrition and Dietetics](#)

Personal health informatics allows individual patients to comprehend and analyse their own personal health issues; the consequences, risks, benefits, and alternatives to therapy, treatment and management. Information based on these analyses used by patients in an individual manner empowers them to make informed decisions about their own healthcare. Personal health informatics is also a subset of clinical informatics which differs from consumer informatics by focusing on the individual patient, rather than a “consumer”.

Source: [Personal Health Informatics: The Evolving Paradigm of Patient Self Care](#)

Pharmacy informatics has grown to be an integral discipline within the clinical informatics domain, centered on the effective management and delivery of medication related data, information, and knowledge across systems that support the medication-use process.

Source: [American Society of Health-System Pharmacists \(ASHP\)](#)

Population Health Informatics (PHI) addresses the information technology and analytic needs of groups and organizations responsible for the health management of defined populations.

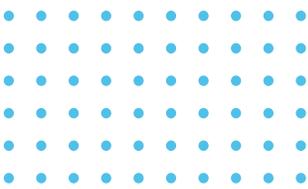
Source: [Public and Population Health Informatics: The Bridging of Big Data to Benefit Communities](#)

Public health informatics (PHI) is the application of informatics in areas of public health, including surveillance, prevention, preparedness, and health promotion. Public health informatics and the related population health informatics, work on information and technology issues from the perspective of groups of individuals. Public health is extremely broad and can even touch on the environment, work and living places and more.

Source: [American Medical Informatics Association \(AMIA\)](#)

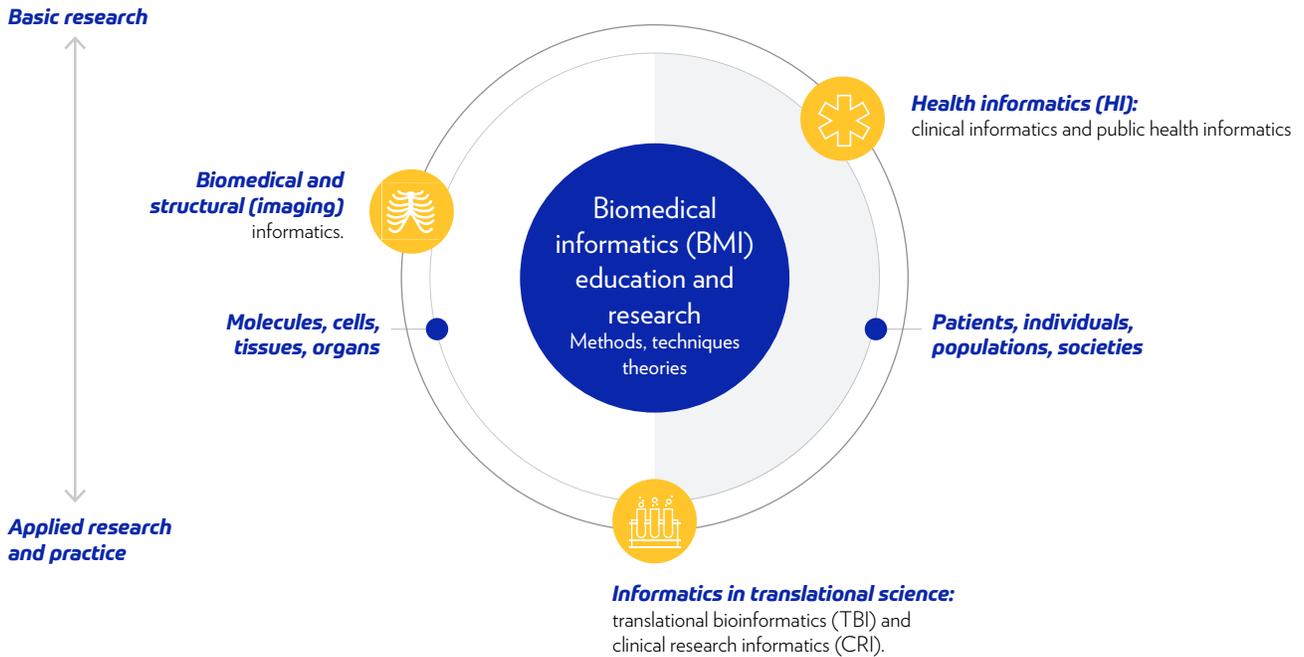
Translational Bioinformatics (TBI) is the development of storage, analytic, and interpretive methods to optimize the transformation of increasingly voluminous biomedical data, and genomic data, into proactive, predictive, preventive, and participatory health.

Source: [AMIA](#)



Infographics

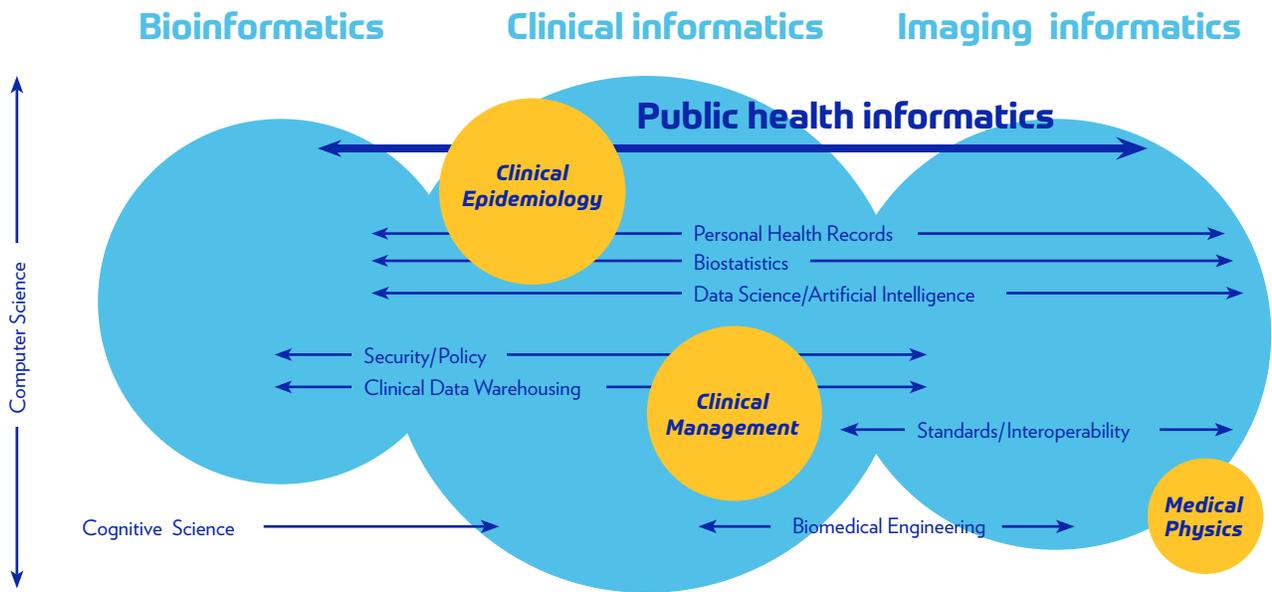
Biomedical Informatics Education and Research:



Biomedical Informatics

Modified from: Kulikowski CA, Shortliffe EH, Currie LM, Elkin PL, Hunter LE, Johnson TR, Kalet IJ, Lenert LA, Musen MA, Ozbolt JG, Smith JW, Tarczy-Hornoch PZ, Williamson JJ. AMIA Board white paper: definition of biomedical informatics and specification of core competencies for graduate education in the discipline. J Am Med Inform Assoc. 2012 Nov-Dec;19(6):931-8. PMID: 22683918.

Medical Informatics:



Biomedical Informatics

Modified from: Herasevich V, Pickering BW, Gajic O, Principles of Medical Informatics and Clinical Informatics In Critical Care // In Kress J, Schmidt G, Hall J. Principles of Critical Care, 4th edition. McGraw-Hill Education / Medical; 2015. ISBN: 978-0071738811

Population Health

Everyone's responsibility

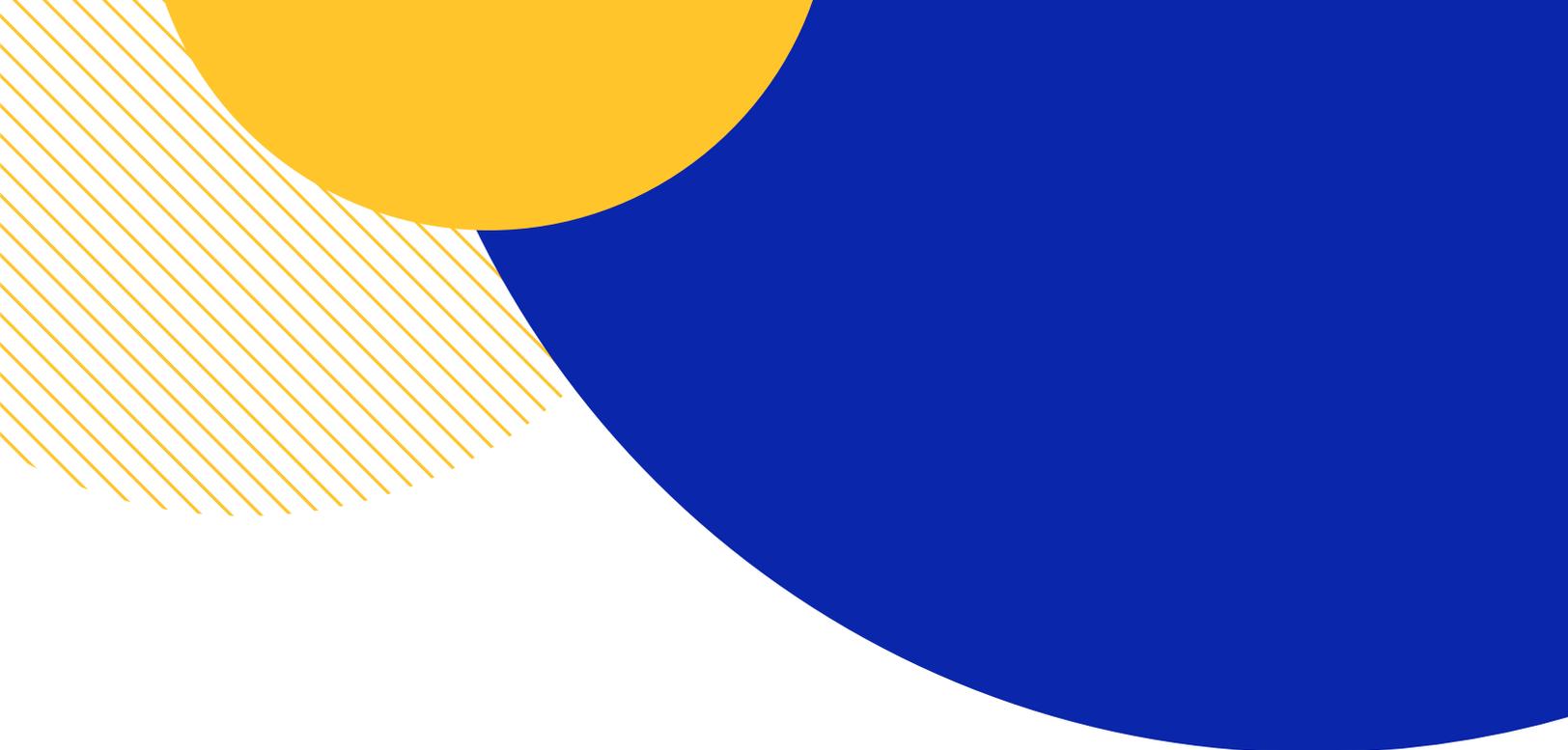
- Measure and improve health of entire population
- Reduce health inequalities among group
- Beyond individual-level focus
- Address a broad range of risk factors – environment, social structure, resource distribution

Public Health

Governmental responsibility

- Concerned with threats to overall health of a community based on population health analysis
- Depends on another entities (e.g., health care delivery system, schools, social services, academia, legislators, regulators, and justice systems)
- Plays a legal regulatory role (e.g., restaurant inspections)

Population Health vs. Public Health Informatics
Resource: Sripriya Rajamani, Minnesota Department of Health



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