

The background features abstract, overlapping geometric shapes in various shades of blue and teal, creating a modern and professional aesthetic. The shapes are primarily triangles and polygons, some with thin white outlines, set against a white background.

Nursing Informatics Research Year in Review

May 19, 2023

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the left and right sides of the frame, creating a modern, layered effect. The central area is a clean, white space where the text is positioned.

Andrew Phillips PhD, RN, FAMIA

Conflict of Interest

Have no real or apparent conflicts of interest to report.

Learning Objectives

- Evaluate themes that impact nursing informatics.
- Identify gaps in nursing informatics research.
- Generate logical next steps in advancing nursing informatics research.

Methods - Scoping Study

Arksey and O'Malley¹

- ▶ Step 1 - Identify the Research Question
- ▶ Step 2 - Identify Relevant Studies
- ▶ Step 3 - Study Selection (Iterative process which can change over time)
- ▶ Step 4 - Charting the Data
- ▶ Step 5 - Collating, summarizing, and reporting the results
- ▶ Step 6 - Consultation - This is you guys

¹Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *5*
International journal of social research methodology, 8(1), 19-32.

Step 1: Research Question

- ▶ What trends and themes emerge from a survey of the published literature in the area of nursing informatics during the past year(s)
- ▶ Make meaning of current and past themes - historical context.

Step 2: Identify Relevant Studies

- ▶ Search Strategy

 - ▶ Databases: PubMed and CINAHL

 - ▶ Search terms

 - ▶ (“nurse” or “nursing”) AND “informatic*”) OR “nursing informatic*”

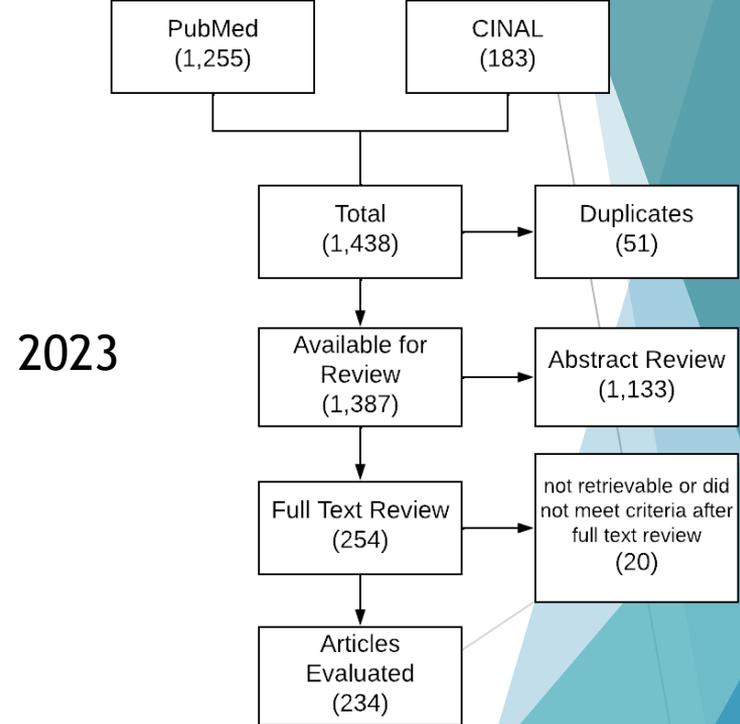
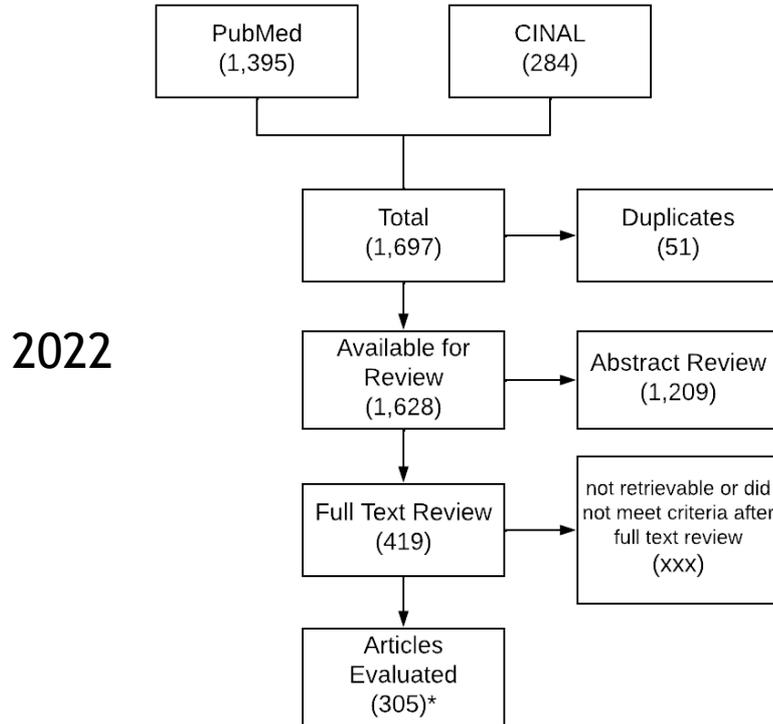
 - ▶ Publication Dates 3/1/2021 - 2/28/2023

Step 3: Study Selection

Inclusion and Exclusion Criteria

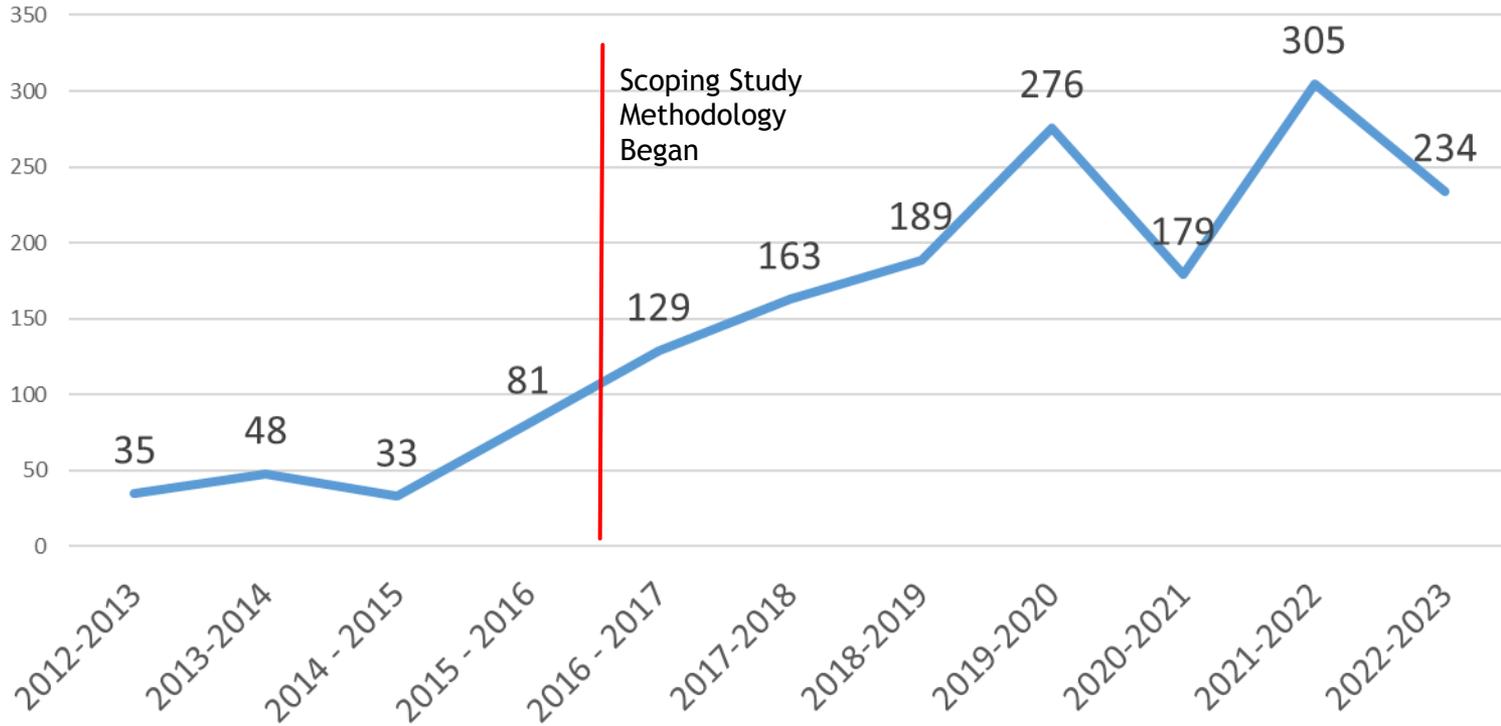
- ▶ Inclusion criteria: Research, contributes to nursing informatics knowledge base, prototype development and testing, clinical care delivery focus; informatics
- ▶ Exclusions: Articles that focused on informatics education programs, nursing education, nursing students

Search Results (2022 and 2023)



*Estimate based on prior years

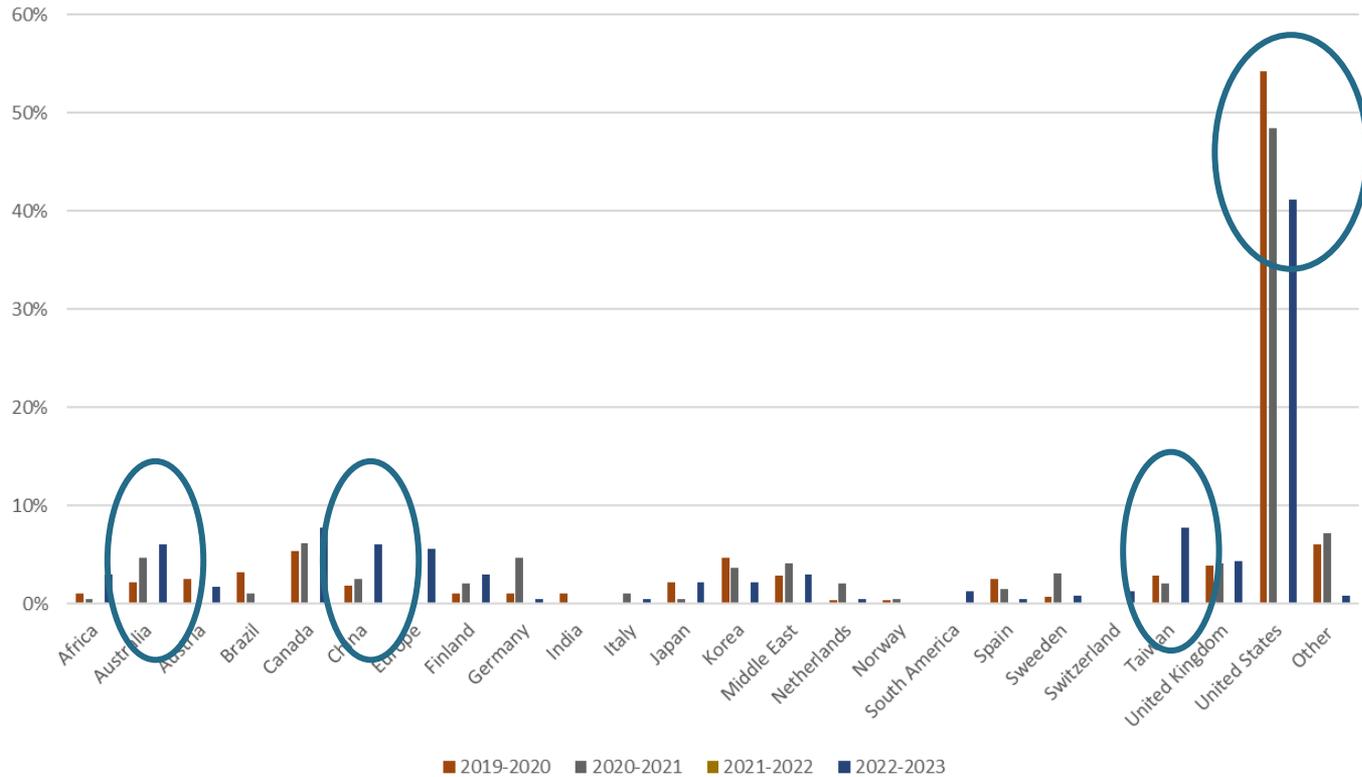
Articles Included in Evaluation



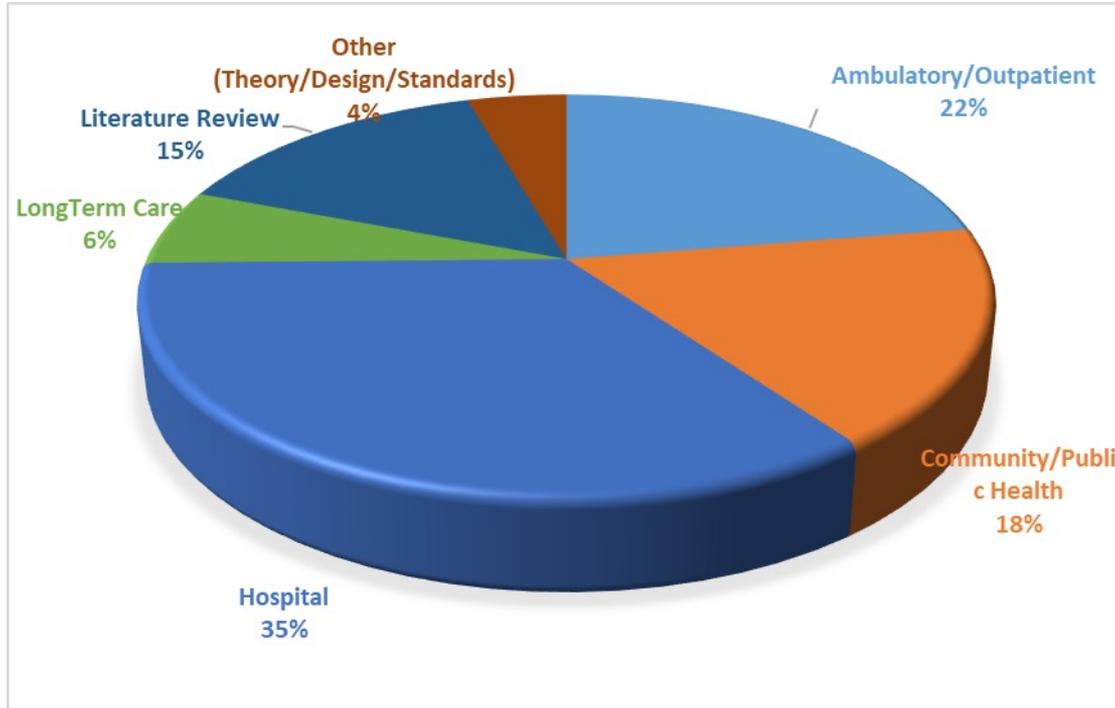


Step 4: Charting the Data

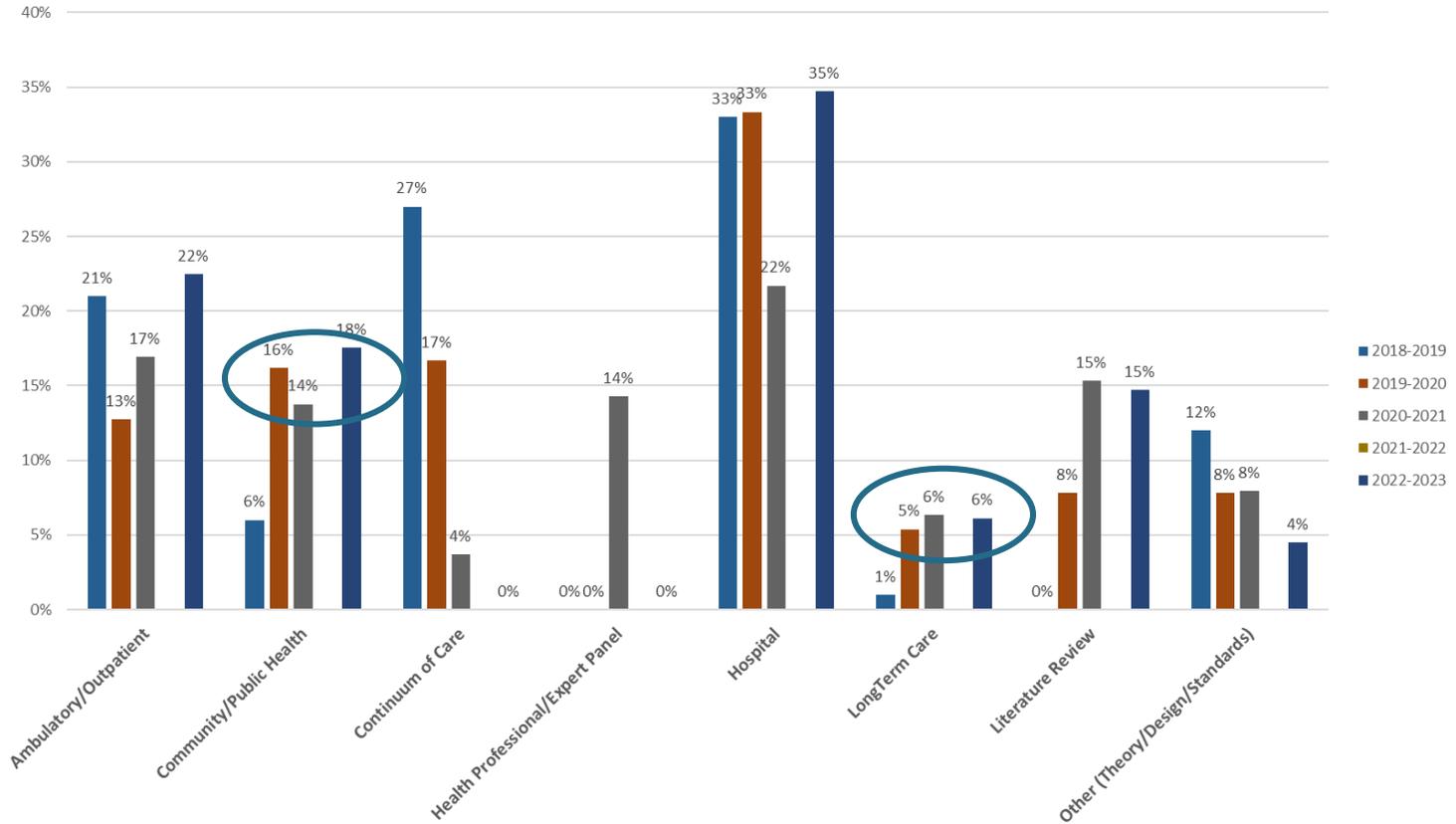
Research Country (%) By Year



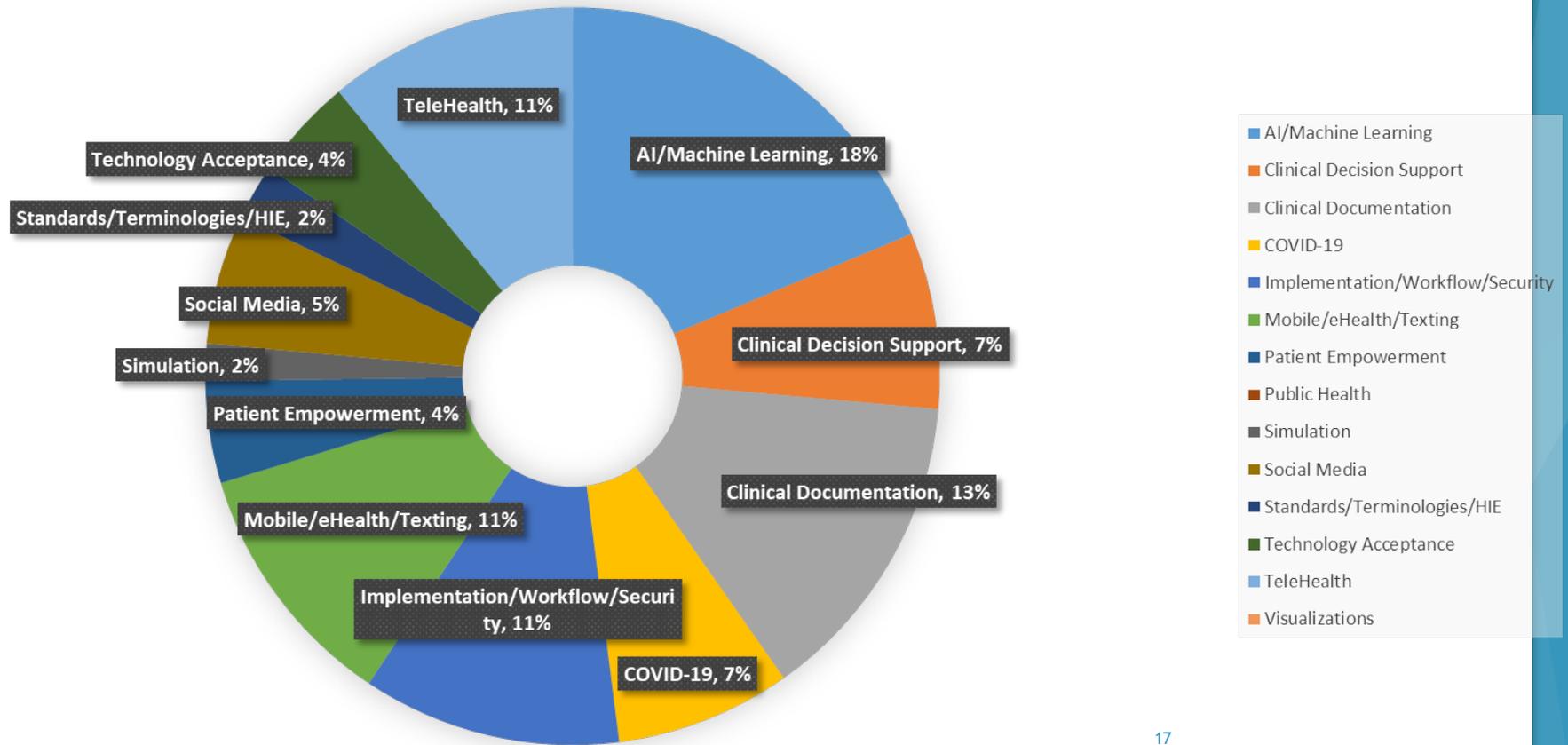
Research by Setting



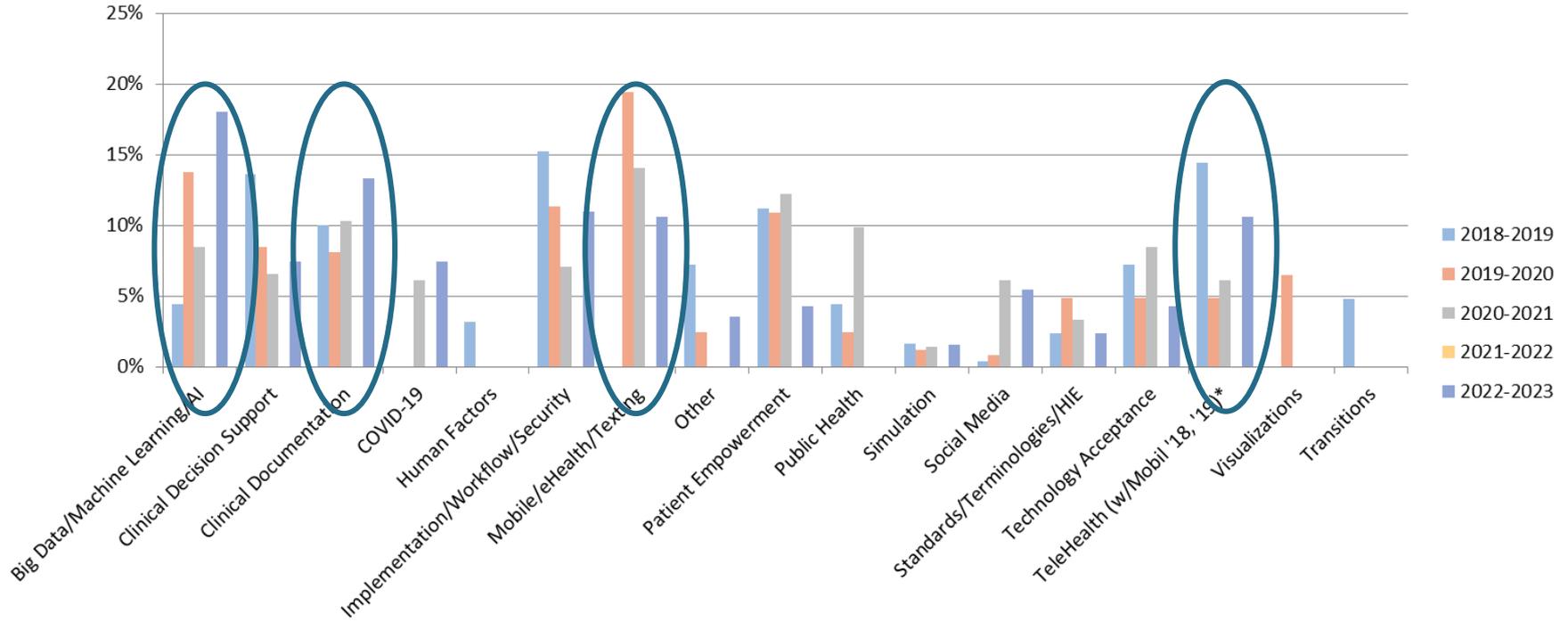
Research Setting (%)
By Year



Topics by Year



Topic (%) by Year



Step 5 - Collating, summarizing, and reporting the results

Themes Identified (2021-2023)

1. Prediction models (falls, decompensation, readmission, etc.)
 - ▶ Use of all this new EHR Data
2. AI/Machine Learning
 - ▶ Radiology
 - ▶ Clinical Decision Support
 - ▶ Disease Specific
 - ▶ Chatbots
 - ▶ Acceptance
3. Telehealth
4. Genome/All of US
5. Data mining
 - ▶ Use of EHR Data
 - ▶ Misinformation
6. Social Determinants
7. Specific Health Concerns (Public Health)
 - ▶ Mental Health
 - ▶ COVID-19
 - ▶ Older Populations
8. Compassion in Digital Health
 - ▶ New Education and Training needs
9. Participatory Informatics
10. Usability and Burden
 - ▶ Few studies, much literature review
11. Climate, equity, diversity, inclusion
12. Competencies
13. Soooo many lit reviews 😊

Representative Citations

- Ali, S., Kleib, M., Paul, P., Petrovskaya, O., & Kennedy, M. (2022). Compassionate nursing care and the use of digital health technologies: A scoping review. *International Journal of Nursing Studies*, 127, 104161.
- Denecke, K., Romero, O. R., Petersen, C., Benham-Hutchins, M., Cabrer, M., Davies, S., ... & Gabarron, E. (2023). Defining and Scoping Participatory Health Informatics: An eDelphi Study. *Methods of Information in Medicine*.
- Hobensack, M., Levy, D. R., Cato, K., Detmer, D. E., Johnson, K. B., Williamson, J., ... & Rosenbloom, S. T. (2022). 25× 5 Symposium to reduce documentation burden: report-out and call for action. *Applied Clinical Informatics*, 13(02), 439-446.
- Jedwab, R. M., Hutchinson, A. M., Manias, E., Calvo, R. A., Dobroff, N., & Redley, B. (2022). Change in nurses' psychosocial characteristics pre-and post-electronic medical record system implementation coinciding with the SARS-CoV-2 pandemic: pre-and post-cross-sectional surveys. *International Journal of Medical Informatics*, 163, 104783.
- Rahmanti, A. R. R., Yang, H. C., Bintoro, B. S., Nursetyo, A. A., Muhtar, M. S., Syed-Abdul, S., & Li, Y. C. J. (2022). SlimMe, a chatbot with artificial empathy for personal weight management: system design and finding. *Frontiers in Nutrition*, 1179.
- Wang, M., Pantell, M. S., Gottlieb, L. M., & Adler-Milstein, J. (2021). Documentation and review of social determinants of health data in the EHR: measures and associated insights. *Journal of the American Medical Informatics Association*, 28(12), 2608-2616.

Ali, S., Kleib, M., Paul, P., Petrovskaya, O., & Kennedy, M. (2022). Compassionate nursing care and the use of digital health technologies: A scoping review. *International Journal of Nursing Studies*, 127, 104161.

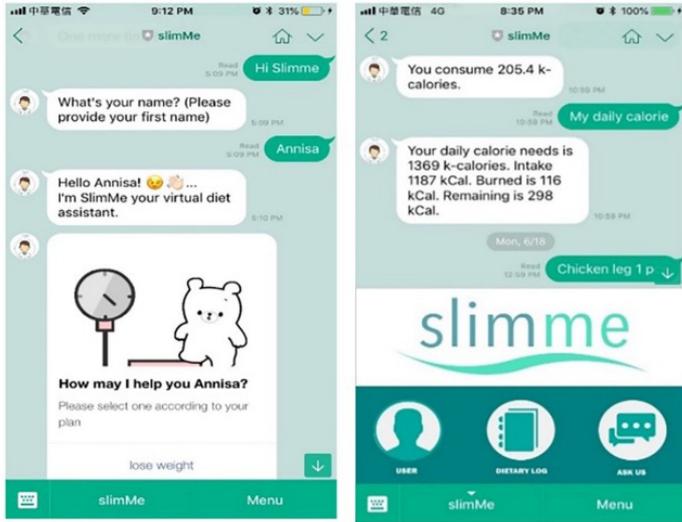
- ▶ **Objective:** To explore the nursing literature **on how nurses provide compassionate care when they use digital health technologies**. A secondary aim was to identify best practices that could be used to guide nursing education and practice toward enhancing compassionate care in digital environment.
- ▶ **Methods:** A **scoping review** was conducted to address the following research question: What is known about compassionate care in relation to the use of digital health technologies within the nursing literature?
- ▶ **Results:** 1) evolving understanding of compassionate nursing care in relation to use of digital health technology, 2) compassionate nursing care in relation to the type of digital health technology, and 3) strategies and interventions to improve education and competence relevant to digital health and compassionate nursing care.
- ▶ **Conclusions:** **The use of technology influences how nurses do their work and interact with patients.** As advances in digital health continue to evolve, future research should aim to expand understanding of compassion relevant to digital health by articulating its characteristics and associated competencies for nurses to further enhance their ability to provide compassionate care when digital health technologies and services are used to support care delivery

Jedwab, R. M., Hutchinson, A. M., Manias, E., Calvo, R. A., Dobroff, N., & Redley, B. (2022). Change in nurses' psychosocial characteristics pre-and post-electronic medical record system implementation coinciding with the SARS-CoV-2 pandemic: pre-and post-cross-sectional surveys. *International Journal of Medical Informatics*, 163, 104783.

- ▶ **Objective:** To investigate changes in nurses' well-being, intention to stay, burnout, work engagement, satisfaction, motivation and experience using technology pre- and post-implementation of an organisation-wide electronic medical record in Victoria, Australia.
- ▶ **Methods:** The natural experiment comprised an electronic medical record system implementation across six hospitals of a large tertiary healthcare organisation. Cross-sectional surveys were collected pre-electronic medical record implementation prior to the SARS-CoV-2 pandemic in 2019, and 18-months post-electronic medical record implementation during the pandemic in 2020, and findings compared.
- ▶ **Results:** A total of 942 surveys were analysed (550 pre-electronic medical and 392 post-electronic medical record. Post-electronic medical record, **nurses' work satisfaction, intention to stay and well-being decreased. Two of three dimensions of work engagement worsened and all dimensions of burnout increased. Nurses reported more burnout symptoms, were less engaged and career trajectory satisfaction decreased.**
- ▶ **Conclusions:** Implementation of an electronic medical record immediately followed by the SARS-CoV-2 pandemic was associated with **negative changes in nurses' well-being, intention to stay, burnout, work engagement and satisfaction.**

Rahmanti, A. R. R., Yang, H. C., Bintoro, B. S., Nursetyo, A. A., Muhtar, M. S., Syed-Abdul, S., & Li, Y. C. J. (2022). SlimMe, a chatbot with artificial empathy for personal weight management: system design and finding. *Frontiers in Nutrition*, 1179.

- ▶ **Objective:** This study aimed to design a **chatbot with artificial empathic motivational support for weight loss** called “SlimMe” and investigate how people react to a diet bot
- ▶ **Methods:** The SlimMe infrastructure was built using Dialogflow as the natural language processing (NLP) platform and LINE mobile messenger as the messaging platform. We proposed a text-based emotion analysis to simulate artificial empathy responses to recognize the user’s emotion
- ▶ **Results:** The result revealed that having an artificially empathic diet bot for weight loss management is a **fun and exciting experience**. The use of emoticons, stickers, and GIF images makes the chatbot response more interactive. Moreover, the motivational support and persuasive messaging features enable the bot to express more empathic and engaging responses to the user.
- ▶ **Conclusions:** More user interactions and further data training and validation enhancement will improve the bot’s in-built knowledge base and emotional intelligence base.



[Human] I want to confess
 [SlimMe] Why what happen?

[Human] I ate a lot
 [SlimMe] Yes! It is so hard to be around good food. I know it was really hard for me at first, but thankfully it got easier over time. I couldn't imagine that I could get a handle on my eating, but I did it! So you try too'

[Human] I want to quit
 [SlimMe] Weight loss is a process not a destination. Trust me !!! 3 months from now, you will thank yourself. 🙏

[Human] You are bad
 [SlimMe] I can improve with continuous feedback. My training is ongoing.

[Human] One bite is not going to kill me
 [SlimMe] "I know, but once you pop you can't stop! And I'm sure the food is so delicious so you wouldn't be able to stop!"

FIGURE 2 | Sequence conversation between SlimMe and users.

Wang, M., Pantell, M. S., Gottlieb, L. M., & Adler-Milstein, J. (2021). Documentation and review of social determinants of health data in the EHR: measures and associated insights. *Journal of the American Medical Informatics Association*, 28(12), 2608-2616.

- ▶ Objectives: Electronic Health Records (EHRs) increasingly include designated fields to capture social determinants of health (SDOH). We **developed measures to characterize their use**, and use of other SDOH data types, to optimize SDOH data integration
- ▶ Methods: We developed 3 measures that accommodate different EHR data types on an encounter or patient-year basis. We implemented these measures—**documented during encounter (DDE) captures documentation occurring during the encounter; documented by discharge (DBD) includes DDE plus documentation occurring any time prior to admission; and reviewed during encounter (RDE) captures whether anyone reviewed documented data**—for the newly available structured SDOH fields and 4 other comparator SDOH data types (problem list, inpatient nursing question, social history free text, and social work notes) on a hospital encounter basis
- ▶ Results: **We observed substantial variation in the use of different SDOH EHR data types.** Notably, social history question fields (newly added at study period start) were rarely used (DDE: 0.03% of encounters, DBD: 0.26%, RDE: 0.03%). Free-text patient social history fields had higher use (DDE: 12.1%, DBD: 49.0%, RDE: 14.4%)
- ▶ Conclusions: Our measures of real-world SDOH data use can guide current efforts to capture and leverage these data. For our institution, measures revealed substantial variation across data types, suggesting the need to engage in efforts such as EHR-user education and targeted workflow integration

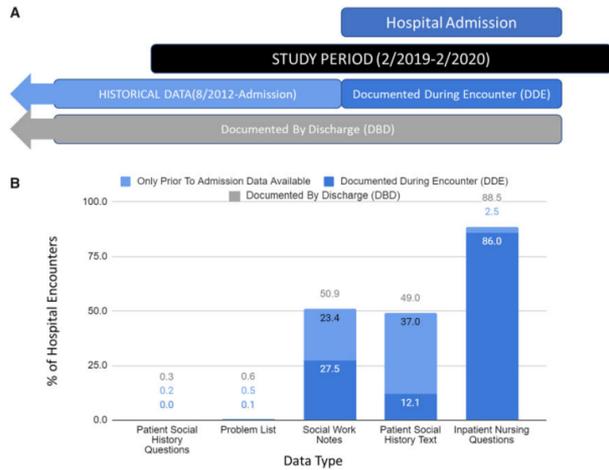


Figure 1. Hospital encounter SDOH documentation measures: UCSF Health. (A) Illustrated timelines of documentation measures. (B) Measures for our 5 selected data types.

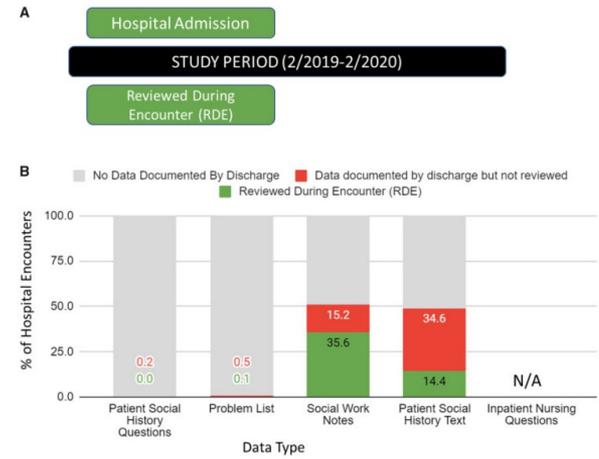


Figure 2. Hospital encounter SDOH review measures: UCSF Health. (A) Illustrated timeline of review measure. (B) Measures for our 5 selected data types.

Denecke, K., Romero, O. R., Petersen, C., Benham-Hutchins, M., Cabrer, M., Davies, S., ... & Gabarron, E. (2023). Defining and Scoping Participatory Health Informatics: An eDelphi Study. *Methods of Information in Medicine*.

- ▶ **Objective:** This article proposes a preliminary definition of **Participatory Health Informatics (PHI)** and defines the scope of the field.
- ▶ **Methods:** We used an adapted **Delphi study** design to gain consensus from participants on a definition developed from a previous review of literature. From the literature we derived a set of attributes describing PHI as comprising 18 characteristics, 14 aims, and 4 relations. We invited researchers, health professionals, and health informaticians to score these characteristics and aims of PHI and their relations to other fields over three survey rounds. In the first round participants were able to offer additional attributes for voting.
- ▶ **Results:** The first round had 44 participants, with 28 participants participating in all three rounds. These 28 participants were gender-balanced and comprised participants from industry, academia, and health sectors from all continents. Consensus was reached on 16 characteristics, 9 aims, and 6 related fields
- ▶ **Conclusions:** The consensus reached on attributes of PHI describe PHI as a multidisciplinary field that **uses information technology and delivers tools with a focus on individual-centered care**. It studies various effects of the use of such tools and technology. Its aims address the individuals in the role of patients, but also the health of a society as a whole. There are relationships to the fields of health informatics, digital health, medical informatics, and consumer health informatics.

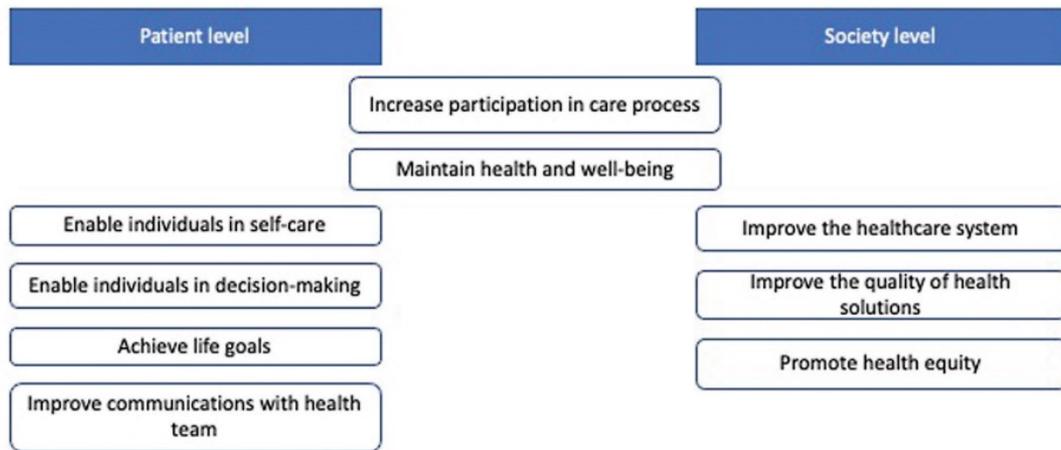


Fig. 2 Proposed aims of participatory health informatics (PHI). Aims can concern individual patients or the society. Aims “Increase participation in care process” and “Maintain health and well-being” are overlapping aims concerning both, patient level and society level.

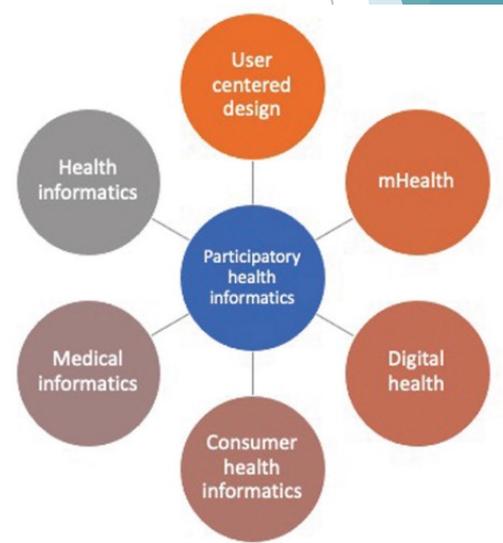


Fig. 3 Relations of participatory health informatics (PHI) to other fields.

Hobensack, M., Levy, D. R., Cato, K., Detmer, D. E., Johnson, K. B., Williamson, J., ... & Rosenbloom, S. T. (2022). 25× 5 Symposium to reduce documentation burden: report-out and call for action. *Applied Clinical Informatics*, 13(02), 439-446.

- ▶ **Objective:** To address the problem of documentation burden, the 25 by 5: Symposium to Reduce Documentation Burden on United States Clinicians by 75% by 2025 (Symposium) was organized to provide a forum for experts to discuss the current state of documentation burden and to identify specific actions aimed at dramatically reducing documentation burden for clinicians.
- ▶ **Methods:** The Symposium consisted of six weekly sessions with 33 presentations. The first four sessions included panel presentations discussing the challenges related to documentation burden. The final two sessions consisted of breakout groups aimed at engaging attendees in establishing interventions for reducing clinical documentation burden. Steering Committee members analyzed notes from each breakout group to develop a list of action items.
- ▶ **Results:** The Steering Committee synthesized and prioritized 82 action items into Calls to Action among three stakeholder groups: Providers and Health Systems, Vendors, and Policy and Advocacy Groups. Action items were then categorized into short-, medium-, or long-term goals. Themes that emerged from the breakout groups' notes include the following: accountability, evidence is critical, education and training, innovation of technology, and other miscellaneous goals (e.g., vendors will improve shared knowledge databases).
- ▶ **Conclusions:** The Symposium successfully generated a list of interventions for short-, medium-, and long-term timeframes as a launching point to address documentation burden in explicit action-oriented ways. Addressing interventions to reduce undue documentation burden placed on clinicians will necessitate collaboration among all stakeholders.

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- ▶ Recommendation 1: Policy and advocacy groups should establish federal common ground and incentives aimed at documentation burden reduction.
 - ▶ Recommendation 2: Providers and health systems should train on documentation brevity in addition to completeness in documentation
 - ▶ Recommendation 3: Vendors should package the best EHR functions into tool kits (i.e., collection of packages to inform and facilitate implementation²⁹) to facilitate deployment and EHR optimizations
 - ▶ Recommendation 4: Providers and health systems should establish and adopt guiding principles for documentation requirements and collaborate with clinical experts
 - ▶ Recommendation 5: Policy and advocacy groups (e.g., National Institute of Health, Agency for Healthcare Research and Quality, etc.) should urge organizations to coordinate and fund research that automates coding information from the HER
 - ▶ Recommendation 6: Vendors should play an integral role in promoting an ecosystem of interoperable systems to ensure complementary technology across EHR products.

Step 6 - Consultation

Feedback and Professional Input...