AI in Urology: Bridging Innovation and Regulation for Improved Care

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Background

- The integration of artificial intelligence (AI) into urologic practice has emerged as a promising frontier, offering innovative solutions for diagnostic, prognostic, and therapeutic decision-making.
- The application of AI in urology has been investigated across diverse domains, including pediatric urology, diagnosis of bladder cancer, and treatment of benign prostatic hyperplasia (BPH).
- Ethical implications surrounding the use of AI in urologic practice have been examined, considering issues such as data privacy, algorithmic bias, and the impact on patient-doctor relationships.
- Responding to President Biden's Executive Order, released earlier last fall, the FDA has initiated the development of a new framework—the Total Product Life Cycle for Medical Devices approach, underscoring the need for iterative development and frequent updates balanced with constant safety and performance monitoring.

Methods

- A comprehensive literature review was conducted to assess AI's current and potential contributions to urological practice, including diagnostic accuracy, treatment planning, and patient outcomes.

- A survey was distributed through REDCap to members of the urology community to assess their awareness and understanding of the ethical and regulatory implications of AI adoption.

- In-depth interviews were conducted via videoconferencing with key stakeholders in urology, including practicing urologists, researchers, and policymakers, to gain qualitative insights into their perceptions and experiences with AI regulation.

Results

- An analysis of AI familiarity revealed no significant differences between physicians and patients in terms of self-reported unfamiliarity with AI, both in general (59.3% vs. 65.8%, p=0.2) (Figure 1) and specifically in healthcare contexts (71.4% vs. 76.8%, p=0.2) (Figure 2).
- Physicians and patients differed in their concern regarding the presence of ethical issues that need to be addressed before implementing AI in urologic practice (38.7% vs. 22.1%, p=0.001).
- There was agreement that AI's potential for inaccuracies, such as artificial hallucinations, posed a notable risk (77.4% of physicians vs. 55.2% of patients, p=0.01)

Results

Table 1 – Respondent Demographics		
	Physicians	**Patients**
Total	199 (52.4)	181 (47.6)
Gender		
Cisgender Male	175 (87.9)	179 (99.0)
Cisgender Female	22 (11.1)	0 (0)
Agender	1 (0.5)	0 (0)
Genderqueer	0 (0)	1 (0.5)
No response	1 (0.5)	1 (0.5)
Race		
American Indian/Alaskan Native	0 (0)	1 (0.55)
Asian	20 (10.1)	1 (0.55)
Black	6 (3.0)	1 (0.55)
Native Hawaiian/Pacific Islander	0 (0)	0 (0)
White	155 (77.9)	172 (95.0)
Other	17 (8.5)	0 (0)
Asian & White	0 (0)	1 (0.55)
White & Other	0 (0)	3 (1.7)
No response	1 (0.5)	2 (1.1)

Results
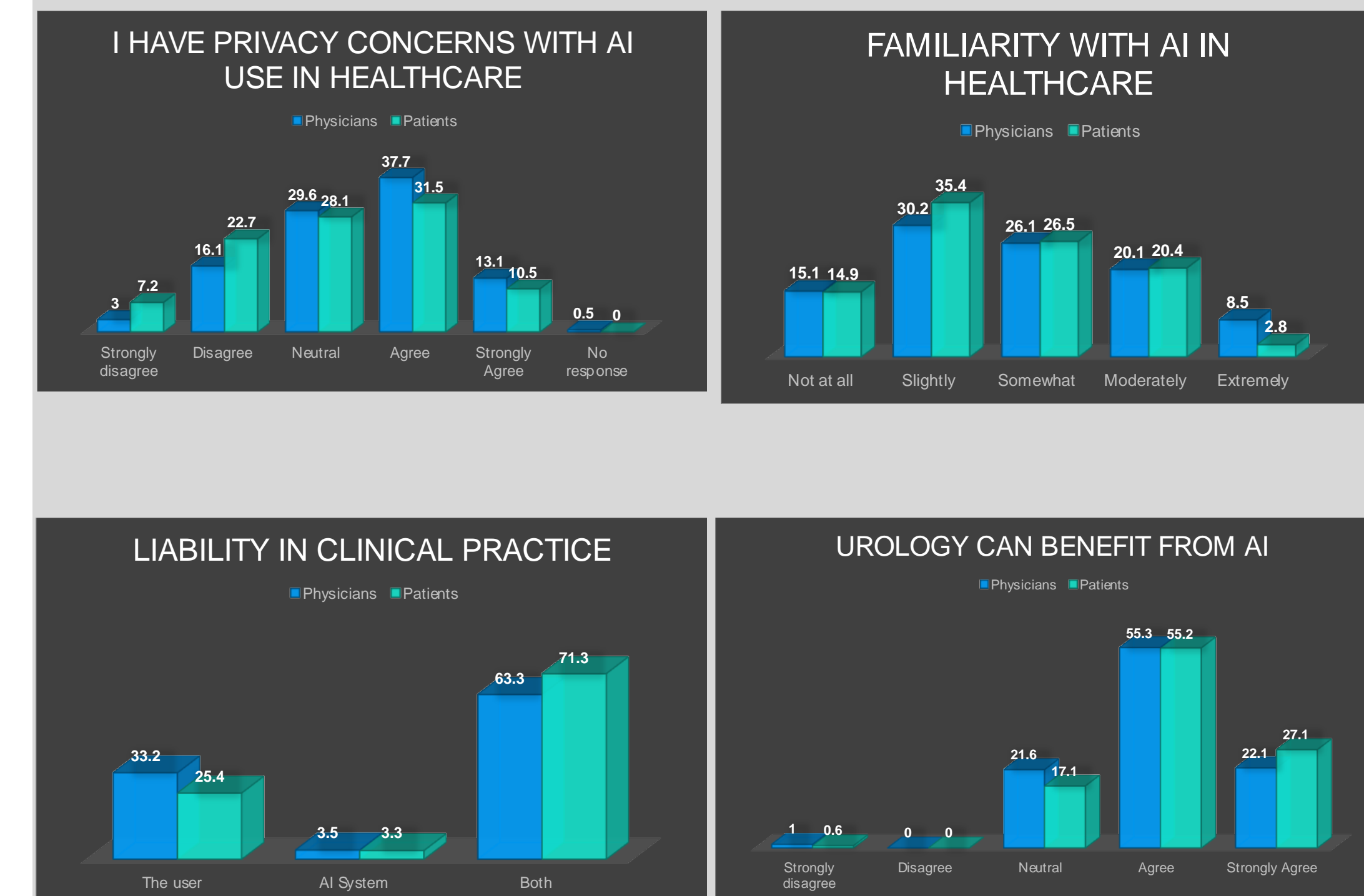
Conclusion

- Findings suggest a comparable baseline of AI awareness, indicating that educational initiatives targeting AI in healthcare could be similarly structured for physicians and patients.

- Respondents are optimistic about AI's potential to improve diagnostic accuracy and streamline workflows, but share concerns about the reliability of AI-generated information.

- Both groups recognize the transformative potential of AI while expressing legitimate concerns about its reliability, ethical implications, and regulatory oversight.

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