When Oncology Care Goes Digital: A Closer Look at Disparities

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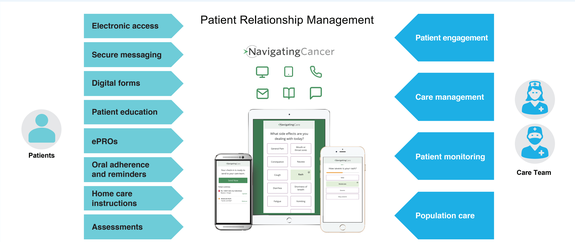
BACKGROUND

- The American Hospital Association reports that 95% of US hospitals have a patient portal, web-based or smartphone application that allows patients to access their medical data[1]
- Oncology providers are increasingly integrating digital solutions, such as patient relationship management, to improve patient care[2]
- Patient relationship management systems, such a Naviation Cancer, enable patients to communicate with their clinic, view health records, receive educational materials and submit electronic patient-reported outcomes (ePROs) (**Figure 1**)[2-4]

Figure 1. Navigating Cancer Patient Relationship Management



ePRO, electronic patient-reported outcome.

OBJECTIVE

- To investigate potential disparities in patient relationship management access and engagement in oncology care

METHODS

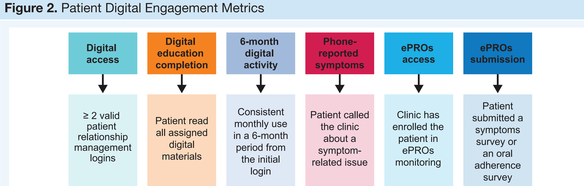
Data Source and Study Population

- De-identified patient-level data, including demographic variables (age, race, sex, preferred language and insurance status), digital access and digital engagement, were obtained from 77 oncology clinics in the US that use Navigating Cancer[4]
- Patients with cancer were included if they were aged ≥ 18 years at the first appointment between October 2017 and September 2020 with ≥ 6 months' follow-up, regardless of tumor type, line of therapy or diagnosis date

Digital Engagement and Analyses

- Six metrics to characterize patients' digital engagement were developed (**Figure 2**)
- Patients' demographics, login history and digital activity data were described
- χ^2-square analyses identified statistically significant differences by race and ethnicity

Figure 2. Patient Digital Engagement Metrics



ePRO, electronic patient-reported outcome.

RESULTS

Demographics and Digital Access

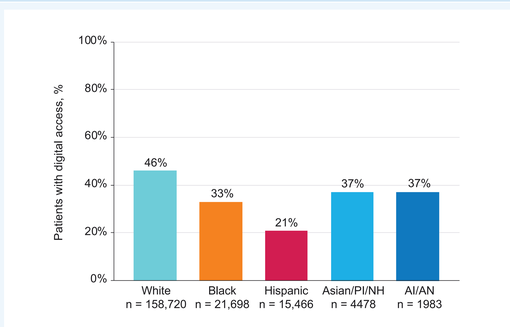
- A total of 202,345 patients with ≥ 6 months of clinical history were identified
- Of the total number of patients identified, 85,020 (42%) had digital access (**Table 1**)
  - The majority of patients were privately insured and diagnosed with solid tumors across all racial and ethnic groups (**Table 1**)
  - White patients had the highest digital access rate at 46%, while Hispanic patients had significantly lower digital access rates (21%; $P < 0.0001$) (**Figure 3**)

Table 1. Demographics of Patients With ≥ 6 Months of Clinical History and Digital Access

Characteristic, n	All Patients n = 85,020	White n = 72,312	Black n = 7082	Hispanic n = 3228	Asian/PI/NH n = 1672	AI/AN n = 726
Female	54,122	45,019	5265	2175	1149	514
Age						
18-54	25,202	19,050	3365	1675	801	311
55-74	47,224	41,707	3179	1272	715	351
≥ 75	12,594	11,555	538	281	156	64
Preferred language						
English	82,443	70,932	6798	2612	1394	707
Other	2577	1380	284	616	278	19
Insurance type						
Commercial	44,707	36,165	4804	2161	1100	477
Medicare	28,477	25,802	1588	563	344	180
Medicaid	997	675	171	88	26	37
Not reported	10,850	9681	519	416	202	32
Tumor type						
Solid tumors	67,757	57,829	5647	2392	1359	530
Hematologic	6866	5911	431	309	134	81
Other/unspecified	8708	1464	93	73	32	27
Not available	1689	7108	911	454	147	88

AI, American Indian; AN, Alaska Native; NH, Native Hawaiian; PI, Pacific Islander.

Figure 3. Patients With Digital Access by Racial and Ethnic Groups

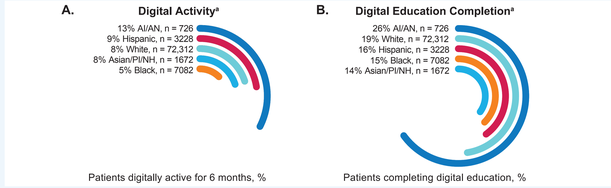


AI, American Indian; AN, Alaska Native; NH, Native Hawaiian; PI, Pacific Islander.

Digital Activity and Education

- Of the patients with digital access, a similar proportion of White, Asian/Pacific Islander/Native Hawaiian and Hispanic patients were digitally active for 6 months (8%-13%; **Figure 4A**)
  - However, a significantly lower proportion of Black patients were digitally active for 6 months (5%; $P < 0.0001$)
- There were significant disparities in digital education completion in patients who had digital access, ranging from 26% for American Indian/Alaska Native patients to 14% for Asian/Pacific Islander/Native Hawaiian patients ($P < 0.0001$; **Figure 4B**)

Figure 4. Digital Engagement for Patients With Digital Access. (A) Digital Activity and (B) Digital Education Completion

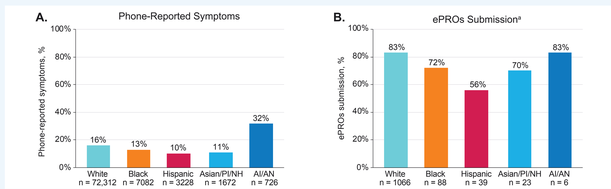


AI, American Indian; AN, Alaska Native; NH, Native Hawaiian; PI, Pacific Islander.
[a] Data reported on a 40% maximum scale.

Patient-Reported Outcomes

- Of patients with digital access (N = 85,020), there were significant disparities in phone-reported symptoms, ranging from 32% (n = 234) for American Indian/Alaska Native patients to 10% (n = 321) for Hispanic patients ($P < 0.0001$; **Figure 5A**)
- ePROs access was similar across all groups ranging from 0.8% to 1.5%
  - Of patients with ePROs access, ePRO submission rates were 5 times higher than rates of symptom reporting via phone for all groups except for American Indian/Alaska Native patients. However, the sample size was small (< 10) for that group ($P = 0.004$; **Figure 5B**)

Figure 5. Method of Patient Outcome Reporting Assessed by Racial and Ethnic Groups. (A) Phone-Reported Symptoms and (B) ePROs Submission[a]

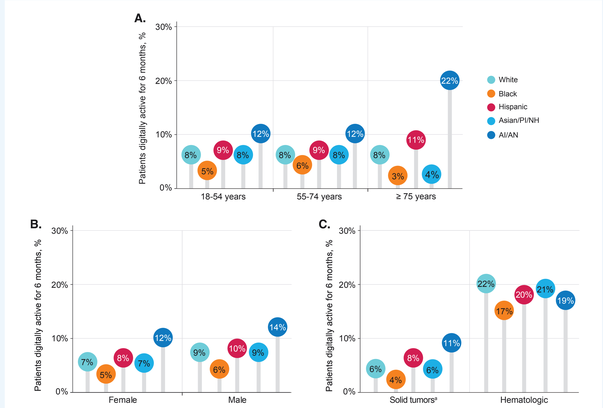


AI, American Indian; AN, Alaska Native; ePRO, electronic patient reported outcome; NH, Native Hawaiian; PI, Pacific Islander.
[a] ePROs submission rates for patients with ePROs access.

Relationships Between Patient Digital Activity and Age, Sex and Tumor Type

- Of patients with digital access, the proportion who were digitally active for 6 months:
  - Was consistent for patients aged 18 to 54 years and 55 to 74 years across all racial and ethnic groups (**Figure 6A**)
    - More variability was observed for patients ≥ 75 years
  - Was higher for male patients compared with female patients across all racial and ethnic groups (**Figure 6B**)
  - Was higher for patients with hematologic cancers compared with patients with solid tumors across all racial and ethnic groups (**Figure 6C**)

Figure 6. Six-Month Digital Activity Rates as a Proportion of Patients With Digital Access Stratified by Race and Ethnicity and (A) Age Group, (B) Sex and (C) Tumor Type



AI, American Indian; AN, Alaska Native; NH, Native Hawaiian; PI, Pacific Islander.
[a] Solid tumors include breast, gastrointestinal, gynecological, head and neck, neurological, skin, thoracic and urological diagnoses.

Treating Clinics and Digital Engagement

- There was a disproportionate patient concentration of certain racial groups at single clinics within the dataset
- A single clinic treated 69% (500/726) of American Indian/Alaska Native patients
  - The proportion of patients who were digitally active for 6 months was 14% at this clinic compared with 11% for all other clinics combined
- A single clinic treated 35% (2483/7082) of Black patients
  - All patients who received treatment at this clinic were digitally active for only a single month

CONCLUSIONS, IMPLICATIONS AND LIMITATIONS

- White patients had higher digital access rates compared with other racial and ethnic groups, especially Hispanic and Black patients
- Disparities in digital, phone and ePROs engagement were observed for all racial and ethnic groups, except American Indian/Alaska Native patients
- Approximately 1 out of 5 patients with cancer completed their healthcare provider assigned digital education materials
  - Rates were consistently lower for all non-White patients
- No differences were observed in ePROs access. However, availability of ePROs is in its infancy, where only 1.2% of patients had the option for outcomes reporting
  - While sample sizes were small, patients who had ePROs as an option to report symptoms showed high utilization (81%), with consistency across racial and ethnic groups
- Selection biases may exist where patients enrolled in Navigating Cancer's patient relationship management may represent an overall more digitally engaged population
- Disparities observed in symptoms reporting via phone were larger than disparities seen in ePROs submissions
- Preliminary evidence based on an initial sub-analysis showed that:
  - A patient's age and sex do not play significant roles in digital engagement
  - A patient's cancer diagnosis may be a factor in digital engagement, as patients with hematologic cancers were digitally active for longer periods compared with patients with solid tumors
  - The clinic where a patient receives care may play a role in digital engagement
- Additional studies are needed to assess other determinants of digital health disparities

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AUTHOR DISCLOSURES

JH and AM are employees of and hold stock in Genentech, Inc.

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