Seminars Article

Referral pattern for urologic malignancies before and during the COVID-19 pandemic

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Abstract

Introduction: The COVID-19 pandemic has required significant restructuring of healthcare with conservation of resources and maintaining social distancing standards. With these new initiatives, it is conceivable that the diagnosis of cancer care may be delayed. We aimed to evaluate differences in patient populations being evaluated for cancer before and during the COVID-19 pandemic.

Methods and Materials: We performed a retrospective review of our electronic medical record and examined patient characteristics of those presenting for a possible new cancer diagnosis to our urologic oncology clinic. Data was analyzed using logistic and linear regression models.

Results: During the 3-month period before the COVID-19 pandemic began, 585 new patients were seen in one urologic oncology practice. The following 3-month period, during the COVID-19 pandemic, 362 patients were seen, corresponding to a 38% decline. Visits per week increased to pre-COVID-19 levels for kidney and bladder cancer as the county entered the green phase. Prostate cancer visits per week remained below pre-COVID-19 levels in the green phase. When the 2 populations pre-COVID-19 and COVID-19 were compared, there were no notable differences on regression analysis.

Conclusion: The COVID-19 pandemic decreased the total volume of new patient referrals for possible genitourinary cancer diagnoses. The impact this will have on cancer survival remains to be determined. © 2020 Published by Elsevier Inc.

Keywords: Coronavirus disease 2019; Genitourinary cancer; Delayed diagnosis; Health services

1. Introduction

The COVID-19 pandemic has posed unparalleled challenges to the healthcare system, hospital staff, providers, and patients alike. In-light of these extraordinary circumstances, it has become prudent to use hospital resources judiciously so that they may be allocated for critically ill COVID-19 patients as needed. As a result of these precautions, cancer diagnoses may inevitably be delayed for numerous reasons, including minimization of staff to reduce exposure risk, postponement of elective services/diagnostics/screening, and patients' desire to avoid exposure to a hospital setting [1].

However, the impact of COVID-19 on the timely diagnosis of urologic malignancies is unclear and will depend on many competing risks. On the one hand, the threat of cancer provokes severe anxiety in patients, and similarly, providers find it counterintuitive to postpone the evaluation of a patient with a potential cancer [2]. On the other hand, COVID-19 poses a real threat to both patients and

providers. Older age and comorbidities are two risk factors for death from COVID-19, which pertain to many of the patients who need a cancer evaluation and a proportion of the providers as well [3]. Telemedicine may enable providers to evaluate new patients while maintaining social distancing, however, evaluation of new patients with potential cancer diagnoses is limited due to the inability to perform physical exams and diagnostic procedures. These competing factors are weighted differently based on the regional COVID-19 outlook. For instance, the risk of contracting COVID-19 will be weighted higher in New York City at the height of the outbreak compared to Pittsburgh, where the initial spread of COVID-19 was largely contained.

For these reasons, we performed a retrospective analysis of new patients seen at one of our department's three busiest oncology sites in Pittsburgh to examine any differences in patient populations being evaluated for new cancer diagnoses before and during the COVID-19 pandemic.

2. Methods

2.1. Study design and study population

We performed a retrospective chart review of all new patient visits with either a cancer screening indication (e.g., elevated PSA) or a newly diagnosed cancer within one of our three oncology practices. We focused on patients presenting for prostate, bladder, or kidney cancer evaluation. Patients were identified as undergoing evaluation for prostate cancer if their visit reasons included elevated PSA, positive multiparametric magnetic resonance imaging, prostate biopsy, or referral for a new prostate cancer. For bladder cancer, visit reasons included micro or macroscopic hematuria, positive cytology, abnormal CT findings, or referral for bladder cancer. For kidney cancer, visit reasons included kidney/renal cyst, kidney/renal nodule, abnormal CT findings, kidney/renal mass, kidney/renal lesion, or referral for new kidney cancer. We defined March 17, 2020 as the start of the COVID-19 period, at which time Pennsylvania began a statewide shutdown starting with school closures. All patients seen in the 3 to 5 months prior to this date were considered "pre-COVID-19" and all patients seen on or 3 to 5 months after this date were labeled as "COVID-19."

2.2. Outcomes

The primary outcome of interest was number of new patients seen for possible cancer diagnosis before and during the COVID-19 pandemic. Our secondary outcomes of interest included proportion of rural patients, proportion of non-white patients, proportion of married patients, age, and median income of patients seen before and during the pandemic.

We obtained baseline demographic data including age, race, ethnicity, ZIP code, sex, marital status, body mass index, smoking history, and comorbid conditions. We obtained

median income per ZIP code using a ZIP code to census tract cross walk [4]. We also collected data on practice site and referral provider (i.e., primary care, other urologist, self, etc.).

We categorized patients by rurality of residence defined based on the Agriculture Rural-Urban Commuting Area (RUCA) codes from the United States Department of Agriculture. RUCA codes were assigned based on ZIP codes using a ZIP code to RUCA approximation [5]. We further condensed the RUCA classifications, which assign a value of 1 to 10, into urban as RUCA codes 1 to 3, large town as RUCA codes 4 to 6, and rural as RUCA codes 7 to 10.

2.3. Statistical analysis

We first examined demographics of patients in the pre-COVID-19 and CVOID-19 periods. We then examined visits per week in the pre-COVID-19 and COVID-19 periods. The COVID-19 period was further stratified into red, yellow, and green phases of reopening [6]. Next, using regression modeling, we examined 5 specific characteristics of patients seen in clinic to identify differences between pre-COVID-19 and COVID-19 patients, which included proportion of rural residents, proportion of non-white patients, proportion of married patients, mean age, and mean income. We chose these 5 characteristics because we were interested in whether COVID-19 created disparities in which patients were seen in clinic. For identification of differences in proportions, logistic regression was performed. To identify differences in means, linear regression was performed. Covariates included sex, comorbid conditions (diabetes, hypertension, and coronary artery disease), smoking status, body mass index, hospital, and referring provider.

Analysis was performed in SAS v9.4 (SAS Institute, Cary, NC) and R v13.2 (R Foundation for Statistical Computing, Vienna, Austria), using the get RUCA function for approximating RUCA classification from zip code [7]. This study was considered exempt from review by our institution review board.

3. Results

A total of 947 patients were seen during the entire study period. During the 3 to 5 month period defined as pre-COVID-19, 585 new patients were seen for cancer screening or new diagnosis in urologic oncology clinic. In comparison, 362 patients were seen within the 3 to 5 month COVID-19 period, an overall 38% decrease. One patient was seen as telehealth visits during the pre-COVID-19 period and 7 patients were seen as telehealth visit during the COVID-19 period (while patients were offered a telehealth option, most elected in-person visits). Baseline demographic data were similar between the 2 groups, including median income and rurality of residence (Table 1). These similarities held true when stratified by cancer site (prostate, kidney, or bladder cancer) (Tables 2A−C).

Table 1
Baseline demographics of patients referred for prostate, kidney, and bladder cancer evaluation, stratified by pre-COVID and COVID periods

Characteristic	Pre-COVID	Post-COVID	*P* value
Age, years, median (IQR)	65 (57, 70)	65 (59, 71)	0.337
Sex (%)			0.0788
Male	450 (77)	282 (78)	
Female	135 (23)	80 (22)	
Marital Status (%)			0.409
Yes	378 (65)	228 (63)	
No/Unknown	207 (35)	134 (37)	
Diabetes Mellitus (%)			0.148
No	475 (81)	279 (77)	
Yes	110 (19)	83 (23)	
Hypertension (%)			0.422
No	282 (48)	164 (45)	
Yes	303 (52)	198 (55)	
Coronary Artery Disease (%)			0.627
No	529 (90)	323 (89.2)	
Yes	56 (10)	39 (11)	
Smoking (%)			0.001
N	585	362	
No	322 (55)	171 (47)	
Yes	263 (45)	191 (53)	
Visit (%)			0.004
In-person	584 (99.8)	355 (98.1)	
Median Income, $, median (IQR)	66,055 (58,429, 71,996)	66,055 (59,964, 71,996)	0.550
Body Mass Index (kg/m2), median (IQR)	28 (25, 32)	29 (25, 33)	0.658
Urban-Rural Location (%)			0.065
Urban	479 (82)	299 (83)	
Rural	101 (17)	63 (17)	
Missing	5 (0.9)	0 (0)	
Race (%)			0.298
White	506 (87)	304 (84)	
Non-white	79 (14)	58 (16)	
Ethnicity (%)			0.298
Not Hispanic	551 (94)	339 (94)	
Missing	30 (5)	21 (6)	
Hospital (%)			0.378
A	310 (53)	175 (48)	
B	137 (23)	94 (26)	
C	138 (24)	93 (26)	
Reason for Visit (%)			
Screening	318 (54)	185 (51)	
New Cancer	268 (46)	179 (49)	
Referral (%)			<0.001
Primary Care	120 (21)	65 (18)	
Other Physician/Unknown	171 (29)	158 (44)	
Other Urologist	113 (19)	26 (7)	
Self	181 (31)	113 (31)	
Referral Condition			
Prostate	268	131	
Kidney	124	99	
Bladder	194	134	

IQR = Inter-quartile range.

New patient visits were further stratified during the COVID-19 period by phases (red, yellow, green) of county re-opening (Table 3). Visits per week were lower during the red phase compared to pre-COVID-19 visits. As the county transitioned to yellow and green phases, visits per week increased to nearly pre-COVID-19 levels for kidney and bladder cancer. Prostate cancer was the only site that continued to have reduced visits per week compared to pre-COVID-19 levels in the green phase. There were no notable differences in visit types between the pre-COVID-19 and COVID-19 periods for kidney and bladder cancer. For prostate cancer, the COVID-19 period had a 43% decline in patients presenting for screening visit.

Table 2A
Baseline demographics for prostate cancer referrals

Characteristic	Pre-COVID ($n = 268$)	Post-COVID ($n = 131$)	P value
Age, years, median (IQR)	65 (60, 69)	65 (61, 69)	0.812
Sex, Male (%)	268 (100)	131 (100)	
Marital status (%)			
Yes	196 (73)	97 (74)	0.942
No/Unknown	72 (27)	34 (26)	
Diabetes mellitus (%)			
No	230 (86)	109 (83)	0.591
Yes	38 (14)	22 (17)	
Hypertension (%)			
No	130 (49)	61 (47)	0.796
Yes	138 (52)	70 (53)	
Coronary artery disease (%)			
No	241 (90)	118 (90)	1.000
Yes	27 (10)	13 (10)	
Smoking, (%)			
No	169 (63)	75 (57)	0.313
Yes	99 (37)	56 (43)	
Visit (%)			
In-person	268 (100)	129 (98.5)	
Tele-health	0 (0)	2 (1.5)	
Median Income, $, median (IQR)	66055 (58706, 71686)	65117 (58918, 71353)	0.544
Body Mass Index (kg/m^2), median (IQR)	28 (25, 32)	29 (26, 33)	0.497
Urban-Rural Location (%)			
Urban	219 (82)	107 (82)	1.000
Rural	49 (18)	24 (18)	
Race (%)			
White	236 (88)	113 (86)	0.727
Non-white	32 (12)	18 (14)	
Ethnicity (%)			
Not Hispanic	260 (97)	126 (96)	0.674
Missing	7 (3)	4 (3)	
Hospital (%)			
A	161 (60)	62 (47)	0.041
B	62 (23)	36 (28)	
C	45 (17)	33 (25)	
Reason for Visit (%)			
Screening	159 (59)	69 (53)	0.248
New cancer	109 (41)	62 (47)	
Referral (%)			
Primary Care	65 (24)	31 (24)	<0.001
Other Physician/Unknown	68 (25)	53 (41)	
Other Urologist	56 (21)	8 (6)	
Self	79 (30)	39 (30)	

IQR = Inter-quartile range.

Regression analysis did not reveal any significant predictors to distinguish the pre-COVID-19 and COVID-19 groups when examining rurality, race, marital status, age, and median income while controlling for demographic and clinical factors such as age, sex, comorbid conditions, smoking history, BMI, or referring provider (Table 4).

4. Discussion

Compared to the pre-COVID-19 period, we find that new patient visits for cancer screening or new prostate, kidney or bladder cancer decreased by 38% during the COVID-19 period. The number of visits per week returned to pre-COVID-19 levels when we entered the green phase of reopening for kidney and bladder cancer, but not for prostate cancer. We hypothesized that the overall reduction in services and patients' perception regarding healthcare utilization would negatively impact traditionally underserved populations (e.g., rural residents, minorities, elderly, or those of lower socioeconomic status). However, this did not appear to be the case in our region.

Our findings must be considered in the context of the COVID-19 burden for our region. On March 13, 2020, a state of national emergency was declared as a result of COVID-19, and by March 17 every state had a reported case of the virus [8]. In our county, the first reported case

Table 2B

Baseline demographics for kidney cancer referrals

Variable	Pre-COVID ($n = 124$)	Post-COVID ($n = 99$)	P value
Age, years, median (IQR)	64 (51, 72)	65 (57, 73)	0.834
Sex (%)			
Male	60 (48)	59 (60)	0.126
Female	64 (52)	40 (40)	
Marital status (%)			
Yes	77 (62)	55 (56)	0.395
No/Unknown	47 (38)	44 (44)	
Diabetes mellitus (%)			
No	91 (73)	67 (68)	0.433
Yes	33 (27)	32 (32)	
Hypertension (%)			
No	49 (40)	38 (38)	0.973
Yes	75 (60)	61 (62)	
Coronary Artery Disease (%)			
No	115 (93)	89 (90)	0.607
Yes	9 (7)	10 (10)	
Smoker (%)			
No	67 (54)	41 (41)	0.082
Yes	57 (46)	58 (59)	
Visit (%)			
In-person	124 (100)	97 (98)	0.196
Median Income, $, median (IQR)	65,090 (57,252, 72,074)	67,542 (60,879, 71,998)	0.250
Body Mass Index (kg/m^2), median (IQR)	29 (26, 34)	30 (26, 35)	0.469
Urban-Rural Location (%)			
Urban	94 (76)	71 (72)	0.233
Rural	27 (23)	28 (28)	
Missing	3 (2)	0 (0)	
Race (%)			
White	117 (94)	85 (86)	0.054
Non-white	7 (6)	14 (14)	
Ethnicity (%)			
Not Hispanic	118 (95)	92 (93)	0.675
Missing	6 (5)	7 (7)	
Hospital (%)			
A	75 (61)	55 (56)	0.501
B	21 (17)	23 (23)	
C	28 (23)	21 (21)	
Reason for Visit (%)			
Screening	26 (21)	17 (17)	0.587
New cancer	98 (79)	82 (83)	
Referral (%)			
Primary Care	26 (21)	13 (13)	0.022
Other Physician/Unknown	48 (39)	52 (53)	
Other Urologist	27 (22)	10 (10)	
Self	23 (19)	24 (24)	

was recorded on March 14th [9]. Schools were closed on March 17th and by March 21th all nonlife sustaining business were required to close and remained so until restrictions began to ease on June 5th [10]. In accordance with Centers for Disease Control and Prevention recommendations, the Governor of Pennsylvania recommended deferment of elective surgery beginning on March 17th [11]. The positivity rate since the initiation of these policies has largely remained less than 5% until June, when rates abruptly rose to 7% [12]. The overall impact of COVID-19 in our county has been notably mild in comparison to other regions such as New York City, which reported positivity rates up to 60% [13].

Despite the overall lower viral burden of our region, we still saw a notable decline in new patient visits for cancer screening or new cancer diagnosis, although they quickly increased as the county transitioned from red to green phase. There are several potential reasons for this decline. While patients with concerning symptoms would likely seek care, those with milder symptoms may view their risk of contracting COVID-19 more worrisome [14]. Additionally, patients may not wish to burden the health system, thinking their evaluation is of lower priority [14]. Part of this decline may also stem from decreased presentation to primary care providers, as they often perform routine screening and provide referrals to specialists. In the United

Table 2C
Baseline demographics for bladder cancer referrals

Variable	Pre-COVID ($n = 194$)	Post-COVID ($n = 134$)	*P* value
Age, years, median (IQR)	64 (51, 72)	65 (57, 73)	0.160
Sex (%)			
Male	122 (63)	93 (69)	0.270
Female	72 (37)	41 (31)	
Marital status (%)			
Yes	106 (55)	77 (58)	0.694
No/Unknown	88 (45)	57 (42)	
Diabetes mellitus (%)			
No	155 (80)	105 (78)	0.842
Yes	39 (20)	29 (22)	
Hypertension (%)			
No	104 (54)	65 (49)	0.426
Yes	90 (46)	69 (52)	
Coronary Artery Disease (%)			
No	174 (90)	118 (88)	0.776
Yes	20 (10)	16 (12)	
Smoker (%)			
No	87 (45)	55 (41)	0.569
Yes	107 (55)	79 (59)	
Visit (%)			
In-person	193 (99.5)	131 (98)	0.309
Median Income, $, median (IQR)	66,055 (59,964, 72,310)	66,055 (59,964, 72,310)	0.816
Body Mass Index (kg/m^2), median (IQR)	27 (25, 31)	28 (24, 33)	0.666
Urban-Rural Location (%)			
Urban	167 (86)	123 (92)	0.203
Rural	25 (13)	11 (8)	
Missing	2 (1)	0 (0)	
Race (%)			
White	154 (79)	108 (81)	0.897
Non-white	40 (21)	26 (19)	
Ethnicity (%)			
Not Hispanic	174 (90)	123 (92)	0.733
Missing	17 (9)	10 (7)	
Hospital (%)			
A	75 (39)	58 (43)	0.701
B	54 (28)	35 (26)	
C	65 (34)	41 (31)	
Reason for visit (%)			
Screening	133 (69)	99 (74)	0.358
New cancer	61 (31)	35 (26)	
Referral (%)			
Primary Care	30 (16)	22 (16)	0.038
Other Physician/Unknown	55 (28)	53 (40)	
Other Urologist	30 (16)	9 (7)	
Self	79 (40)	50 (37)	

IQR = Inter-quartile range.

Kingdom, for example, fewer people presented to general practitioners resulting in greater than 70% reduction in cancer related referrals [15,16]. Similarly in the United States, general practitioners reported 60% decline in patient volume [17]. Patient's willingness to present during the stay-at-home period likely impacted our referral given that we saw a general increase in visits per week as the county progressed through the phases of reopening.

Reduced cancer visits may also stem from an overall decrease in cancer screening performed during the pandemic. We saw a 43% decline in new prostate cancer screening visits during the pandemic. In the United States,

screening measures including mammography, Pap smear, colonoscopy, and prostate-specific antigen testing all declined notably [18,19]. In fact, the Centers for Medicare & Medicaid Services labeled screening visits as low acuity and recommended postponing such services [20]. Several governments within the United Kingdom even suspended screening services for breast, cervical, and colon cancers [21]. Although prostate cancer's more indolent course makes its evaluation more reasonable to postpone, the effect of the delayed diagnosis of other urologic malignancies remains to be determined. Modeling efforts from the United Kingdom have estimated 3291 to 3,621 avoidable

Table 3
Visits per week in urologic oncology clinic, stratified by pre-COVID and COVID, which is further stratified by county phase (red, yellow, green)

Referral condition	Total visits	Visits per week
Overall		
Pre-COVID	585	38.3 (35.2, 41.5)[a]
COVID	362	
Red Phase	164	19.5 (16.5, 22.7)
Yellow Phase	76	25.3 (20.0, 31.7)
Green Phase	122	32.9 (27.3, 39.2)
Prostate		
Pre-COVID	268	17.5 (15.5, 19.8)
COVID	131	
Red Phase	64	7.59 (5.9, 9.7)
Yellow Phase	26	8.7 (5.7, 12.7)
Green Phase	41	11.0 (7.9, 12.7)
Kidney		
Pre-COVID	124	8.1 (6.8, 9.7)
COVID	99	
Red Phase	44	5.2 (3.8, 7.0)
Yellow Phase	23	7.7 (4.9, 11.5)
Green Phase	32	8.6 (5.9, 12.2)
Bladder		
Pre-COVID	194	12.7 (11.0, 14.6)
COVID	134	
Red phase	58	6.9 (5.2, 8.9)
Yellow Phase	27	9.0 (5.9, 13.1)
Green Phase	49	13.2 (9.7, 17.44)

[a] Ninety-five percent confidence intervals are in parentheses.The pre-COVID period extends from 12/1/2019 to 03/16/2020 (107 days). The COVID period extends from 3/1720 to 6/30/20 and is further stratified by the county's reopening phase. The Red phase extended from 3/17/20 to 5/14/20 (59 days); Yellow Phase 5/15/20 to 6/4/20 (21 days); Green Phase 6/5/30 to 6/30/20 (26 days).

deaths as a result of reduced screening and delayed diagnosis of breast, colorectal cancer, lung, and esophageal cancers during the lockdown period [16].

While the first step in cancer diagnosis requires patients to seek care, the next step requires them to schedule and attend a consultation with a health professional. The ability to complete this step may be impacted by the healthcare system's capacity and patients' socioeconomic status. General practitioners have needed to reduce staffing and hours, both as a mechanism to maintain distancing but also in response to reduced revenue from diminished patient volume [17]. Specialty care was also affected, as revealed by a survey study of 51 medical oncology practices throughout the country showing that 71% cancelled routine office visits and 14% reduced their clinic staff [22]. The ability to seek consultation is further compounded by the economic fallout during the pandemic. Given that health insurance is linked to employment for many, losing a job can equate to losing insurance. It is estimated that a 20% unemployment rate would result a loss of employer insurance among 16% who were insured by those plans, and more than a quarter of those would remain uninsured [23]. Reduced insurance coverage would likely worsen the existing socioeconomic disparity in healthcare [24]. While we found no differences in various social determinants of health (e.g., rurality of residence, race, marital status, income) between our pre-COVID-19 and COVID-19 populations, other regions more significantly impacted by the virus may see more startling differences.

Many practices, including urologic oncology, are employing telehealth in response to their reduced in-person capacity [25]. Telehealth offers many benefits such as a means for triaging patient symptoms. However, new cancer visits often require physical exam, laboratory work, and diagnostic testing [26]. Furthermore, the need for broadband internet access and digital devices limits its use in populations that lack these services, such as those in rural areas [27]. It has been shown that most urologic oncology patients preferred a telehealth visit during the pandemic, but interestingly many preferred to resume face-to-face visits when feasible [2]. In our practice, all patient referrals were screened, and those with a potential cancer diagnosis were prioritized as face-to-face visits but offered telehealth if they were interested. While our overall rate of telehealth visits for non-cancer and routine

Table 4
Estimated effect (adjusted OR[a] and 95% CI) of being evaluated in the pre-COVID or COVID period on urban-rural location, racial status, marital status[b], age, and income level

Outcome	Prostate	Kidney	Bladder
Urban	Reference	Reference	Reference
Rural	1.36 (0.71, 2.58)	1.33 (0.63, 2.83)	0.55 (0.22, 1.28)
White	Reference	Reference	Reference
Non-white	1.07 (0.54, 2.09)	2.72 (0.92, 9.01)	0.93 (0.49, 1.74)
Married	Reference	Reference	Reference
Not married/Unknown	0.91 (0.54, 1.53)	1.10 (0.59, 2.04)	0.92 (0.55, 1.53)
Age, years	−0.49 (−2.28, 1.29)	1.82 (−2.10, 5.74)	1.43 (−1.60, 4.45)
Income, $	−650 (−3,421, 2122)	1,732 (−2,196, 5,660)	−17 (−3,002, 2,967)

Results of a multivariable logistic and linear regression analyses.

[a] Each outcome is adjusted for the other outcomes as well as urban-rural location, race, martial status, age, and median income.

[b] Logistic regression was performed for categorical outcomes (urban-rural location, racial status, and marital status) and linear regression was performed for continuous outcomes (age, median income).

follow-up visits increased, only 7 new cancer patients in our COVID-19 cohort received a telehealth visit.

Our findings have several policy implications. Given the overall morbidity and life-threatening nature of malignancy, the evaluation of patients who may harbor cancer must adapt to the COVID-19 era in order to ensure timely diagnosis. While the impact delayed cancer diagnosis will have on survival remains to be seen, modeling using SEER program data estimates 33,890 excess cancer related deaths based on the decline in diagnoses and treatment of cancer during the COVID-19 period [28]. Fortunately, the urologic community has come together to put forth recommendations regarding triage of urologic oncology surgeries. However, we are still in need of policy-level interventions to lessen the potential mortality from delayed cancer diagnosis. These policies need to impact every step of the pathway to diagnosis. First, patients must participate in their care by seeking help when concerning symptoms arise [14]. This can be facilitated by public health campaigns and policy initiatives that expand Medicaid or subsidies that make marketplace plans more affordable to those who have lost employer coverage [23]. Second, providers must be available and ready to receive an influx of patients. Primary care providers are at the forefront of this battle and unfortunately their practices can be financially precarious [17]. Increasing government relief and loan forgiveness programs for these practices can ensure that this frontline remains stable [29]. Although CMS has set telemedicine reimbursement to expire, continuing reimbursement will allow for increased visits and aid in triaging patients who require an in-person visit [26,30]. Third, expedition of diagnostic services for cancer evaluation is needed. Some propose establishment of alternate diagnostic sites that are intended to be far removed from potential viral exposure, thereby providing a "COVID-19 protected" space [31].

Our findings must be considered in the context of several limitations. First, this was a retrospective study in which new patients were extracted using reasons for referral, and therefore subject to confounding bias and coding errors. However, in our regression models, we adjusted for several clinical and nonclinical factors to minimize this bias. Second, we do not have any pathologic data to quantify that proportion of these individuals who went on receive a cancer diagnosis and therefore cannot comment on treatment delays. However, this is data we plan to collect for future studies, and we opted to limit the scope of this study to new patient evaluations only. Third, our region was relatively spared from a large COVID-19 burden, and therefore may not be generalizable to regions that were more heavily impacted.

5. Conclusion

There is no question that the world is entering a different era, and therefore, our health systems must adapt accordingly. As a urologic oncology community, it is our job to ensure patients with concern for malignancy are evaluated and diagnosed in a timely manner to prevent delays in cancer treatment. Improving clinic-based triage methods and developing safe methods to continue screening and diagnostic testing will help ensure we do not fail our patients harboring malignancy.

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