

## ORIGINAL RESEARCH

# An Expedited Malignancy Evaluation: Quality Improvement in a Safety Net Hospital

Joseph P. Marshalek, MD<sup>1</sup>, Christopher O. Brown, MD<sup>2</sup>, Jesse Szatkowski, MD<sup>2</sup>, Joe A. Torre, MD<sup>2</sup> and James J. Yeh, MD<sup>1</sup>

<sup>1</sup>Division of Hematology/Oncology, Department of Medicine Harbor-UCLA Medical Center, Torrance, CA, USA

<sup>2</sup>Department of Medicine, Harbor-UCLA Medical Center, Torrance, CA, USA

### Abstract

Evaluation of patients with suspected malignancy can be nuanced and multi-disciplinary. Patients may be admitted to the hospital to expedite and coordinate care. At Harbor-UCLA Medical Center, a Los Angeles County safety net hospital, an Expedited Work-up Clinic was developed to coordinate outpatient imaging, biopsy, and oncology referral for uninsured patients without an established primary care provider. This cohort of 328 patients were seen between 2018-2021 in our Expedited Work-up Clinic. Most referrals came from the emergency department (85%) with 44% of those patients referred to Harbor-UCLA Medical Center from an outside facility. The median time from Expedited Work-up Clinic referral to Expedited Work-up Clinic visit was 10 days. On average, the time to outpatient imaging was 14 days, and the time to biopsy was 18 days. Ultimately, 183 patients (56%) were diagnosed with cancer with most at stage IV disease (57%). Upon confirmation of malignancy, patients were referred to the appropriate oncologic subspecialty with a median of 17 days from referral to appointment. Overall, the median time from Expedited Work-up Clinic to first oncology appointment was 25 days, and the median time from first EWC appointment to first oncology treatment was 53 days. Of the 328 patients seen at Expedited Work-up Clinic, 56 patients (17%) died or enrolled in hospice within 1 year. This study demonstrates the efficacy of outpatient expedited work-up as an alternative to inpatient hospitalization in patients with suspected malignancy, even in a predominantly uninsured patient population. Future aims include engaging involved stakeholders for coordinated efforts to optimize each stage in the diagnostic work-up.

**KEYWORDS:** Malignancy, cancer, diagnosis, work-up, disparities

**ABBREVIATIONS:** Computed tomography (CT), Department of Health Services (DHS), electronic consult (eConsult), Expedited Work-up Clinic (EWC), interquartile range (IQR), magnetic resonance imaging (MRI), positron emission tomography (PET), primary care provider (PCP), Quick Diagnosis Unit (QDU), UCLA (University of California Los Angeles), ultrasound (US)

### Introduction

Diagnostic evaluation of suspected malignancy can be a complex and challenging process requiring coordination of various diagnostic modalities and collaboration between multiple specialties. Harbor-UCLA Medical Center is a Los Angeles County public hospital that provides care for many people who are uninsured or underinsured without access to longitudinal primary care. Many patients are referred from outside hospitals or clinics to establish care with subspecialty oncologists.

The Expedited Work-up Clinic (EWC) at Harbor-UCLA Medical Center sees patients with suspected malignancies who do not have primary care providers (PCP) nor health insurance. The clinic's goal is to coordinate imaging, biopsy, and referral to oncologic subspecialties. EWC aims to hasten the diagnosis and treatment of malignancy for a particularly vulnerable population of patients, as delays in diagnosis and treatment have been associated with worse outcomes.<sup>1-4</sup> We retrospectively examined three-years of data from EWC to characterize the length of time between stages in the diagnostic evaluation. We hoped to identify bottlenecks, shortcomings, and barriers in order to improve future care.

### Methods

The EWC is staffed by one internal medicine staff physician, one rotating internal medicine resident, and one registered nurse. The clinic operates for 4 hours one day each week. The internist and registered nurse assigned to EWC each also spend roughly 4 hours per week coordinating care outside of scheduled clinic hours. Referrals to EWC were made via the electronic health record using direct messaging or order placement. Referral criteria to EWC are defined in Figure 1. These exclude suspected primary breast, head and neck, renal, and brain masses.

We examined 359 referrals to EWC from 2018 to 2021. Data included demographics, site of referral, imaging, biopsies, cancer type, cancer stage, first oncology appointment, first oncology treatment, and survival. The times between various stages in the diagnostic evaluation were characterized by median, range, and interquartile range (IQR).

The project was reviewed by the Lundquist Institutional Review Board and determined to be a quality improvement project which did not require formal IRB review.

## Results

A total of 359 patients presenting to Harbor-UCLA Medical Center with suspected malignancy were referred to EWC. The referrals came from the emergency department (85%), urgent care (12%), inpatient wards (2%), and the observation unit (1%). Referred patients to EWC included 143 patients (44%) referred to Harbor-UCLA Medical Center from an outside clinic or hospital not part of the Los Angeles County Department of Health Services (DHS). The median time from first contact at a non-DHS site to first Harbor-UCLA visit was 7 days (IQR 3 – 19 days).

The median time from first Harbor-UCLA Medical Center visit to Expedited Work-up Clinic was 10 days (IQR 6 – 17 days). Of the 359 patients referred, there were 31 no-shows (9%) with 328 patients who were eventually seen in EWC. Ages ranged from 21 to 88 years old (median 53 years old). The cohort was ethnically and racially diverse: 72% Hispanic; 10% Black / African-American; 7% Asian; 5% White; 6% Other. Primary languages included 60% Spanish, 35% English, 5% Other.

After the EWC visit, patients were referred for imaging and biopsy. The median time from EWC to imaging was 14 days (IQR 7 – 23 days), and Table 1 presents time to imaging by modality. The median time from biopsy request to biopsy date was 18 days (IQR 11 – 41 days) and Table 2 presents the breakdown by department. The average was 6 days (IQR 3 – 8 days) for review and release of biopsy results by Pathology. Importantly, 265 patients (81%) had imaging prior to EWC, and 31 patients (10%) had a biopsy performed before EWC.

If a malignancy was confirmed after imaging and biopsy, an electronic consult (eConsult) was placed by EWC providers to the appropriate oncologic subspecialty. The median time from eConsult initiation to oncology subspecialty appointment was 17 days (IQR 10 – 28 days). Table 3 stratifies these data by oncology specialty. The total time from Expedited Work-Up Clinic visit to first oncology appointment was a mean of 25 days (IQR 15 – 46 days).

Of the 329 patients seen at EWC, 183 patients (56%) were ultimately diagnosed with cancer. A wide variety of cancer types were identified (Figure 1) with colorectal (15%), hepatobiliary (10%), genitourinary (10%), gastroesophageal (9%), and lung (9%) cancers being the most common. Staging at time of diagnosis was: 11% stage I; 8% stage II; 16% stage III; and 57% stage IV as shown in Figure 2.

After malignancy diagnosis, 82% of patients underwent active treatment at Harbor-UCLA Medical Center, with 18% of patients receiving supportive care only or care out-of-network. First-line treatment strategies included: chemotherapy (48%); surgery (22%); concurrent chemoradiation (6%); radiation

therapy (4%); other (1%); and surveillance (1%). The median time from EWC visit to first oncology treatment was 53 days (IQR 36 – 80 days). Of the 329 patients seen at Expedited Work-up Clinic, 56 patients (17%) died or enrolled in hospice within 1 year of EWC visit.

## Discussion

Since 2018, our EWC has seen over 300 patients with a suspected malignancy to coordinate diagnosis and oncology referrals. The large majority (85%) of EWC referrals originated from the emergency department. None of these patients had a PCP to coordinate care. 44% of patients referred to EWC were initially evaluated at a non-DHS hospital or clinic and were recommended to present to Harbor-UCLA Medical Center for further evaluation of suspected malignancy. This was primarily due to a lack of adequate insurance, illustrating the vulnerability of patients in this study.

Eventually, 56% of patients evaluated at EWC were diagnosed with cancer. Gastrointestinal malignancies accounting for greater than 40% of cancers diagnosed (15% colorectal, 10% hepatobiliary, 9% gastroesophageal, 7% pancreatic). Most patients presented with advanced stage disease (57% stage IV, 16% stage III), with poor 1-year overall survival. Seventeen percent died or were enrolled in hospice within 1 year. This confirms high-risk patients who have limited access to cancer screening, preventative care, and longitudinal primary care, helpful for earlier cancer detection. Because certain suspected primary malignancies were excluded (Figure 1), malignancies referred to a smaller percentage of the cancers seen in EWC compared to incidence in the general population. Some suspected malignancies were excluded from EWC because of well-defined evaluations within our system or because of the importance of surgical input in initial management. Some patients referred to EWC had non-malignant symptoms. A wide variety of etiologies included benign masses, rheumatologic, and infectious causes.

Limited numbers of similar clinics have been described. The Maimonides Medical Center in Brooklyn, New York developed a Rapid Assessment Service clinic to coordinate evaluation of patients referred from the emergency department with suspected malignancy.<sup>5</sup> Spain developed multiple Quick Diagnosis Units (QDUs) to provide a similar service for patients with suspected cancer.<sup>6-10</sup> These aim to hasten the time to diagnosis and treatment while simultaneously reducing the costs of unnecessary hospitalizations.

Our data identified potential areas for improvement at each stage of the diagnostic evaluation. First, the median time from EWC referral to EWC visit was 10 days (IQR 6 – 17). Increasing the frequency of Expedited Work-Up Clinic from one half-day per week to two half-days per week could shorten this time. Comparing two Quick Diagnosis Units in Spain, the QDU with increased number of days and time per week had a statistically significant shorter time to diagnosis.<sup>9</sup>

After being seen in EWC, the median time to imaging was 14 days (IQR 7 – 23) with similar times across all imaging modalities (14 day median for CT, MRI, US) except for PET imaging (median 24 days, IQR 14 – 45), representing another delay in the diagnostic pathway. We believe a target imaging time of 7 – 10 days would be a feasible improvement. Interventions could include priority scheduling or overbooking for patients referred from EWC.

Across all interventional specialties, the median time from biopsy request to biopsy completion was 18 days (IQR 11 – 41). Interventional Radiology (median 13 days) performed above average ahead of all other specialties. The longest median waits were Pulmonology (median 36 days) and Gynecologic Oncology (median 33 days).

Time to imaging and time to biopsy represent the greatest portions of time in the diagnostic pathway. Imaging upon presentation in the emergency department and inpatient biopsy may expedite outpatient oncology referral and treatment. However, this must be balanced with the reduced costs<sup>6,8,11</sup> and decreased utilization of inpatient beds<sup>7,11</sup> with outpatient evaluation. Some studies report patients prefer outpatient Quick Diagnosis Unit over conventional hospitalization.<sup>7,11</sup> These studies were primarily in Spain, where universal health care is more readily accessible than in the United States, especially for this cohort of patients.

This descriptive analysis of the Harbor-UCLA Expedited Work-up Clinic has multiple limitations. Firstly, there is no direct comparison to the diagnostic pathways with an empaneled PCP or inpatient hospitalization. Second, a cost-analysis was not performed which may strengthen the rationale for EWC utilization. Lastly, the relationship between time to diagnosis and treatment and survival was not examined.

Future work should engage stakeholders to discuss strategies to optimize care for patients with suspected malignancy. Addi-

tionally, we plan to include patient information to understand EWC strengths and weaknesses. Potential considerations include expanding access to the Medicaid program in California, which could reduce the numbers of patients without health insurance, thus reducing the future need for EWC.

Reviewing published reports of similar clinics globally identified additional strategies to optimize the Harbor-UCLA Expedited Work-up Clinic. Increasing the number of dedicated clinical staff, such as an additional mid-level practitioner or dedicated nurse coordinator, could be beneficial. In the 2017 comparative analysis by Montori-Palacin et al, the Quick Diagnosis Unit with more dedicated staff (registered nurse, care coordinator nurse, secretaries) demonstrated statistically significant shorter time to diagnosis.<sup>9</sup> Furthermore, patient navigation tools and resources have been shown to be particularly valuable for patients with known or suspected cancer.<sup>12</sup> Another possible strategy could be utilizing rotating hematology / oncology fellows who are more familiar with the complexities and nuances of cancer diagnosis. One of the Quick Diagnosis Units in Spain conducts weekly meetings with 6 oncology subspecialists and the dedicated QDU internist to help guide diagnostic work-up.<sup>10</sup>

Access to care remains suboptimal. The median time from EWC to first oncology visit was 25 days, IQR 15 – 46, and EWC to first oncology treatment was 53 days, IQR 36 – 80. Some have reported shorter times,<sup>5,7,9,11</sup> while others report comparable waiting periods.<sup>10,13,14</sup> About half of our study period included the COVID-19 pandemic, with substantial impact on outpatient appointments, imaging, and procedures.<sup>15,16</sup>

In conclusion, our resource limited setting has opportunities to reduce the time to diagnosis and treatment, while balancing costs of unnecessary inpatient hospitalizations. Optimizing malignancy evaluations are important for our high-risk, underserved patients.

**Tables and Figures**

Imaging Modality	Number of Patients	Median (days)	Interquartile Range (days)
Computed tomography (CT)	88	14	8 – 25
Magnetic resonance imaging (MRI)	52	14	4 – 22
Positron emission tomography (PET)	45	24	14 – 45
Ultrasound (US)	25	14	4 – 18

**Table 1: Time from Expedited Work-up Clinic to imaging by modality**

Department Performing Biopsy	Number of Patients	Median (days)	Interquartile Range (days)
Interventional Radiology	67	13	9 – 18
Gastroenterology	67	19	11 – 44
Pulmonology	16	36	21 – 55
Urology	11	21	18 – 36
Otolaryngology	9	28	19 – 44
Gynecologic Oncology	9	33	16 – 51
Endocrinology	5	28	20 – 41

**Table 2: Time from biopsy request to biopsy date by department**

Oncologic Subspecialty	Number of Patients	Median (days)	Interquartile Range (days)
Hematology / Oncology	72	17	10 – 28
Surgical Oncology	38	23	14 – 30
Urology	11	17	10 – 29
Colorectal Surgery	10	9	6 – 15
Otolaryngology	9	22	10 – 29
Gynecologic Oncology	8	11	8 – 26
Cardiothoracic Surgery	6	16	8 – 30
Breast Surgery	3	40	32 – 40

**Table 3: Time from eConsult initiation to first oncology appointment by specialty**

**Figure 1: Expedited Work-Up Clinic Referral Criteria**

### Expedited Work-Up Clinic Referral Criteria

#### New onset ascites

This must be a new diagnosis and first presentation of ascites. Requires paracentesis performed in ED to rule out infection, SAAG >1.1, transaminases < 3x normal, rapid HIV, CBC, lipase, CMP. No referral for therapeutic paracentesis alone, No evidence of pancreatitis or biliary obstruction.

#### Anemia (Hgb < 8g/dL on initial presentation)

Requires CBC, peripheral smear, CMP, rapid HIV, ECG, CXR, type and screen No evidence of pancytopenia, HIV, leukemia, active GI/GU bleeding, or evidence of hemolysis. Patients with suspected gynecologic etiology should be referred to the GYN service. Post transfusion CBC required.

#### Weight loss (unexplained >10% within 1 month or >15% in 6 months)

Requires CBC, CMP, ECG, CXR, rapid HIV. Patients with prior imaging must have actual images or be instructed to retrieve images prior to clinic appointment.

#### Undiagnosed mass (excluding primary breast, head and neck, renal, and brain masses)

- Contact the appropriate surgical service for primary breast, head and neck, renal, and brain masses
- Requires results or radiographic imaging to confirm presence of mass. Patients with prior imaging must have actual images or be instructed to retrieve imaging prior to clinic appointment.

#### New onset pleural effusion

Requires thoracentesis, CMP, CBC, serum amylase, LDH, and pleural fluid analysis (predominant lymphocytic effusion or high suspicion for Tuberculosis must be admitted). Chest CT only if immediately clinically indicated (ie. suspicion for pulmonary embolism).

#### Clinical Criteria:

- Patient is stable (T < 38.3c, HR < 100, RR < 24, BP > 110/50, BP < 180/110, pulse ox > 92% on room air, oriented x 4)
- Able to be seen in 2-10 business days without significant risk
- No active co-morbidities (ie infection, CAD, CHF, stroke, metastatic cancer, renal failure, dyspnea).
- Patient has reliable contact information.

Figure 2: Distribution of Cancer Types diagnosed in EWC (n = 183 patients)

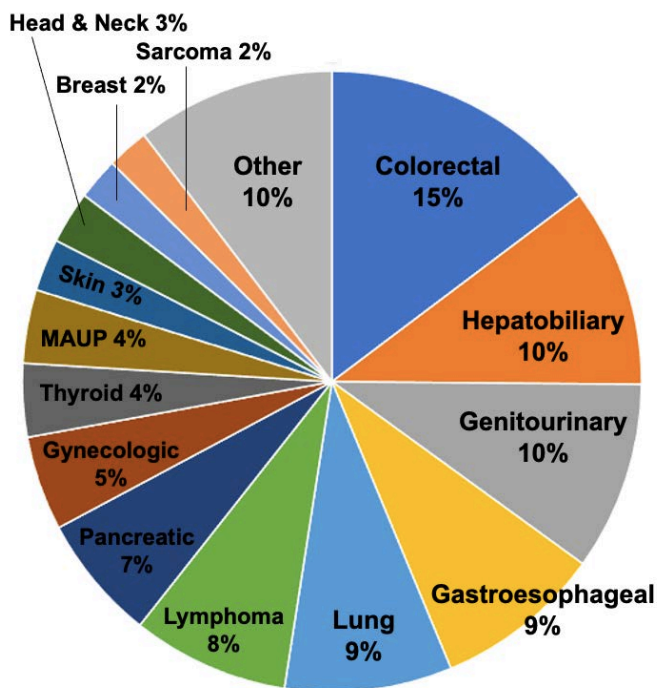
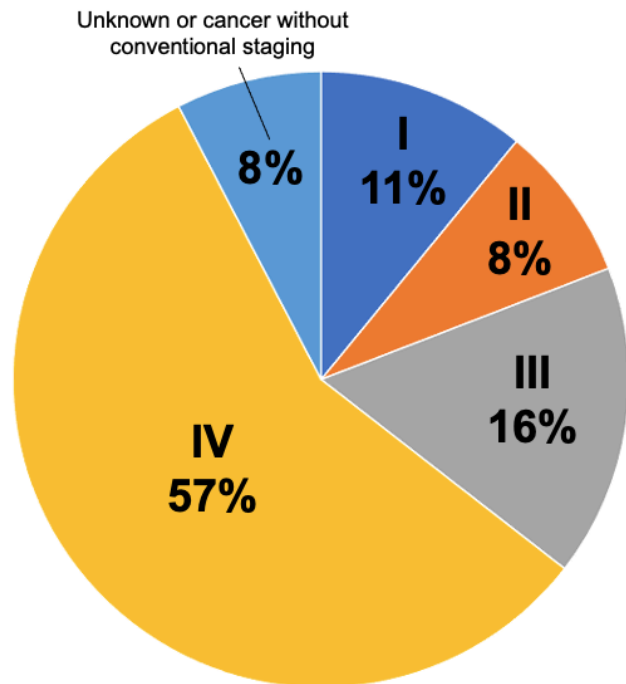


Figure 3: Cancer stage at time of diagnosis (n = 183 patients)



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