Receiving a cancer diagnosis is anxiety provoking. Waiting for definitive treatment for cancer augments this anxiety [1-7]. Waiting for treatment also decreases patient satisfaction with their medical center and results in a poorer quality of life [4,8]. The underlying concern is whether longer wait times lead to spreading of tumor, the need for more extensive therapy and ultimately poorer survival.

There have been studies across cancer types addressing the relationship between wait times and overall survival. Table 1 shows those studies where there is a clear detrimental relationship on survival and those where the relationship is inconclusive [4,8-35].

With the exception of esophageal cancer, each disease site has studies showing divergent answers as to whether there is a relationship between wait times for surgery and survival. In part this is related to the quality of the studies. All of the studies are retrospective cohort studies that may be single center or population based. Such studies have the risk of confounding and so it is important to conduct multivariate analysis with risk adjustment. Unfortunately, many studies do not have details about stage, or histology which should be included in the model. Duration of follow-up can lead to variation in results. In addition the reason for treatment delay is not always clear (i.e., patient comorbidities impacting the timing of surgery). Single center studies often have small sample sizes which may limit the ability to find a relationship even if one exists. Rather than looking at wait times as a continuous relationship, often the studies look at wait times in a dichotomous variable and so miss an issue.

There is a clear relationship between better outcomes (quality of care) in high volume hospitals compared to low volume centers across many cancer types [10]. In many jurisdictions we have seen a displacement of surgical volume to high volume cancer centers [36]. Rising wait times in this setting reflects a compromised ability of the system of care to deal with this volume in terms of availability of resources and efficiencies [9]. Specific stresses are seen in diagnostic (i.e., diagnostic radiology, interventional radiology, pathology) and treatment resources (number of quality oncology surgeons, operating room access, inpatient beds) [4,8,9,36-38]. To compound this, fixed hospital budgets limit capacity and provide little incentive for medical staff to increase production. To deal with this problem, there has been a plea that wait times be considered when formulating national health policy [8]. Profession societies and authorities have set standards which by enlarge focus on 30 days from diagnosis of cancer to treatment [8,39] and no longer than 8 weeks [40,41]. Fast tract programs in Europe, USA, and Canada [9,11,42] promote care pathways to minimize time from diagnosis, staging to treatment. Implementing multidisciplinary tumor boards and joint clinics have also helped.

In this journal, Nanthamongkolkul and Hanprasertpong [35] adds to the list of studies in Table 1 showing that in Thailand at a single center, wait times exceeding 8 weeks for surgery in early stage cervical cancer care leads to worse outcomes. This group also shows that in middle resource countries, long wait times for surgery can be related to additional factors. Rising wait times can reflect issues with inability to pay (co-pay or patient pay systems), poor access to services (i.e., limited human resources like surgical oncologists or limited treatment resources like availability of operating rooms) [8,9], and poor quality of care (i.e., timely diagnosis through screening, diagnosis and staging investigation) [8,12].

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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See accompanying article by Nanthamongkolkul and Hanprasertpong on page 262.
### Table 1. Relationship of time from diagnosis to surgical treatment on survival

| Study                          | Time       | Clear relationship | Study                          | Time       | Unclear relationship |
|-------------------------------|------------|--------------------|-------------------------------|------------|----------------------|
| Bladder                       | Kulkarni et al. (2009) [13]* | 40 day              | Nielsen et al. (2007) [17]    |            |
| Ayres et al. (2008) [14]      |            |                    |                               |            |
| Lee et al. (2006) [15]        |            |                    |                               |            |
| Gore et al. (2009) [16]       |            |                    |                               |            |
| Breast                        | Richards et al. (1999) [18]† | 3 mo                | Brazda et al. (2010) [12]     |            |
| Yun et al. (2012) [8]*        |            |                    | McLaughlin et al. (2012) [19] (early stage)* | 60 day |
| McLaughlin et al. (2012) [19] |            |                    |                               |            |
| Cervix                        | Nanthamongpokkul et al. (2015) [35] | 8 wk       | Umezu et al. (2012) [20]     |            |
| Colorectal                     | Yun et al. (2012) [8]*     | 1 mo                | Simunovic et al. (2009) [4]†  | 2 wk       |
|                               |            |                    | Walsh et al. (2007) [22]      | 2 wk       |
|                               |            |                    | Zafar et al. (2012) [23]      |            |
|                               |            |                    | Currie et al. (2012) [25]     |            |
| Esophagus                      | Kotz et al. (2006) [27]*   | 3, 5, 9 wk          | Grotenhuis et al. (2010) [26] |            |
|                               |            |                    | Sharpe et al. (2010) [28]     | 2 wk       |
| Head and neck                 | Van Harten et al. (2015) [11]* | 15, 30, 60, 75, 90 day | Myrdal et al. (2004) [29]     |            |
| Lung                          | Yun et al. (2012) [8]*     | 1 mo                | Ramos et al. (2007) [24]†     |            |
| Melanoma                      | Pacífico et al. (2007) [30] | 2 wk                | Simunovic et al. (2009) [4]†  |            |
| Pancreas                      | Yun et al. (2012) [8]      | 1 mo                | Walsh et al. (2007) [22]      |            |
|                               |            |                    | Zafar et al. (2012) [23]      |            |
|                               |            |                    | Currie et al. (2012) [25]     |            |
| Prostate                      | Raptisi et al. (2010) [31] | 62 day              | Redaniel et al. (2013) [32]*  | 3, 6 mo    |
| Renal                         | Stec et al. (2008) [10]    |                    |                               |            |
| Stomach                       | Yun et al. (2012) [8]*     | 1 mo                |                               |            |
| Uterus                        | Elit et al. (2014) [9]*    | 12 wk               | Menczer et al. (1995) [33]    | 4 mo       |
|                               |            |                    | Matsuo et al. (2015) [34]     | 14, 42, 84 day |

*Population based; †Meta-analysis.

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