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Assessing Time from Door-to-Antibiotic Administration for Adult Cancer Patients with Neutropenic Fever in the Emergency Department

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Background

- Infection, related to febrile neutropenia, in patients receiving chemotherapy for cancer remains a common complication and is a medical emergency.
- Fever is often the only sign of severe underlying infection in neutropenic patients due to the patient's immunosuppressed state (Butts, et.al, 2017).
- Vigilant nursing assessment and immediate medical attention for neutropenic fever (NF) is imperative because the rate of major organ complication and mortality is as high as 30% and 11% respectively (Freifield et.al, 2011 & Taplitz et.al, 2018).
- In the setting of severe sepsis or septic shock the mortality rate may be as high as 50% (Taplitz et.al, 2018).
- Reduced time to antibiotics has been shown to improve outcomes in patients with sepsis (Fletcher et.al, 2013).
- Despite controversial outcomes related to door to antibiotic times in NF patients, the expert recommendation and current standard of practice uphold that initiation of antibiotics be administered within 60 minutes (Taplitz et.al, 2018 & Flowers et.al, 2013).
- NF patients frequently present to Emergency Department (ED) settings for evaluation and treatment (Bow et.al, 2019).
- Studies confirm significant delays in antibiotic administration, associated with NF patients, occur in the ED setting (Koenig et.al, 2019).
- As a result, increased length of stay, increased risk for adverse events, sepsis and even death can occur (Koenig et.al, 2019).
- Providence Portland Medical Center's (PPMC) 46-bed ED is where cancer patients commonly present with NF and are provided nursing and medical care.

Purpose

The purpose of this study is to assess the door to antibiotic times, based on current standards of care of a 60-minute time frame, for cancer patients presenting with NF who are admitted through PPMC's ED.

Methods

- The Providence Oregon Regional Institutional Review Board approved this project.
- This was a retrospective chart review of adult cancer patients admitted with NF from PPMC's ED to inpatient units between January 1st, 2018 to December 31st, 2019.
- Inclusion criteria used to define the study population consisted of: age of at least 18 years old, active cancer diagnosis, received chemotherapy within 14 days of presentation to the ED, absolute neutrophil count (ANC) of less than or equal to 1,000pu/L, and an oral temperature of equal to or greater than 38.1 C.
- Data points included door to antibiotic (DTA) times, early identification of risk factors in triage note, demographics, vital signs, triage acuity using Emergency Severity Index (ESI) with 1 being higher acuity than 5, types of venous access, and times of blood draws, and antibiotic orders.

Figure 1: Door to Antibiotic Times
Mean 152 minutes
N=21

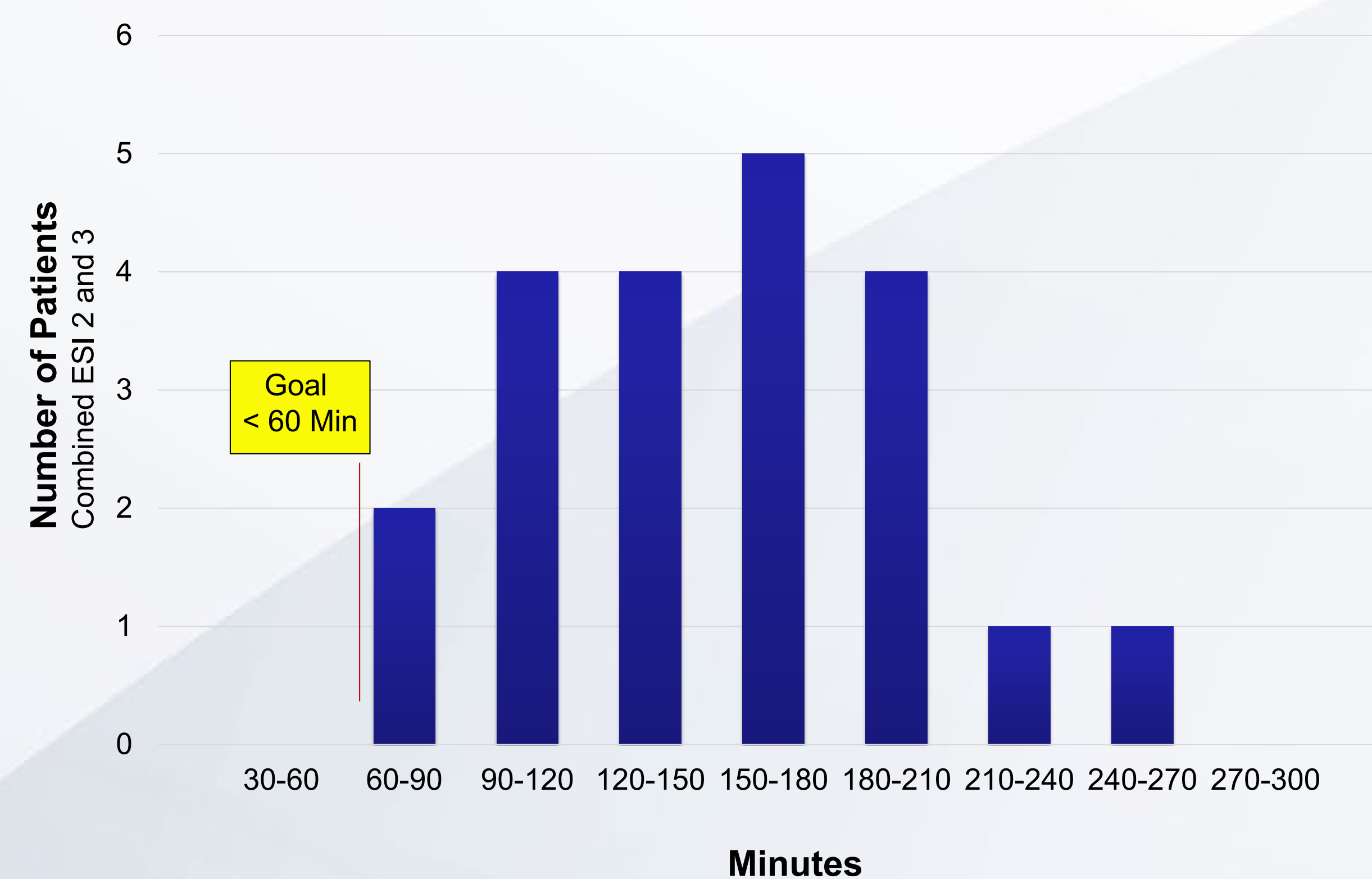
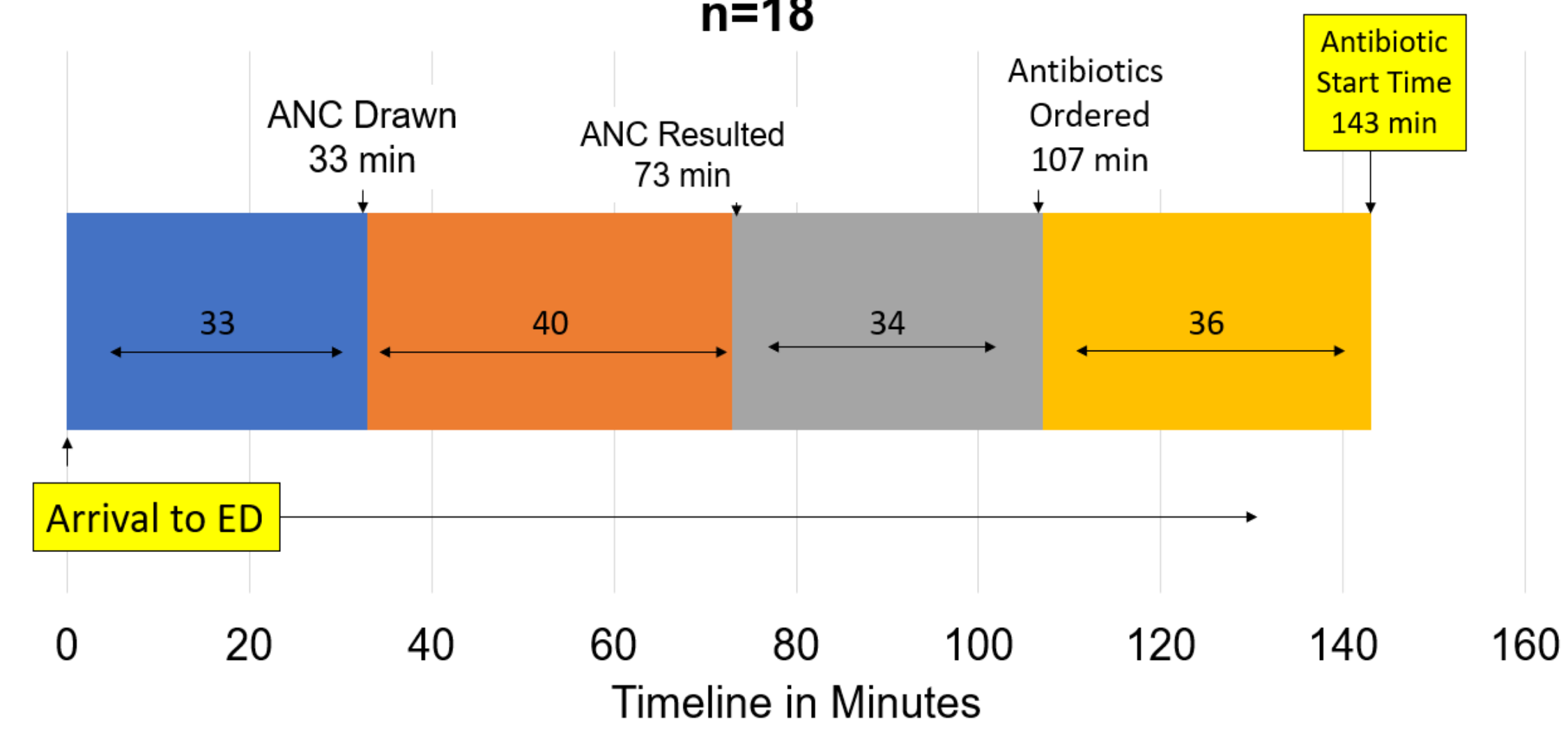


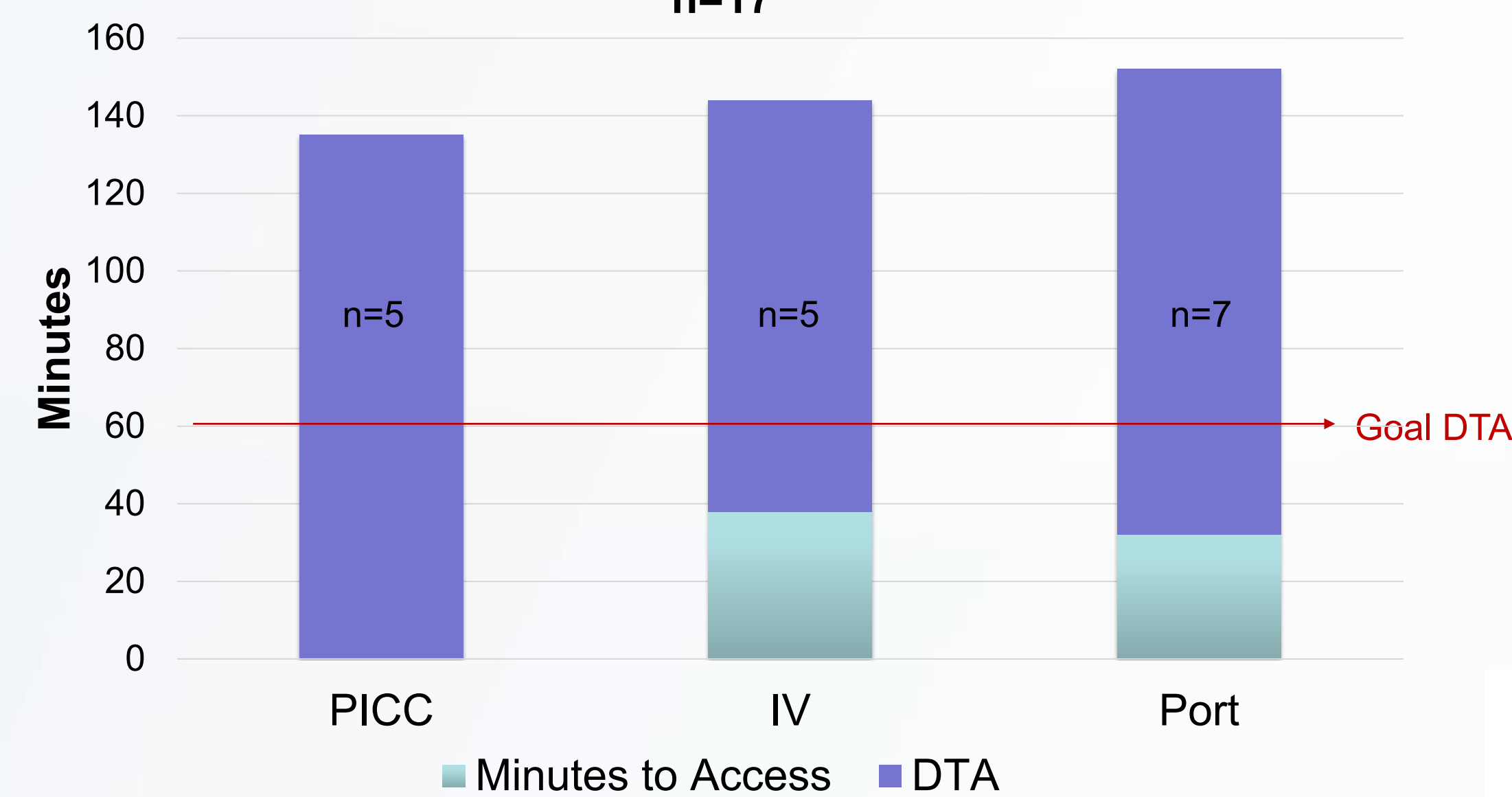
Figure 2: Timeline of Door to Antibiotics in ESI 2 Patients:
Mean Time in Minutes Between Markers
n=18



Results

- 21 patients met inclusion criteria for this project.
- The average DTA time was 152 minutes with a range between 72 and 260 minutes (Figure 1).
- The 2 outliers with the longest DTA times were mis-triaged at a lower acuity of ESI-3.
- On arrival to the ED, patients self identified a risk factor of cancer, chemotherapy, or fever between 67 – 95% of the time.
- There were no significant DTA discrepancies between select populations except for ESI acuity (Figure 4).
- Delays were spread evenly between blood draw, ANC result, antibiotic order, and antibiotic delivery (Figure 2).

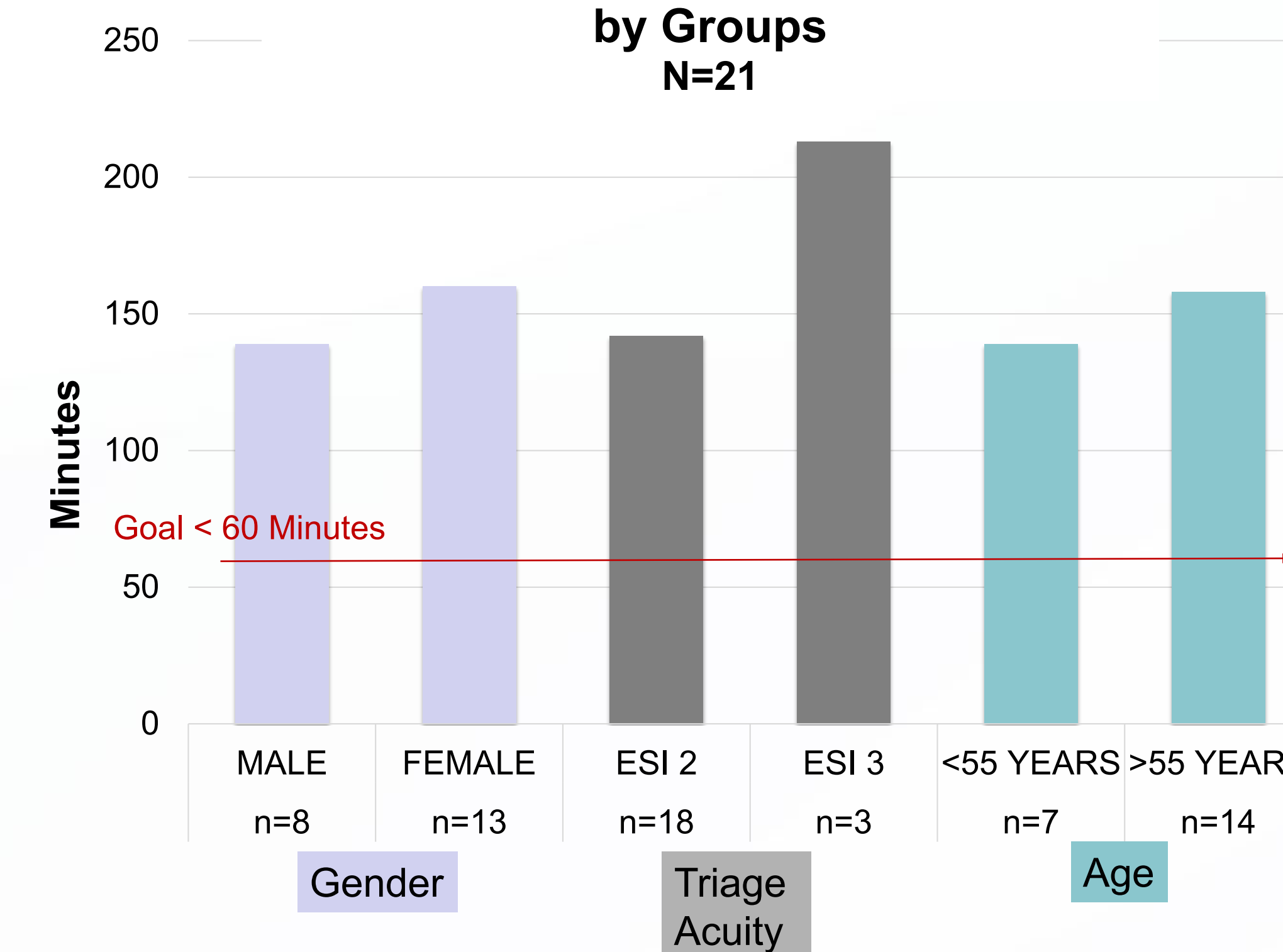
Figure 3: Door to Antibiotic (DTA) and Venous Access Times in ESI 2 Patients: Comparing PICC, IV, & Port
n=17



Discussion/Conclusions

- Lengthy DTA times suggest interventions are needed to address delays.
- A key limitation was the small sample size of 21 patients.
- Assigning an ESI-2 triage acuity is recommended as lengthy delays were noted with ESI-3 patients (Figure 4).
- Time delays are spread throughout the DTA timeline suggesting that multiple workflow barriers exist throughout the ED encounter (Figure 2).
- Future projects should focus on process improvement towards rapid identification of febrile neutropenia, timely antibiotic orders and delivery as well as nursing education.

Figure 4: Mean Door to Antibiotic Times by Groups
N=21



References

- Freifield, A.G., Bow, E.J., Sepkowitz, K.A., et al. (2011). Clinical practice guideline for the use of antimicrobial agents in neutropenic patients with cancer: 2010 update by Infectious Diseases Society of America. *Clinical Infectious Diseases*, 52: e56-e93.
- Koenig, C., Schneider, C., Morgan, J.E., Ammann, R.A., Sung, L., Phillips, B. (2019). Association of time to antibiotics and clinical outcomes inpatients with fever and neutropenia during chemotherapy for cancer: a systematic review. *Supportive Care in Cancer*. <https://doi.org/10.1007/s00520-019-014961-4>.
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- Other references available upon request.

