

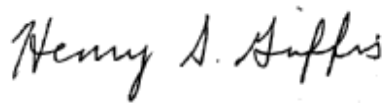
# Analysis of Sea Tour Incompletion Rates and Reasons

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## Executive summary

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One of the primary products of the Navy's enlisted personnel system, and one that is currently receiving heightened scrutiny, is manning at sea. Several factors can affect manning at sea, including whether sailors complete their expected sea duty obligations, or Prescribed Sea Tours (PSTs). Past CNA studies have found that a sizable share of sea tours are incomplete and that average sea duty served falls short of sailors' PSTs [1, 2]. In this study, N14 has asked CNA to examine more recent data on sea tour incompletions (STIs) and analyze what's driving STIs.

Focusing on men, we find that not all sea tours are being completed, most notably sea tours with 60-month PSTs. However, we find that average sea duty served approximately equals PSTs (when we exclude STIs due to enlisted Navy losses). When it comes to the drivers of STIs, we find that a majority of STIs are due to enlisted Navy losses. Among non-loss STIs, the largest group are those that cannot be explained by limited duty, having a military spouse, recruiter duty, instructor billets, or serving at sea on a DOD area tour. Instead, most non-loss STIs are due to sailors rolling to shore for reasons that we are unable to identify in our data.

In summary, our analysis suggests that STIs are less problematic than previously thought. For those who remain in the enlisted Navy, sailors are staying at sea for the length of their PSTs, on average. But, the Navy is still losing sea duty in two ways: when sailors remain in the enlisted Navy but do not complete their PSTs and when sailors leave the enlisted Navy.

In closing, we urge the Navy to add PSTs to the enlisted personnel files so that STIs may be more readily tracked. In addition, we caution against using our results to determine how much more sea duty would be served if PSTs were increased beyond 60 months, since that requires extrapolation beyond the bounds of our dataset.

## Outline

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- Background
- Approach
- Results
- Conclusions



In this annotated briefing, we begin by discussing previous CNA research on STIs and how this study furthers that analysis. Next, we discuss the analytical approach used in this study, highlighting how STIs are measured, interpreted, and analyzed. We also discuss how and why our analytical approach differs from the most recent CNA study on STIs [2]. Then, we present our results for men's first-term and career sea tours. Finally, we close with conclusions and implications for policy and planning.

## Previous CNA research on STIs

- Previous CNA studies find that many sailors do not complete their sea tours
  - [1]: Two-thirds of sea tours were incomplete, mostly enlisted Navy losses
  - [2]: After removing enlisted Navy losses,
    - STIs
      - First-term sea tours: 15% and 52% of sea tours with 48- and 60-month PSTs, respectively, were incomplete
      - Career sea tours: 18% and 29% of sea tours with 36- and 48-month PSTs, respectively, were incomplete
    - Average months of sea duty served
      - First-term sea tours: Average sea duty served on sea tours with 48- and 60-month PSTs was 49.5 and 51.4 months, respectively
      - Career sea tours: Average sea duty served on sea tours with 36- and 48-month sea tours was 35.7 and 45.3 months, respectively



Earlier CNA studies found that many sea tours are not completed. In [1], the authors find that, among sea tours ending in FY87–01, as many as two-thirds of sea tours were not completed and that the STI rate increased with PST. Most of these STIs were due to losses to the Navy (e.g., attrition or End of Active Obligated Service (EAOS) losses). However, the analysis conducted in [1] rarely distinguished between first-term and career sea tours, which are characterized by different PST profiles; first-term sea tours are usually associated with longer PSTs than career sea tours. Because of this, the results in [1] mask potentially important differences in STIs between first-term and career sailors.

As a result, the authors of [2] conducted separate analyses for first-term and career sea tours, focusing on sea tours that ended in FY00–06. They found that, after removing Navy losses from the sample, 15 percent and 52 percent of first-term sea tours with 48- and 60-month PSTs, respectively, were incomplete. Among career sea tours, 18 percent and 29 percent of sea tours with 36- and 48-month PSTs, respectively, were incomplete. The authors also compared average sea duty served by PST for first-term and career sailors. The differences were more pronounced for first-term sea tours. The average sea duty served on first-term sea tours with 48-month PSTs (49.5 months) differs from that of first-term sea tours with 60-month PSTs (51.4 months) by only 2 months despite a 12-month difference in obligated sea duty. In contrast, for career sea tours, the same difference in obligated sea duty (36 versus 48 months) is associated with 10 additional months of sea duty served (35.7 versus 45.3).

## Issues addressed in this study

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- Test [2]’s findings using more recent data
- Explore what’s driving STIs
- Ultimate goal: Use our findings to inform whether parameters should be modified or introduced in the Sea Shore Flow Model



The main policy implication of [2]’s findings was that there should be little expected return, in terms of sea duty served, to increasing first-term PSTs beyond 48 months. Understandably, the findings reported in [2] and their associated policy implication raised alarms.

As a result, in this study we begin by testing whether [2]’s findings are upheld in more recent data on sea tours. Next, we explore what’s driving STIs, to the extent that these drivers can be observed in our data. Finally, the ultimate goal is to use this study’s findings to inform the Navy’s planning process for distributing sailors to sea billets. The Sea Shore Flow Model, introduced in 2008, is the mechanism that the Navy uses to determine sailors’ PSTs to obtain the right distribution of sailors across sea and shore billets. Ideally, this study’s findings can be used to inform whether parameters should be modified or introduced into the Sea Shore Flow Model to ensure that the model incorporates a realistic estimate of sea duty served relative to PSTs.

## Outline

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- Background
- Approach
  - Measuring STIs
  - Understanding STIs
    - Policy and practice: Setting PRDs relative to PSTs
    - Reasons why Navy practice might lead to STIs
  - Approach to analyzing STIs
  - Key definitions and analysis sample
- Results
- Conclusions



In this section, we discuss the analytical approach used in this study. We begin with a discussion of how STIs are measured and understood, the latter highlighting the role that Navy policy and practice play in creating opportunities for STIs. Next, we define some key terms and describe how we created our analysis sample. Finally, we describe our empirical approach to analyzing STIs in this study and pay careful attention to how our approach differs from that used in [2].

## Measuring STIs

- Using our in-house enlisted personnel files, we compare months of sea duty served to PSTs
- PSTs merged onto data from NAVADMINS *at the start of the sea tour*
- But, PST at the start of a sea tour might not be relevant when the sea tour ends; PSTs *might* change during a sea tour if
  - Sailor promotes, but policies say otherwise [4-6]
  - If a new NAVADMIN is released
    - It would be difficult to update PSTs in our analysis
    - It isn't clear how (and for whom) detailers update PRDs
- Therefore, we focus only on sea tours for which PSTs did not change when a new NAVADMIN is released



When determining whether a sea tour was incomplete, we compare sea duty served to PSTs. We observe sailors serving on sea duty directly in our enlisted personnel files. However, PSTs are not included in the enlisted personnel files. As a result, we gather PSTs from relevant NAVADMINS and merge them onto our enlisted personnel files at the start of each sea tour. For sea tours that began no later than August 2008 (when Sea Shore Flow enlisted career paths were introduced), PSTs are assigned on the basis of Enlisted Management Community (EMC) and paygrade at the start of the sea tour. For sea tours that began after August 2008, PSTs are assigned on the basis of EMC and sea tour number at the start of the sea tour [3].

But, the prevailing PST at the start of a sea tour may no longer be relevant when a sea tour ends. Indeed, there are two reasons why a PST might change during a sea tour. First, before the introduction of Sea Shore Flow, if a sailor promoted during a sea tour, his PST may change based on his new paygrade. References [4–6], however, state that a sailor's projected rotation date (PRD), or the date he will rotate from sea to shore, will not change due to a mid-sea-tour promotion. Second, a sailor's PST could change during a sea tour if a new PST NAVADMIN is released. Of particular concern is whether a sailor's PST would be shortened by a new NAVADMIN, since this could lead us to overstate STIs if we rely on PSTs assigned at the start of the sea tour. While it is somewhat straightforward to assign PSTs at the start of the sea tours, it would be very difficult to update PSTs over the course of a sea tour in our data. This is largely because it is not clear how and for which sailors detailers changed PRDs in response to new PSTs. Therefore, as we discuss in more detail in the pages that follow, in this study we follow the next best strategy: we focus only on sea tours for which PSTs did not change when a new NAVADMIN is released.



## Understanding STIs

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- A visit to PERS 40 has informed our understanding of what might be driving STIs
  - Met with PERS 4013 (Enlisted Readiness and Support), PERS 40G (Senior Enlisted Advisor), and detailers
  - Main takeaways: It is important to consider
    - The role of Navy policy: MILPERSMANs governing how PRDs are set relative to PSTs
    - The role of Navy practice: How Navy policies are applied when PRDs are determined
    - Various reasons why Navy practice might lead to STIs



To gain a better understanding of what might be driving STIs, we visited PERS 40 and met with PERS 4013 (Enlisted Readiness and Support), PERS 40G (Senior Enlisted Advisor), and several detailers. From this visit, we learned three important points.

First, Navy policy plays an important role in STIs—namely, how PRDs are set relative to PSTs as governed by the relevant Military Personnel Manuals (MILPERSMANs). Second, Navy practice also plays a key role in STIs—namely, how PRD-setting policies are applied when PRDs are determined. Third, Navy practice might lead to STIs for a variety of reasons, beyond the application of PRD-setting policies.

Next, we discuss each of these takeaways in turn.

## Setting PRDs relative to PSTs

- For career sailors
  - Policy: New sea duty orders, PRD = PST without exception
  
- For first-term sailors, before April 2010
  - Policy: New sea duty orders, PRD = PST or PRD = EAOS if EAOS < PST
  - Practice: Even if sailor whose PRD = EAOS reenlists, there still is a chance for an STI
    - Backfilling sailor fills billet
    - If ship undermanned, reenlisting sailor might stay on board
    - Otherwise, if the sailor has a year or less left until PST, likely to roll to shore



When setting PRDs relative to PSTs, the policies are different for career and first-term sailors. For career sailors, when new sea duty orders are written, his PRD is set equal to his PST without exception [6].

For first-term sailors, however, the policy for setting PRDs relative to PSTs is different, and it has also changed over time. Before April 2010, when new sea duty orders were written for a first-term sailor, his PRD was set equal to his PST or his EAOS, whichever came first [7]. In practice, this means that, even if a sailor whose PRD is set at his EAOS reenlists, there is still a chance he will not complete his PST because of the following chain of events. First, as that sailor's PRD approaches, a requisition is created to backfill his billet and new sea duty orders are cut for a sailor to take his place aboard that ship. But, if the sailor decides to reenlist, Navy practice is to honor the new orders written for the backfilling sailor and, therefore, new orders must be written for the reenlisting sailor. If the ship he is currently on is undermanned, then he might be written new orders to stay onboard. If not, the sailor should be written new orders to continue to serve at sea on a different ship for the time remaining until his PST. In practice, however, if the sailor has a year or less left until he reaches his PST, it is not considered worthwhile to issue new sea duty orders to a new ship (and potentially pay associated Permanent-Change-of-Station costs). Instead, the sailor will roll to shore early.

Therefore, before April 2010, the interplay of Navy policy (setting a PRD equal to a sailor's EAOS when time to his EAOS is shorter than his PST) and Navy practice (rolling reenlisting sailors to shore early if they have a year or less left on to their PSTs) creates opportunities for STIs among first-term sailors.

## Setting PRDs relative to PSTs, continued

- For first-term sailors, starting in April 2010
  - Policy: New sea duty orders, set PRD = PST even if EAOS < PST
  - Practice: Reenlistment intentions gathered as EAOS approaches
    - Intend to reenlist, PRD stays at PST
    - Intend not to reenlist, PRD moved to EAOS
  - Limits opportunities for STIs, complicated by Perform to Serve
  - But, if sailor intends not to reenlist but then does, still is an opportunity for STI
- In this study, sample spans pre- and post-April-2010, so old and new policies/practices apply



Starting in April 2010, the policy for setting PRDs relative to PSTs for first-term sailors changed [8]. Now, the policy is identical for first-term and career sailors. Specifically, when new sea duty orders are written for a first-term sailor, his PRD is set equal to his PST regardless of his EAOS. In practice, for a sailor whose time to EAOS is less than his PST at the start of his sea tour, this means that his reenlistment intentions are gathered as his EAOS approaches. If the sailor says he intends to reenlist, his PRD does not change (since it is already set at his PST). If the sailor says he intends not to reenlist, his PRD is moved back to his EAOS.

This new policy limits opportunities for STIs since no requisitions are created to backfill billets until a sailor declares that he does not intend to reenlist. This new policy is complicated, however, by Perform to Serve (PTS) since at the time that reenlistment intentions are gathered not all sailors who wish to reenlist will know whether they will receive a quota to reenlist.

Still, if a sailor intends to not reenlist but then does reenlist (for instance, if he received an unexpected PTS quota), then it essentially reverts to the pre-April-2010 situation. Indeed, by the time the sailor reenlists, a backfilling sailor has already been identified, so new sea duty orders will need to be written for the reenlisting sailor.

In this study, our sample spans the pre- and post-April-2010 periods, so the old and new policies and practices for setting PRDs relative to PSTs for first-term sailors apply.

## Reasons why Navy practice *might* lead to STIs

- There are many other reasons sailors might not complete their sea tours given Navy policies
  - Military spouse (36-month maximum)
  - Recruiting duty
  - Instructor billets
  - Pregnancy/maternity tour
  - Other LIMDU
  - DOD area tours (36-month maximum)

Can be distinguished in our data

  - Roll early if reached PRD, have <12 months to PSTs
  - Roll early in exchange for reenlistment
  - Individual Augmentees
  - Exceptional Family Member program
  - Family Advocacy Program

Cannot be distinguished in our data



In addition, during our visit to PERS 40, we learned about several other reasons why Navy policies create opportunities for STIs.

Among the reasons we can distinguish in our data, first we note that sailors who are married to other servicemembers can serve a maximum of 36 months at sea to prevent a situation where both spouses are away from home at the same time [9]. Second, sailors might be pulled early from sea duty to fill recruiting duty and instructor billets. Third, women might leave sea duty early due to a pregnancy or maternity tour [10]. However, this does not apply to results presented here since we focus on men. Fourth, sailors might leave sea duty early for other limited duty (LIMDU) reasons beyond those related to pregnancy. Finally, sailors on DOD area sea tours (or OCONUS sea tours) can serve a maximum of 36 months on that tour regardless of their PSTs [11, 12].

However, there are other reasons that Navy policies might lead to STIs that cannot be identified in our data. These include detailers rolling sailors to shore early if they have reached their PRDs (e.g., their PRDs were set at their EAOSs and then the sailors reenlisted and they have less than 12 months to their PSTs) or in exchange for reenlistment. While the latter seems unlikely in the current retention environment, it could have been more prominent in previous years when the economy was stronger. In addition, we cannot identify sailors who were pulled from sea duty early as Individual Augmentees. Finally, we cannot identify sailors who participate in the Exceptional Family Member program or the Family Advocacy Program, which can place geographic restrictions on where the sailors can be stationed. If sea billets are in short supply in those areas, this can affect how long their sea tours can be.

## Key definitions

- Start of sea tour: When a sailor switches from shore to sea duty (or for first sea tours when a sailor reaches his first full duty sea billet)
- End of sea tour: A sea tour ends when a sailor switches from sea duty to shore duty or leaves the Navy
- STI: PST is more than 6 months greater than months of sea duty
- First-term sea tour: Sea tour that begins when the sailor is in Zone A and is the sailor's first sea tour
- Career sea tour: Sea tour that begins when the sailor is in Zone B or higher, regardless of sea tour number



Before we discuss our empirical approach, it is important to define some key terms.

First, we define the start and end of a sea tour in the following ways. A *sea tour starts* when a sailor switches from shore to sea duty or, in the case of a first sea tour, when a sailor reaches his first full duty sea billet. A *sea tour ends* when a sailor switches from sea duty to shore duty or leaves the Navy.

Second, a sea tour is defined as *incomplete* (i.e., as an STI) if the PST is more than 6 months greater than the total number of months of sea duty served. In other words, if the difference between the PST and the months of sea duty served exceeds 6 months, we call that sea tour incomplete. For example, a sea tour with a 48-month PST would be considered an STI if the total sea duty served was less than 42 months. This is the convention used in [1] and [2] because it allows us to clearly distinguish STIs from the roughly 3-month window in which detailers might pull a sailor early from sea duty to start his new orders.

Finally, a *first-term sea tour* is defined as a sea tour that begins when the sailor is in Zone A and it is the sailor's first sea tour. A *career sea tour*, in contrast, is one that begins when the sailor is in Zone B or higher, regardless of what number the sea tour is. The vast majority of Zone B sea tours are second or higher sea tours; less than 10 percent are first sea tours.

## Empirical approach

- In this study, we analyze STIs and average months of sea duty served for men
  - Separate results for first-term and career sea tours
  - Separate results by PST
- We report results for two samples
  - Earlier years in our sample: Sea tours that ended in FY94–06
  - Five most recent years in our sample: Sea tours that ended in FY07–11



In this study, we analyze STIs and average months of sea duty served for men. We do so separately for first-term and career sea tours and separately by PST.

In the results that follow, we report results for two samples: the earlier years in our sample (sea tours that ended in FY94–06) and the five most recent years in our sample (sea tours that ended in FY07–11). We divided sea tours into the two samples so that we could separate recent results out from the full sample. We chose to define “recent” as beginning with sea tours that ended in FY07 for two reasons. First, [2] examined sea tours that ended through FY06, so defining recent as beginning with sea tours that ended in FY07 picks up where [2] left off. Second, limiting our focus to sea tours that ended in FY07–11 left a large enough sample of sea tours to make statistical inferences.

## How our approach is similar to that used in [2]

- Like [2], we:
  - Calculate STI rates by PST separately for first-term and career sea tours
  - Calculate average months of sea duty served by PST separately for first-term and career sea tours
    - But, unlike [2], we use the median instead of a top-coded mean
  - Exclude ratings that have INUS/OUTUS rotations



Our approach to analyzing STIs is similar to the approach followed in [2] in that we calculate STI rates and average months of sea duty served by PST, separating out first-term and career sea tours. However, when it comes to calculating average sea duty served, we use the median since, unlike the mean, the median will be insensitive to the very small share of sea tours that can extend way beyond PSTs. In contrast, [2] used the mean and top-coded sea duty served at 13 months beyond PST. In other words, any sea tour with a 48-month PST that lasts for 61 months or longer would be counted as a 61-month sea tour in [2]. Since we prefer to not top-code the data, we use the median in our calculations.

In addition, as was done in [2], we exclude ratings that have INUS/OUTUS rotations, meaning that sailors in these ratings rotate between billets that are inside the United States (INUS) and outside the United States (OUTUS), rather than rotating between sea and shore billets. We exclude these ratings from our analysis because they are not governed by sea-shore rotation policies and consequently do not have PSTs.

## How our approach differs from that used in [2]

- Unlike [2], we:
  - Include interrupted sea tours (that go into non-full-duty-status, such as training, medical, or legal)
    - Interrupted sea tours constitute 9% of our sample
    - When calculating sea duty served, exclude non-full-duty months
  - Examine what can explain STIs, to include:
    - Military spouse
    - Recruiting duty
    - Instructor billets
    - LIMDU
    - DOD area tours
  - Keep sea tours that reached PSTs but were followed by Navy losses
  - Focus on sea tours for which PSTs did not change when a new NAVADMIN was released



Our approach differs from [2] in some key ways. First, [2] dropped sea tours that were “interrupted” in the sense that the sailor went from full-duty status to non-full-duty-status for such reasons as training, medical, or legal. We include sea tours that are interrupted once—a very small share of the sample has more than one interruption during a sea tour and since this is so rare, we drop these sea tours. For sea tours that have an interruption, when we calculate how much sea duty was served on the sea tour, we simply exclude the non-full-duty months from the calculation.

Second, we examine what can explain the STIs. As we explained on the previous slide, we can identify sailors with military spouses, sailors who take recruiter or instructor billets, sailors who go on pregnancy, maternity, or other LIMDU, and sailors who are returning from DOD area tours. If a sailor’s STI cannot be linked to one of these reasons, we code his STI as one that just ended in “other shore” duty.

Third, when calculating the STI rate, we keep sea tours in which the sailors reached their PSTs but subsequently left the Navy. In [2], these sea tours were dropped from the sample because the authors were analyzing the share of sailors who rolled to shore early (relative to their PSTs) among those sailors who made it to shore after their sea tours. By definition, sailors who reached their PSTs but then left the Navy never made it to shore after their sea tours, so those sea tours were excluded in [2]’s analysis.

Lastly, because PSTs can change during a sea tour when a new NAVADMIN is released, we focus on sea tours for which PSTs remained unchanged, as we describe in detail in the next two slides.



## Addressing changing PSTs

- Since a PST can change during a sea tour, we focus on sea tours for which PSTs did not change when a new NAVADMIN was released
- This is a straightforward exercise for sea tours ending in FY94–06
  - We keep only those sea tours for which the next NAVADMIN does not call for a change in PST
- However, this is problematic for sea tours ending in FY07–11
  - The majority of sea tours that would be dropped are those that had PSTs shortened when the Sea Shore Flow Model was introduced
  - Because the Sea Shore Flow Model was introduced relatively late in our sample, we do not observe these sea tours in our data for very long
  - Therefore, the sea tours we would be dropping necessarily would be short sea tours, leading to biased results



To address the fact that a PST can change during a sea tour, we focus our analysis on sea tours for which PSTs did not change when a new NAVADMIN was released. This is a straightforward exercise for the earlier part of our sample, namely sea tours that ended in FY94–06. We simply keep those sea tours for which the next NAVADMIN does not call for a change in PST.

However, this approach is problematic for sea tours ending FY07–11. Among these sea tours, if we excluded sea tours for which the next NAVADMIN calls for a change in PST, then the majority of the sea tours that would be dropped would be those that had their PSTs changed when the Sea Shore Flow Model was introduced. Because this happened relatively late in our sample (at the end of FY08), we do not observe these sea tours in our dataset for very long. Therefore, among sea tours that ended in FY07–11, if we kept only those that did not have their PSTs changed by the introduction of the Sea Shore Flow Model, we would be systematically excluding short sea tours, leading to biased results.

## Addressing changing PSTs, continued

- For sea tours that ended in FY07–11, instead we focus on EMCs that did not have their PSTs changed when the Sea Shore Flow Model was introduced
  - Among men’s first-term sea tours that began just before introduction of Sea Shore Flow Model, we calculate (separately by EMC) the share that could have had PSTs changed when Sea Shore Flow NAVADMIN was released
  - Then, we narrow our sample to EMCs in which less than half of sea tours could have had PSTs changed
- Thus, we are able to remove the influence of a change in PSTs from the analysis while limiting the likelihood that our results will be biased
- If PSTs were included in the enlisted personnel files, we would be able to conduct our analysis on the full sample of sea tours



For sea tours that ended in FY07–11, we circumvent the issue of changing PSTs by narrowing the sample to sea tours in Enlisted Management Communities (EMCs) that did not have their PSTs changed (versus dropping specific sea tours within an EMC as we did for the earlier part of our sample) when the Sea Shore Flow Model was introduced. Specifically, we conducted a side analysis on sea tours that began just before the introduction of the Sea Shore Flow Model where we calculated, separately for each EMC, the share of sea tours for which the introduction of the Sea Shore Flow Model calls for a change in PST. This allowed us to identify EMCs for which less than half of sea tours could have had their PSTs changed when the Sea Shore Flow Model was introduced. Then, we limited our sample of sea tours ending in FY07–11 to sea tours in those specific EMCs. In this way, we are able to remove the influence of a change in PSTs from the analysis while limiting the likelihood that our results will be biased.

Note that if PSTs were included in the enlisted personnel files, we would know precisely which PST applied to each sea tour at any given time. Therefore, we would be able to conduct our analysis on the full sample of sea tours.

## Description of the analysis sample

- Sample includes 432,490 men's first-term and career sea tours that ended in FY94–11
- In addition to excluding sea tours for which the next NAVADMIN calls for a change in PST, sample also excludes:
  - Sea tours with multiple non-full-duty periods
  - Sea tours in ratings with INUS/OUTUS rotations
  - Sea tours with *other than* 36-, 42-, 48-, 54-, and 60-month PSTs
  - Programmed School Input (PSI) sea tours, typically sea tours that occur before the end of initial training
  - First-term sea tours that were preceded by a PSI sea tour and the sailor was not rated
  - First-term sea tours that were followed by a PSI sea tour



Next, we describe the sample used for this analysis. The sample includes 432,490 men's first-term and career sea tours that ended in FY94–11. In addition to excluding sea tours for which the next NAVADMIN calls for a change in PST (as described in the previous slide), we exclude some sea tours from various other reasons. First, we exclude sea tours with multiple non-full-duty periods. Second, we exclude sea tours in ratings with INUS/OUTUS rotations. Third, we exclude sea tours with other than 36-, 42-, 48-, 54-, and 60-month PSTs since an insufficient number of sailors are assigned these PSTs to allow for statistical inferences.

Finally, we drop Programmed School Input (PSI) sea tours, which are different from other first-term sea tours in that they are typically short sea tours that occur before the end of initial training. Relatedly, we drop first-term sea tours that were preceded by a PSI sea tour in which the sailor does not get rated. In this instance, the unrated sailor would be required to complete the PST associated with the PSI sea tour, but since we exclude PSI sea tours from our sample, we cannot identify that PST. We also drop first-term sea tours that were followed by a PSI sea tour, since these are a very rare event.

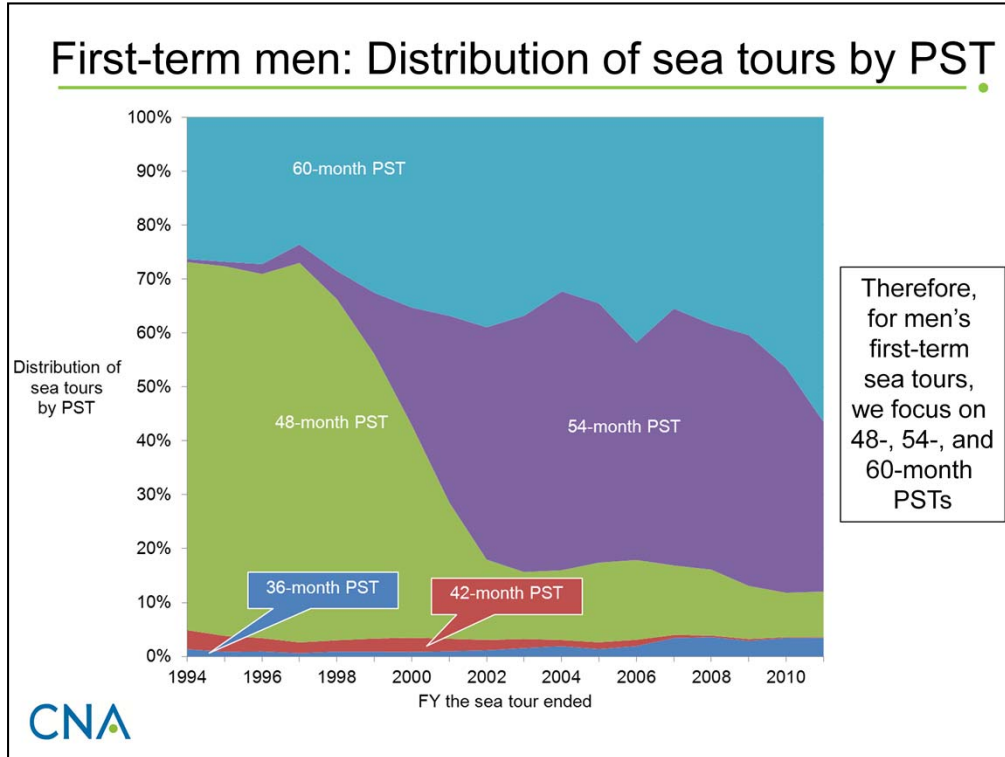
## Outline

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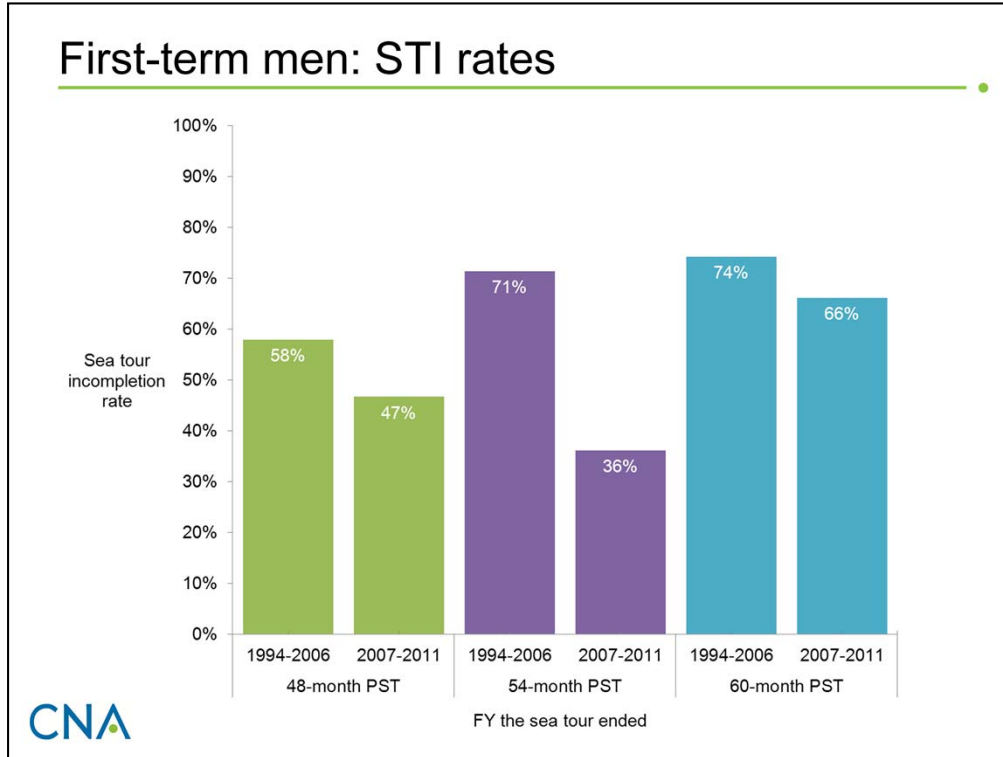
- Background
- Approach
- Results
  - Men's first-term sea tours
    - STI rates and reasons
    - Average months of sea duty served
  - Men's career sea tours
- Conclusions



In this section, we describe our results for men's first-term and career sea tours. In particular, we present STI rates and reasons as well as average months of sea duty served.



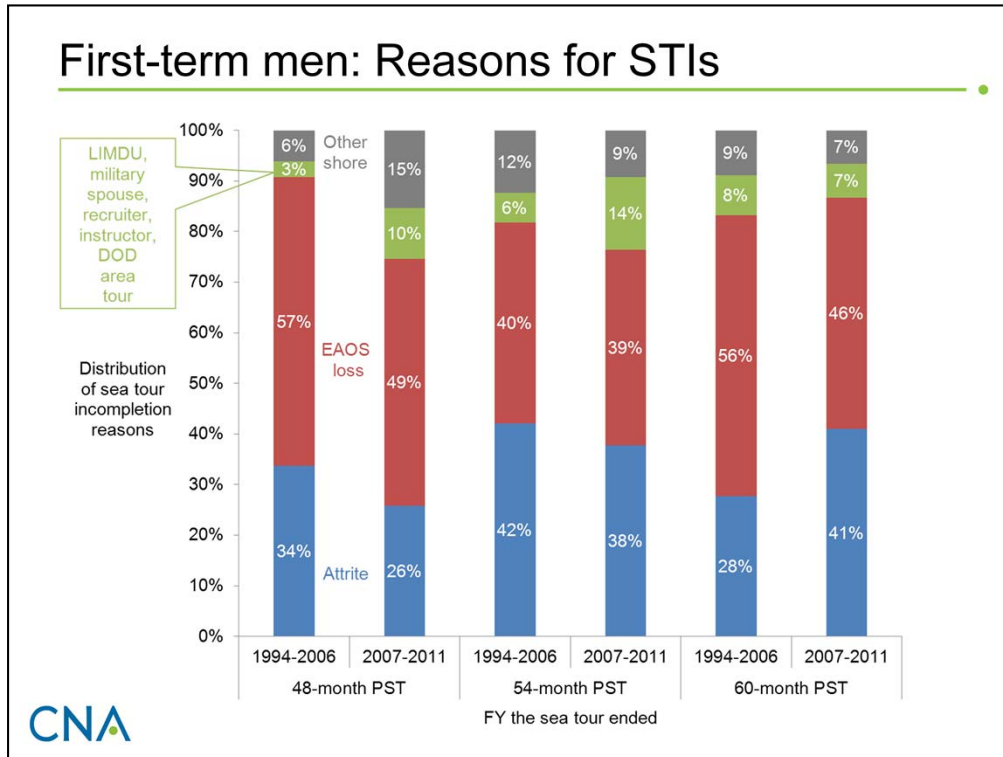
The figure above shows the distribution of PSTs among men's first-term sea tours in our sample by the FY the sea tour ended. For first-term men, the vast majority of sea tours in our sample have 48-, 54-, or 60-month PSTs. Therefore, for the remainder of the men's first-term results, we focus on these three PSTs.



This figure shows the STI rates for men’s first-term sea tours. Three sets of results are displayed: STI rates for sea tours with 48-month PSTs (shown in green), STI rates for sea tours with 54-month PSTs (shown in purple), and STI rates for sea tours with 60-month PSTs (shown in blue). Differences in STI rates between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) are statistically significant at the 5-percent level for all three PSTs shown.

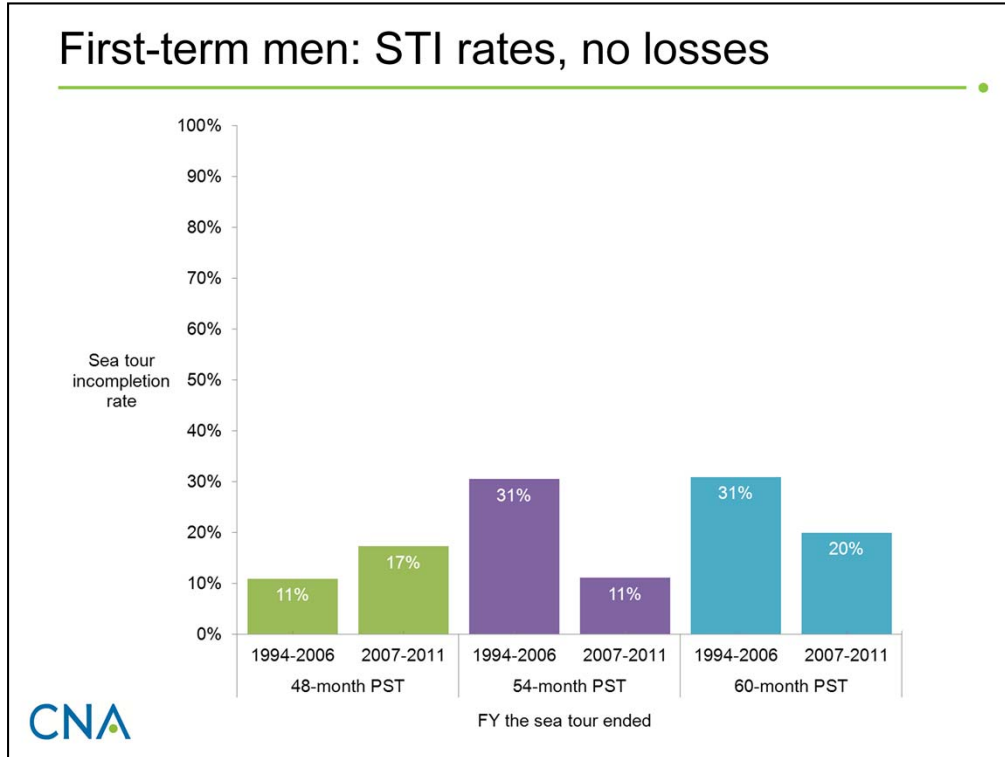
A substantial share of sea tours that ended over the course of the earlier years of our sample (FY94–06) or over the five most recent years (FY07–11) were incomplete. When looking at the five most recent years of data, we see that 47, 36, and 66 percent of sea tours with 48-, 54-, and 60-month PSTs were incomplete.

## First-term men: Reasons for STIs



However, the majority of these STIs were caused by enlisted Navy losses. This figure shows the distribution of STIs by reason for the incompleteness. Again, the results are reported separately by PST. Differences in the distribution of STI reasons between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) are statistically significant at the 5-percent level for all three PSTs shown.

We find that between 26 and 42 percent of STIs result from attrition and another 39 to 57 percent are attributable to EAOS losses. We also separate out officer commissioning as another kind of enlisted Navy loss, but this accounts for less than 1 percent of STIs. The remaining 9 to 25 percent of STIs are split between reasons we can identify in our data (LIMDU, military spouse, recruiter duty, instructor billets, or DOD area—but not pregnancy/maternity because these results are for men) and those we cannot identify in our data (which we label “other shore”).

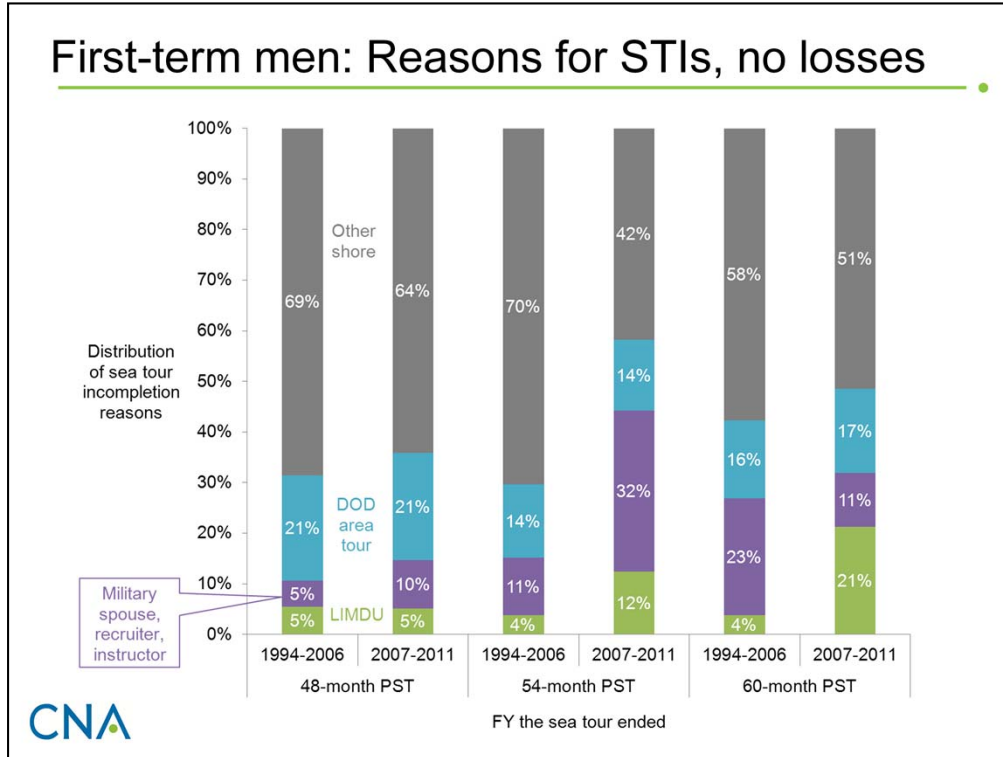


Because enlisted Navy losses account for such a large share of STIs, in this figure we remove those STIs that were due to enlisted Navy losses and recalculate the STI rate. As is the case for STIs, including those that resulted from enlisted Navy losses, differences in STI rates between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) are statistically significant at the 5-percent level for all three PSTs shown.

As would be expected, STI rates are lower once we remove sea tours that were incomplete because of enlisted Navy losses. For instance, for sea tours that ended in FY07–11, STI rates were 17, 11, and 20 percent for sea tours with 48-, 54-, and 60-month PSTs.

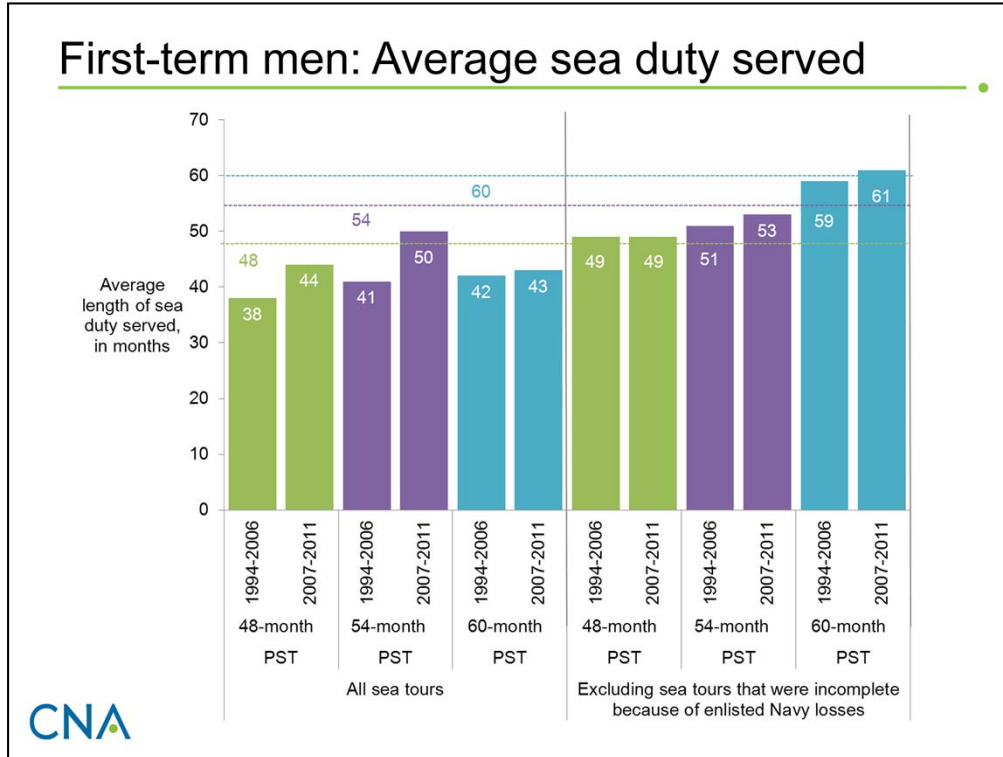


## First-term men: Reasons for STIs, no losses



Also, now that sea tours that were incomplete because of enlisted Navy losses are removed from the sample, we can reexamine reasons for STIs. As is the case for STIs including those that resulted from enlisted Navy losses, differences in the distribution of STI reasons between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) are statistically significant at the 5-percent level for all three PSTs shown.

This figure shows that LIMDU accounts for a relatively small share (no more than 5 percent) of non-loss STIs among sea tours ending in FY94–06 and a slightly larger share (upwards of 21 percent) of non-loss STIs among sea tours ending in FY07–11. Having a military spouse or going to a recruiter or instructor billet generally accounts for a small share of non-loss STIs. In most cases, these reasons combined account for no more than 11 percent of non-loss STIs, with the exception being sea tours with 54-month PSTs that ended in FY07–11 and sea tours with 60-month PSTs that ended in FY94–06. Sea tours that were DOD area tours account for a somewhat larger share of non-loss STIs, up to 21 percent. However, the largest group, comprising 42 to 70 percent of non-loss STIs, is the “other shore” group for which we cannot identify a specific reason for the early roll to shore.



Finally, we change gears and shift from reporting on STIs to reporting average sea duty served by PST as captured by the median. These averages include sea duty served on sea tours that were complete and those that were incomplete (relative to PSTs). This figure shows two sets of results: average sea duty served for all sea tours and average sea duty served when excluding sea tours that were incomplete because of enlisted Navy losses. Differences in average sea duty served between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) are statistically significant at the 5-percent level for all three PSTs shown in both sets of results.

When looking at all sea tours, we see that average sea duty served frequently falls short of PST for each PST group. However, when we exclude sea tours that were incomplete because of enlisted Navy losses, we see that average sea duty served is quite close to the targets, especially for sea tours ending in FY07–11. Specifically, average sea duty served among sea tours ending in FY07–11 is 49, 53, and 61 months for sea tours with 48-, 54-, and 60-month PSTs, respectively.

These findings suggest that, conditional on staying in the enlisted Navy, sea duty served is approximately equal to PST on average. Recall, though, that upwards of one-fifth of these sea tours are not completed (see slide 22). So, even though expected sea duty served for a sea tour is approximately the length of the PST when excluding STIs due to enlisted Navy losses, the Navy is still losing some sea duty in the form of sea tour incompletions. And, the Navy is losing a substantial amount of sea duty in the form of enlisted Navy losses.

The figure above displays median sea duty served, but this masks considerable variation in sea duty served across all sea tours. This is captured in additional figures in the appendix that show the distribution of sea duty served, excluding sea tours that were incomplete because of enlisted Navy losses, for the five most recent years of data.

## Outline

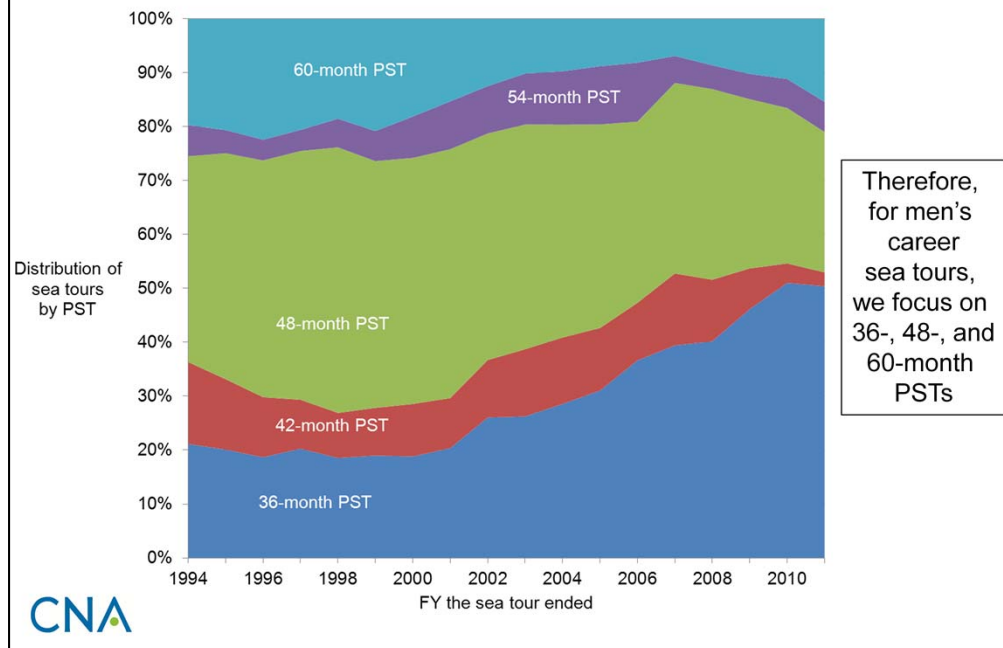
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- Background
- Approach
- Results
  - Men' first-term sea tours
  - Men's career sea tours
    - STI rates and reasons
    - Average months of sea duty served
- Conclusions

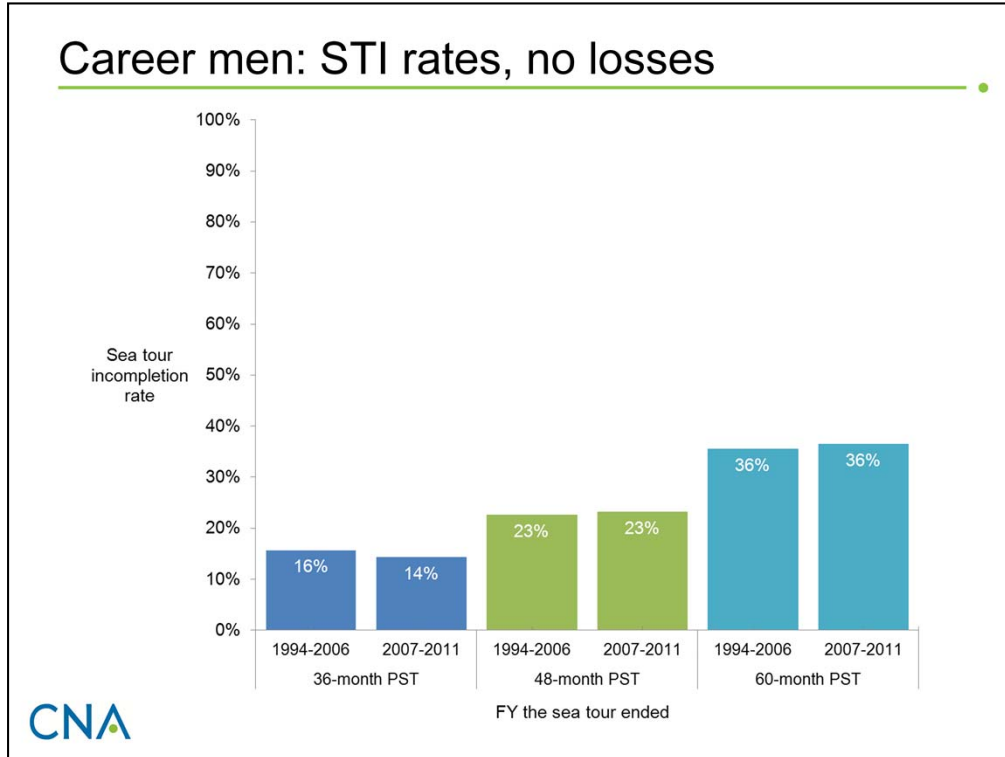


In this section, we present STI rates and reasons as well as average months of sea duty served for men's career sea tours. Because the results are similar to what we found for men's first-term career sea tours, we present an abbreviated version of the results for men's career sea tours. Additional results may be found in the appendix.

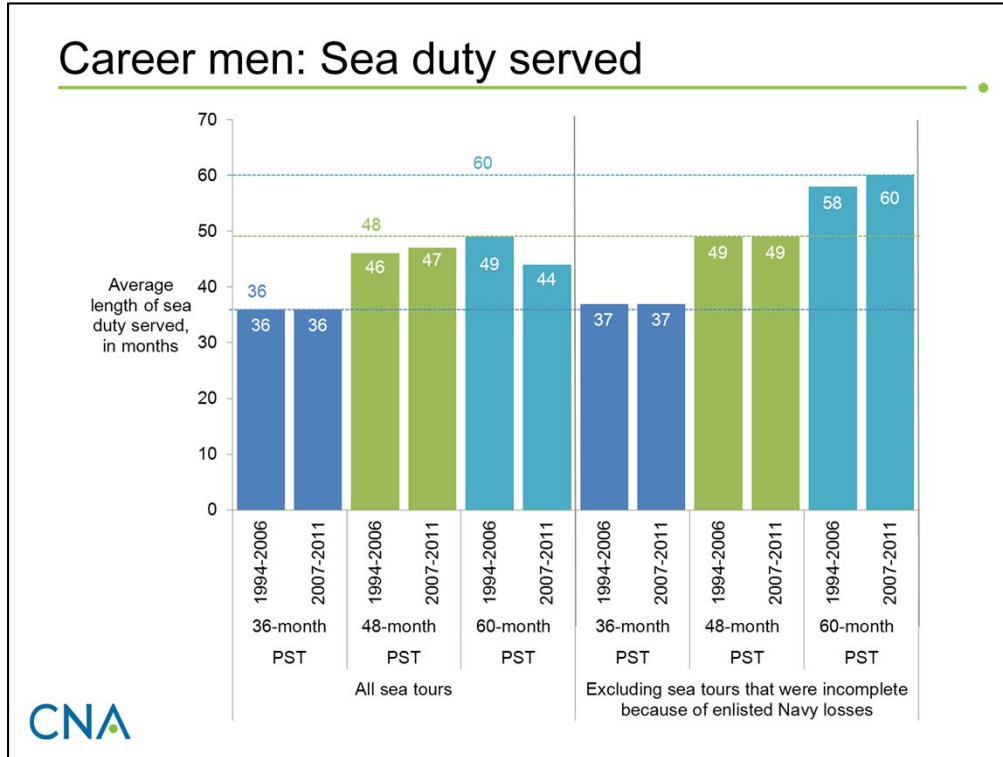
## Career men: Distribution of sea tours by PST



We begin with the distribution of PSTs among men’s career sea tours in our sample by the fiscal year in which the sea tour ended. For career men, the vast majority of sea tours in our sample have 36-, 48-, or 60-month PSTs and these are the PSTs we focus on for the remainder of the men’s career sea tour results. This is different than the approach used in [2]. [2] followed men’s career sea tours with 36-, 42-, and 48-month PSTs, which made up the preponderance of sea tours in [2]’s sample. However, our sample is different from that of [2] in several ways—most notably, we focus on sea tours for which the next NAVADMIN would not call for a change in PST—and this results in different distributions of PSTs.



As was the case for men’s first-term sea tours, enlisted Navy losses account for a large share of men’s career STIs (though, not surprisingly, attrition accounts for a smaller share of enlisted Navy losses for career sea tours compared with first-term sea tours). Therefore, here we only show STI rates after having excluded STIs that were due to enlisted Navy losses. The difference in STI rates between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) is statistically significant at the 5-percent level for sea tours with 36-month PSTs but statistically insignificant for sea tours with 48- and 60-month PSTs. For men’s career sea tours that ended in FY07–11, STI rates were 14, 23, and 36 percent for sea tours with 36-, 48-, and 60-month PSTs. In addition, when we examine reasons for STIs among men’s career sea tours, we continue to find that the largest group, comprising 45 to 58 percent of non-loss STIs, is the “other shore” group for which we cannot identify a specific reason for the early roll to shore as was the case for men’s first-term sea tours. (For more details, see the appendix.)



This figure shows average sea duty served by PST as captured by the median, for all sea tours and excluding sea tours that were incomplete because of enlisted Navy losses. The difference in average sea duty served between FY94–06 and FY07–11 is statistically significant at the 5-percent level only for sea tours with 48- and 60-month PSTs among all sea tours and for sea tours with 60-month PSTs when excluding sea tours that were incomplete because of enlisted Navy losses.

As the figure shows, when we exclude sea tours that were incomplete because of enlisted Navy losses, average sea duty served on men’s career sea tours is right on target relative to PST, as was the case for men’s first-term sea tours. Regardless of whether we look at sea tours ending in FY94–06 or FY07–11, we see that average sea duty served on men’s career sea tours hovers right around PST for sea tours with 36-, 48-, and 60-month PSTs.

Therefore, as was the case for first-term sea tours, we find that, conditional on staying in the enlisted Navy, sea duty served on men’s career sea tours is equal to PST on average. Recall, though, that we find that upwards of one-third of these sea tours are not completed (slide 27). So, for men’s first-term and career sea tours, the Navy is losing sea duty in the form of STIs even though expected sea duty served is approximately the length of the PST (when excluding losses). Moreover, the Navy is losing a substantial amount of sea duty on men’s career sea tours with 60-month PSTs in the form of enlisted Navy losses.

Again, the figure above displays median sea duty served, masking considerable variation in sea duty served across all sea tours. See the appendix for additional figures that show the distribution of sea duty served, excluding sea tours that were incomplete due to enlisted Navy losses, for the five most recent years of data.

## Outline

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- Background
- Approach
- Results
- Conclusions



In this final section, we summarize our findings and present our conclusions.

## First-term men: STI findings

- Not all sea tours are being completed
- When we exclude sea tours that were incomplete because of enlisted Navy losses, STI rate for sea tours with 60-month PSTs is considerably lower than what was found in [2]
- First-term men: STI rates

PST	All sea tours		Excluding losses		
	FY94–06	FY07–11	FY94–06	FY07–11	[2]: FY00–06
48-mo	58%	47%	11%	17%	15%
54-mo	71%	36%	31%	11%	--
60-mo	74%	66%	31%	20%	52%



For men’s first-term sea tours, we find that sea tours are still not being completed, mostly for sea tours with 60-month PSTs. However, when we eliminate from our sample sea tours that were incomplete because of enlisted Navy losses, our estimated STI rates drop. Moreover, our non-loss STI rate for sea tours with 60-month PSTs, which were found to have particularly high non-loss STI rates in [2], are lower than what was found in [2]—20 versus 52 percent. There are two reasons. First, [2] focused on sea tours ending in FY00–06, whereas we focus either on sea tours ending in FY94–06 or FY07–11. When we apply our methodology to sea tours ending in FY00–06, this closes the gap somewhat between our STI rates for sea tours with 60-month PSTs and [2]’s estimates.

Second, as we discussed earlier, our methodology differs from that of [2] in two important ways. One difference is the fact that we focus on sea tours for which the next NAVADMIN does not call for a change in PST. But, the most critical difference in our methodologies, in terms of explaining the difference between the estimated STI rate for men’s first-term sea tours with 60-month PSTs, is the fact that we retain in the calculation of the STI rate sea tours in which the sailors reached their PSTs but subsequently left the Navy. Recall that the authors of [2] dropped these sea tours from the sample because they were estimating the share of sailors who rolled to shore early (relative to their PSTs) *among those sailors who made it to shore after their sea tours*. This has a direct mechanical effect on the STI rate calculation because these sea tours appear in the denominator of the STI rate in our study but not in the denominator of the STI rate in [2]. In both studies, moreover, these sea tours do not appear in the numerator of the STI rate (because they were not incompletions). That means that the approach to calculating the STI rate in [2] would be an overestimate of the STI rate we calculate in this study—a difference that is driven entirely by differences in the policy questions asked in [2] and in this study.



## First-term men: Sea duty served findings

- Across all sea tours, average sea duty served falls short of PSTs
- But, when we exclude sea tours that were incomplete due to enlisted Navy losses, average sea duty served approximates PST
- First-term men: Average months of sea duty served

PST	All sea tours		Excluding losses		
	FY94–06	FY07–11	FY94–06	FY07–11	[2]: FY00–06
48-mo	38	44	49	49	49.5
54-mo	41	50	51	53	--
60-mo	42	43	59	61	51.4



For men’s first-term sea tours, we also find evidence that sea duty is falling short of PSTs. However, when we eliminate sea tours that were incomplete because of enlisted Navy losses, the gap between sea duty served and PSTs closes. In particular, we find no evidence of a gap between average sea duty served and PST for sea tours with 60-month PSTs, whereas [2] finds a 9-month gap.

Again, some of the difference in our 60-month PST findings can be attributed to the fact that [2] focused on sea tours ending in FY00–06, whereas we focus either on sea tours ending in FY94–06 or FY07–11.

More important, however, is the fact that our methodology differs from that of [2] in two key ways. Here, the fact that we focus on sea tours for which the next NAVADMIN does not call for a change in PST plays a large role. This is because the Navy caps sea tours at 60 months; so, when we exclude sea tours that could have had their PSTs changed from 60 months to something else with the release of the next NAVADMIN, we are in fact only dropping sea tours that had their PSTs shortened. Therefore, assuming that shorter PSTs lead to shorter sea tours, we would expect our estimate of average sea duty served to be higher than [2]’s. In addition, the difference in how losses are eliminated in our study versus in [2] affects the estimate of average sea duty served, just as it affects the STI rate. In particular, [2] drops sea tours that we keep, namely sea tours in which sailors completed their PSTs but subsequently left the enlisted Navy. Since these sea tours are, by definition, at least as long as the PST, the fact that [2] excludes these sea tours means that their estimate of average sea duty served should be lower than our estimate. Again, this difference is driven entirely by differences in the policy questions asked in [2] and in this study.

## Career men: STI findings

- Similar story for career men
- Career men: STI rates

PST	All sea tours		Excluding losses		
	FY94–06	FY07–11	FY94–06	FY07–11	[2]: FY00–06
36-mo	29%	29%	16%	14%	18%
48-mo	41%	38%	23%	23%	--
60-mo	57%	62%	36%	36%	--



As was the case for men’s first-term sea tours, for men’s career sea tours we find that sea tours are still not being completed, most notably for 60-month PSTs. However, when we eliminate sea tours that were incomplete because of enlisted Navy losses from our sample, again our estimated STI rates drop. Still, non-loss STI rates for sea tours with 60-month PSTs remain relatively high at more than one-third. Compared with [2], we find a similar non-loss STI rate for sea tours with 36-month PSTs (the only overlap between our and [2]’s career sea tour results)—14 versus 18 percent.

## Career men: Sea duty served findings

- Career men: Average months of sea duty served

PST	All sea tours		Excluding losses		
	FY94-06	FY07-11	FY94-06	FY07-11	'07 report: FY00-06
36-mo	36	36	37	37	35.7
48-mo	46	47	49	49	--
60-mo	49	44	58	60	--



For men's career sea tours, we find that sea duty is falling short of PSTs only for sea tours with 60-month PSTs. However, when we eliminate sea tours that were incomplete because of enlisted Navy losses, the gap closes.

## All men: Reasons for STIs findings

- Enlisted Navy losses explain half or more of STIs
- Excluding sea tours that were incomplete because of enlisted Navy losses, we find:
  - LIMDU, military spouse, recruiter duty, instructor billets, and DOD area tours each explain a relatively small share of non-loss STIs
  - The largest group of non-loss STIs cannot be explained by any of these alternatives, could be due to other Navy practices, e.g.,
    - Roll early if reached PRD, have <12 months to PSTs or in exchange for reenlistment
    - Individual Augmentees
    - Exceptional Family Member program
    - Family Advocacy Program action
  - However, we cannot distinguish between these (and potentially other) reasons in our data



For all men in our sample, we find that sea tours can be incomplete for a number of reasons. First, enlisted Navy losses explain half or more of STIs. Next, when we exclude sea tours that were incomplete because of enlisted Navy losses, we find that only a small share of non-loss STIs can be explained by LIMDU, having a military spouse, going on recruiter duty, taking an instructor billet, and having been at sea on a DOD area tour.

However, the largest group of non-loss STIs cannot be explained by any of these alternatives. Instead, these sea tours might be incomplete as a result of detailers rolling sailors to shore early if the sailors have reached their PRDs (e.g., if their PRDs were set at their EAOS and then the sailors reenlisted with less than 12 months until their PSTs). Another reason for these non-loss STIs could be that detailers roll sailors to shore early in exchange for reenlistment. Although this seems unlikely in the current retention environment, it could have been more prominent in previous years when the economy was stronger. Moreover, non-loss STIs could result from sailors being pulled from sea duty early as Individual Augmentees. A final reason for non-loss STIs could be sailors participating in the Exceptional Family Member program or the Family Advocacy Program, in which case there may be geographic restrictions on where the sailors can be stationed and therefore limits on how long they are able to serve at sea. Still, we cannot distinguish between these (and potentially other) reasons in our dataset.

## Interplay between STIs and SDIP

- Sea Duty Incentive Pay (SDIP) is designed to address undermanning at sea in specific sea-intensive ratings and paygrades
- SDIP awards eligible sailors additional compensation for extending their sea tours (or curtailing their shore tours)
- For sea duty extensions, sailors must reach their PSTs to be eligible for SDIP
  - Sea tour incompletions => fewer sailors will be eligible for SDIP
  - SDIP => also incentivizing sea tour completions?
    - CNA began evaluating the effectiveness of SDIP shortly after the program began
    - Our previous SDIP analyses [13, 14] did not take this into account, but we could revisit this in future SDIP analysis



Finally, we want to highlight the potential for interplay between STIs and Sea Duty Incentive Pay. SDIP is an incentive pay that is designed to address undermanning at sea in specific sea-intensive ratings and paygrades. As such, SDIP awards eligible sailors additional compensation for extending their sea tours or curtailing their shore tours.

To be eligible for an SDIP sea duty extension, sailors must first reach their PSTs. This has two implications. First, to the extent that sailors do not complete their PSTs, as reflected in our STI rates, this reduces the number of sailors eligible for SDIP. Second, SDIP could act as an incentive for sailors to finish their PSTs, in addition to acting as an incentive for sailors to extend beyond their PSTs. CNA started evaluating the effectiveness of SDIP since shortly after the program began. Our SDIP analyses [13, 14] did not take the PST-completing incentive effect of SDIP into account when estimating the effect of SDIP on manning at sea, but we could revisit this idea in future SDIP analysis.

## Conclusions

- We find that not all sea tours are being completed, particularly for sea tours with 60-month PSTs
  - All sea tours: Two-thirds of men's first-term and career sea tours ending in FY07–11 with 60-month PSTs are incomplete
  - Excluding STIs due to enlisted Navy losses: STI rates fall to one-fifth and one-third, respectively
- A majority of non-loss STIs cannot be explained
- We also find average sea duty served approximately equals PSTs for men's first-term and career sea tours, excluding enlisted Navy losses
- Therefore, we come to three conclusions
  - For those who remain in the enlisted Navy, sailors are staying at sea for the length of their PSTs, on average
  - But, the Navy is still losing sea duty in the form of non-loss STIs
  - And, of course, the Navy is still losing sea duty in the form of enlisted Navy losses



In summary, we find that not all sea tours are being completed, particularly for sea tours with 60-month PSTs. Among all sea tours, roughly two-thirds of men's first-term and career sea tours ending in FY07–11 with 60-month PSTs are incomplete. After excluding STIs that result from enlisted Navy losses, these STI rates fall to one-fifth and one-third for men's first-term and career sea tours, respectively. Also, we find that a majority of non-loss STIs cannot be explained by LIMDU, having a military spouse, recruiter duty, instructor billets, or serving at sea on a DOD area tour. Finally, we find that, on average, sailors stay at sea for the length of their PSTs when excluding sea tours that were incomplete due to enlisted Navy losses.

Therefore, we come to three conclusions. First, for those who remain in the enlisted Navy, sailors can be expected to stay at sea for the length of their PSTs, on average. This stands in sharp contrast with the findings in [1] and [2] that average sea duty served falls short of PSTs. Second, even though average sea duty served approximates PSTs for those sailors, the Navy is still losing sea duty in the form of non-loss STIs. Third, the Navy is also losing sea duty in the form of enlisted Navy losses.

## Implications for policy

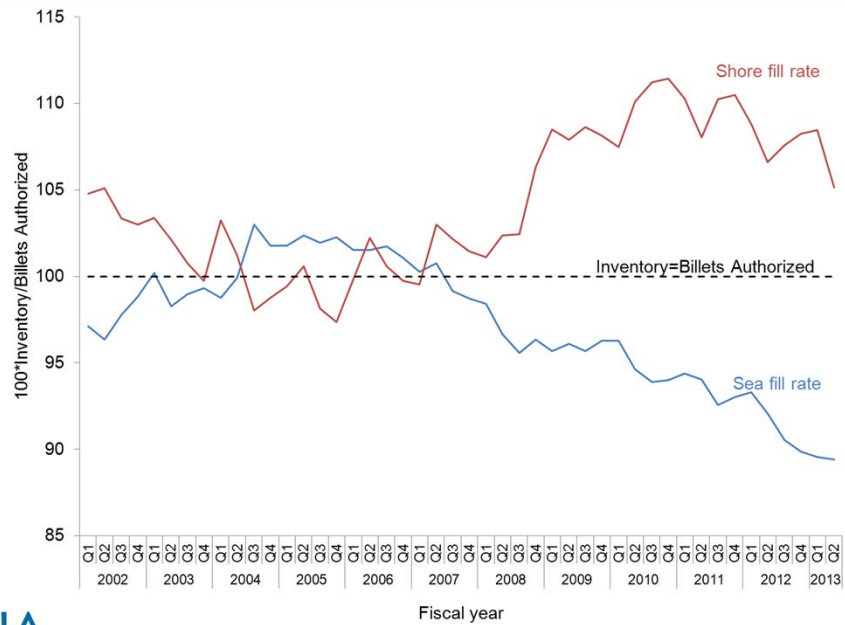
- Given our findings, STIs might be less problematic than previously thought, but there are two caveats
  - It would be wise to reanalyze in a few years, when we can observe sea tours that began under the Sea Shore Flow Model for a sufficient amount of time
  - We recommend adding PSTs to the enlisted personnel files so that this analysis could be extended to the full sample of sea tours and the Navy could track STIs more readily
- Also, we caution against using these results to determine how much more sea duty would be served if PSTs were increased beyond 60 months
  - Since we do not observe sea tours with PSTs of greater than 60 months, our analysis cannot be extrapolated in that manner



Given our findings, we argue that STIs might be less problematic than previously thought. But, there are two caveats to this statement. First, we advise that additional analysis should be conducted in a few years, at which point we will be able to observe sea tours that began under the Sea Shore Flow Model for a sufficient amount of time. Second, because PSTs do not appear in the enlisted personnel files, we are unable to conduct this analysis on the full sample of sea tours. We recommend that PSTs be added to the enlisted personnel files. This would allow us to expand our analysis to all sea tours. In addition, this would allow the Navy to track STIs and average sea duty served by PST more readily.

In addition, while our results suggest that sea duty served increases with PSTs, we caution against using our results to determine how much more sea duty would be served if PSTs were increased *beyond* 60 months. Since we do not observe sea tours with PSTs of greater than 60 months, our analysis cannot be extrapolated in that manner.

## Implications for sea/shore distribution



Even though our analysis suggests that STIs aren't as big a problem as we once thought, it still is the case that sea and shore manning are out of balance across the Navy. This figure shows sea and shore fill rates (where a fill rate is defined as 100 times the ratio of inventory to Billets Authorized). Since midway through FY07, sea fill rates have fallen whereas shore fill rates have risen. What can account for this and what does our analysis bring to bear on this issue? We suggest that our analysis may be used to inform some of the parameters used in the Sea Shore Flow Model, as we discuss in more detail on the next slide.



## Our analysis and the Sea Shore Flow Model

- With respect to the Sea Shore Flow Model, two parameters might be informed by our analysis
  - Average sea duty served by sailors who remain in the enlisted Navy
    - We find that this is approximately equal to PST
  - Average sea duty served by sailors who leave the enlisted Navy prior to reaching their PSTs
    - We find:

Average sea duty served by men who leave the enlisted Navy prior to reaching their PSTs

PST	First-term, FY07–11	Career, FY07–11
36-mo	--	20
48-mo	24	26
54-mo	33	--
60-mo	35	23



While we do not know the inner workings of the Sea Shore Flow Model, we can think of two potential parameters of interest that our findings may inform and that might be introduced or modified in the Sea Shore Flow Model.

The first parameter is average sea duty served by sailors who remain in the enlisted Navy. Since our results suggest that on average these sailors remain at sea for the entire length of their PSTs, there is no need for such a parameter in the Sea Shore Flow Model. In other words, our results suggest that the model may assume that if a sailor remains in the enlisted Navy, he will, on average, serve the length of his PST.

The second parameter is average sea duty served by sailors who leave the enlisted Navy before reaching their PSTs. For such sailors on first-term sea tours, we estimate an average sea duty served of 24, 33, and 35 months for sea tours with 48-, 54-, and 60-month PSTs, respectively. For such sailors on career sea tours, we estimate an average sea duty served of 20, 26, and 33 months for sea tours with 36-, 48-, and 60-month PSTs, respectively. In other words, these estimates could be used as the model’s predictions of how much sea duty will be served by sailors who will leave the enlisted Navy before reaching their PSTs.

Another related parameter of interest, but one that is not directly informed by our analysis, is the rate at which sailors leave the enlisted Navy before reaching their PSTs. If it turns out that the Sea Shore Flow Model accurately estimates both the average sea duty served by sailors who leave the enlisted Navy before reaching their PSTs and the rate at which sailors leave the enlisted Navy before reaching their PSTs, then perhaps a separate analysis of the model and its approach to determining PSTs is warranted.

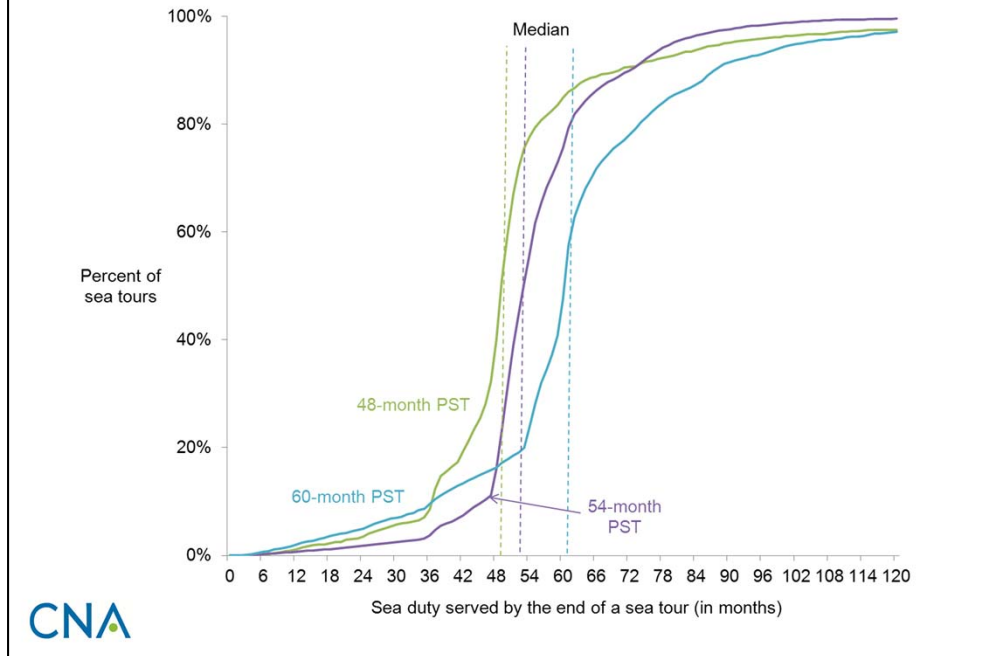
## Appendix

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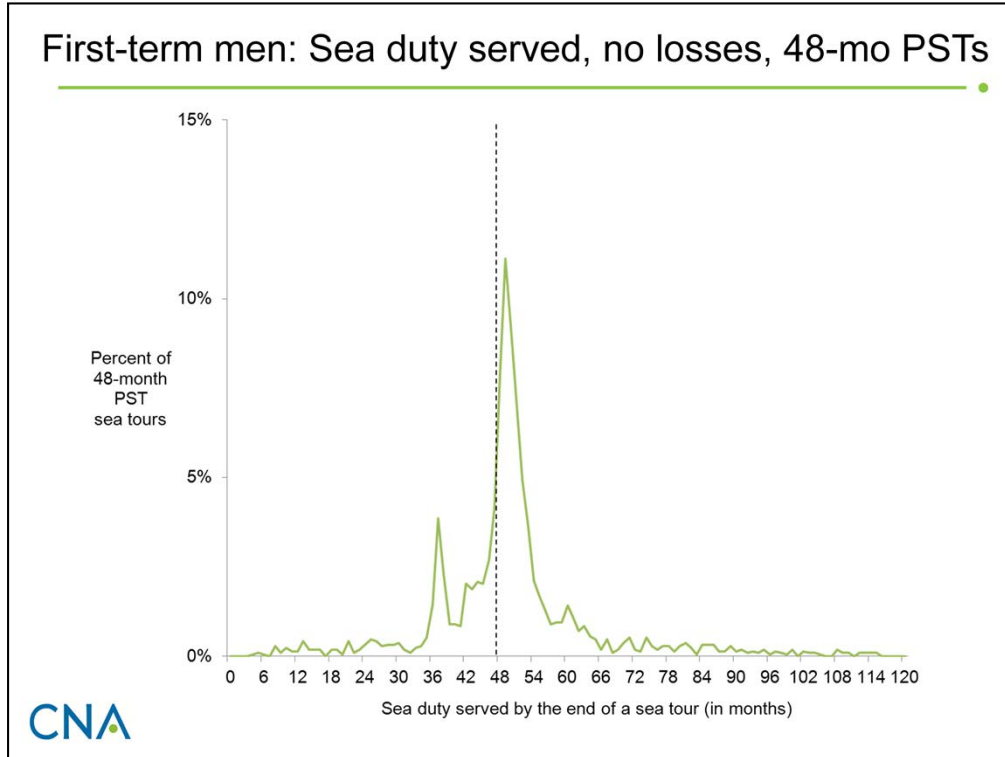


The following slides contain appendix figures.

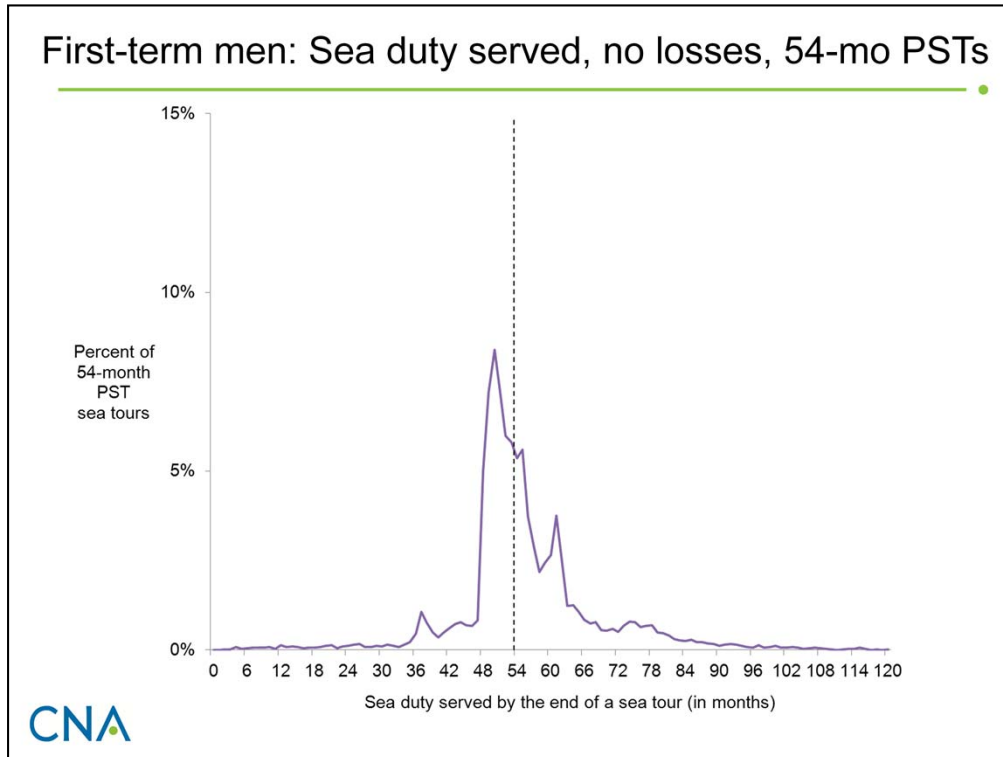
## First-term men: Sea duty served, no losses



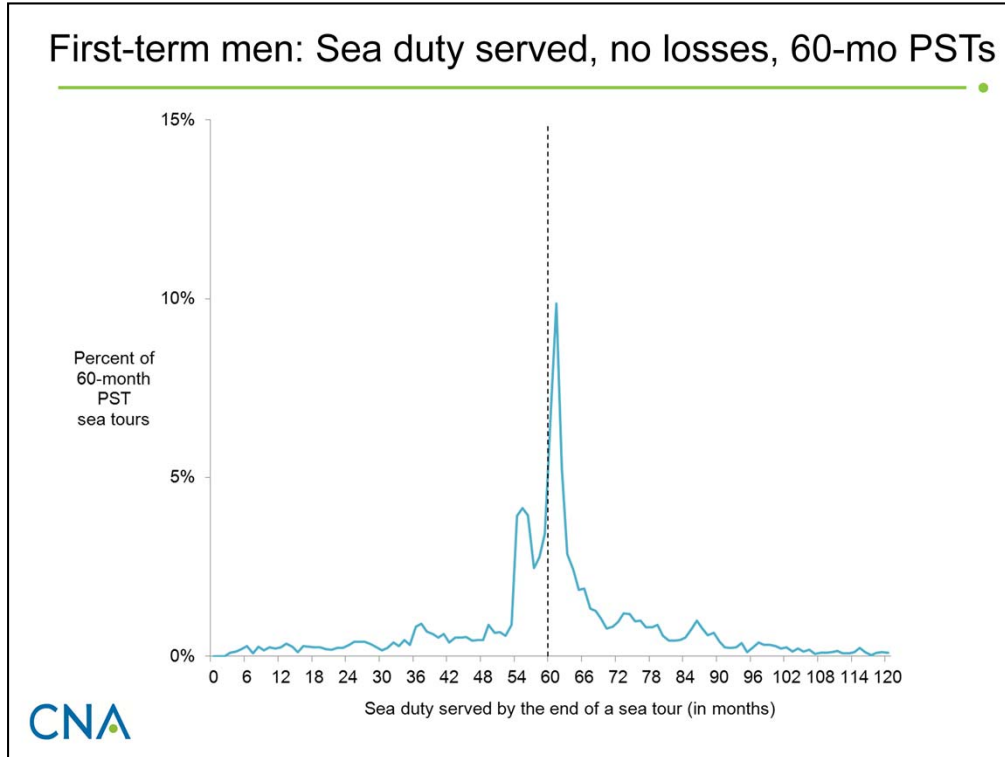
This figure shows the cumulative distribution of sea duty served by PST for men's first-term sea tours ending in FY07-11, excluding sea tours that were incomplete because of enlisted Navy losses. There is considerable variation in sea tour lengths that is not conveyed when simply examining the median. Indeed, for each of the PSTs shown, more than one-tenth of sea tours are *shorter* than the PST by 6 months or more, while more than one-fifth of sea tours are *longer* than the PST by 6 months or more.



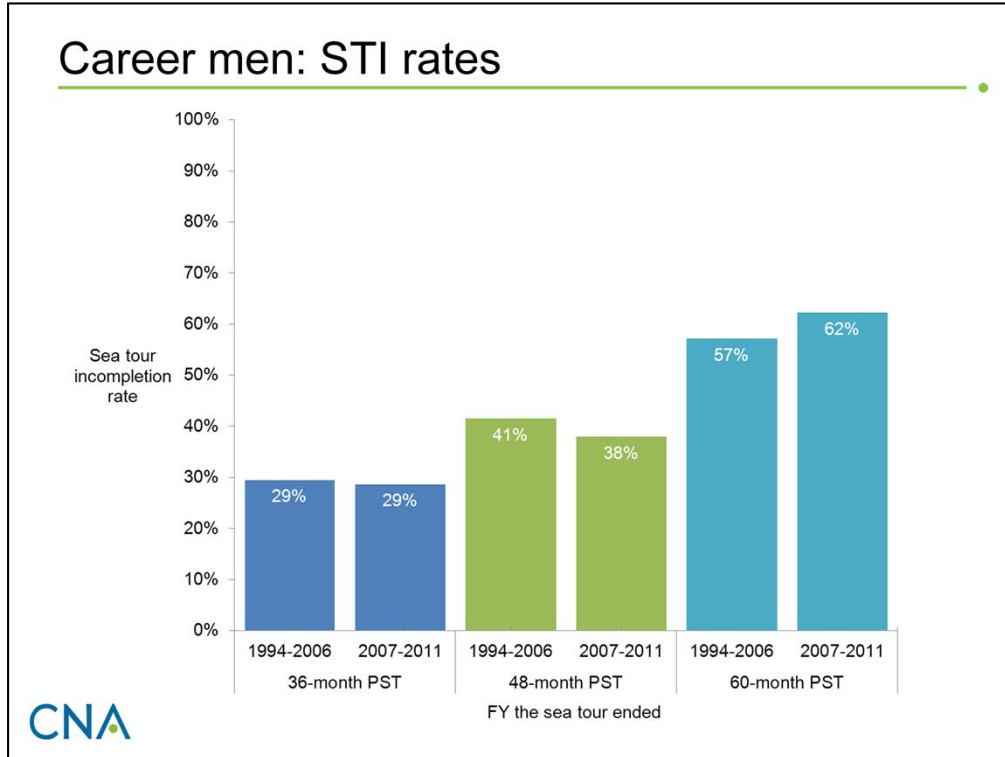
This figure shows the histogram of sea duty served for sea tours with 48-month PSTs for men’s first-term sea tours ending in FY07–11 excluding sea tours that were incomplete due to enlisted Navy losses. A majority of the mass of this histogram is within 6 months of the 48-month PST. However, there is a small, but nontrivial, spike at 37 months at sea. Also of note are the long tails on either end of the histogram, again showing the variation in sea duty served across the sample.



This figure shows the histogram of sea duty served for sea tours with 54-month PSTs for men’s first-term sea tours ending in FY07–11, excluding sea tours that were incomplete because of enlisted Navy losses. Again, a majority of the mass of this histogram is within 6 months of the 54-month PST. However, there is a small, but nontrivial, spike at 61 months at sea, just outside that 12-month window. Again, the histogram has long tails on both ends of the distribution, showing the variation in sea duty served across the sample.

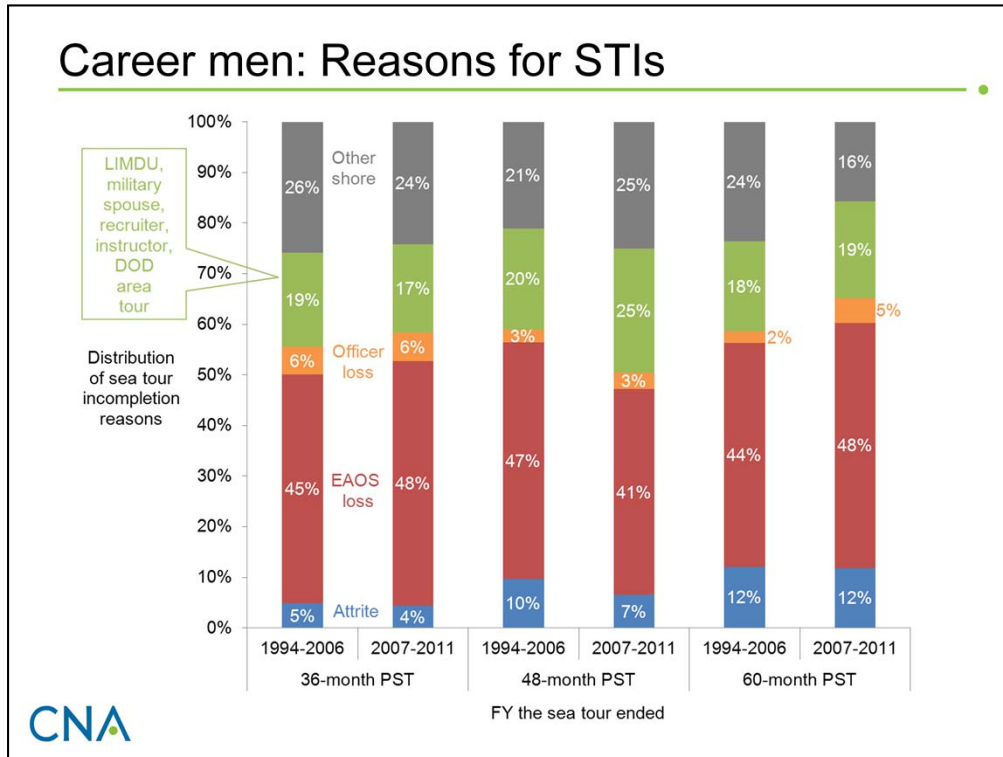


This figure shows the histogram of sea duty served for sea tours with 60-month PSTs for men's first-term sea tours ending in FY07–11, excluding sea tours that were incomplete because of enlisted Navy losses. Again, a majority of the mass of this histogram is within 6 months of the 60-month PST. Unlike the histograms for 48- and 54-month PSTs, there are no spikes outside that 12-month window. But, like the histograms for 48- and 54-month PSTs, the histogram has long tails on both ends of the distribution, showing the variation in sea duty served across the sample.



This figure shows STI rates for men’s career sea tours. It displays three sets of results: STI rates for sea tours with 36-month PSTs (shown in darker blue), STI rates for sea tours with 48-month PSTs (shown in green), and STI rates for sea tours with 60-month PSTs (shown in lighter blue). The difference in STI rates between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) is statistically significant at the 5-percent level for sea tours with 48- and 60-month PSTs but statistically insignificant for sea tours with 36-month PSTs. As the figure shows, 29 to 62 percent of men’s career sea tours that ended in FY94–06 or FY07–11 were incomplete.

## Career men: Reasons for STIs

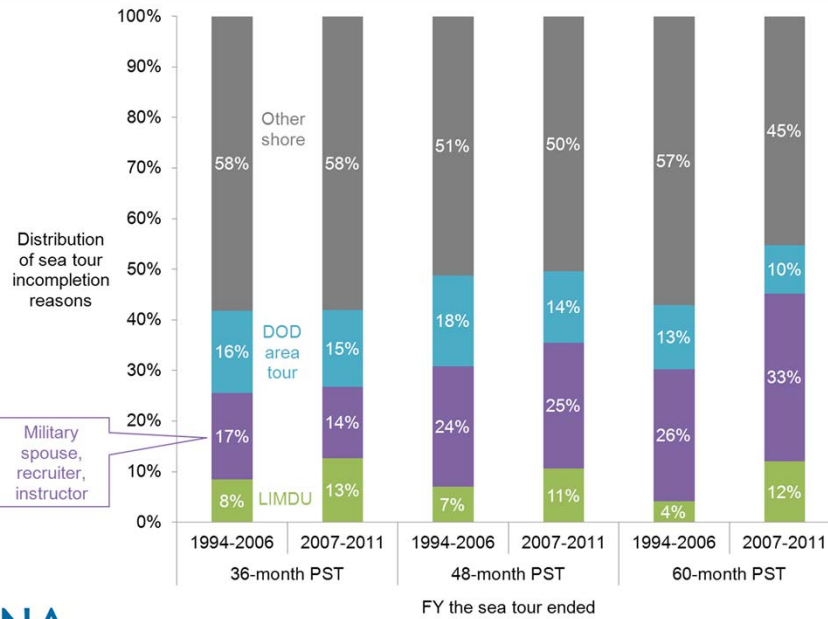


This figure shows the distribution of STIs by reason for the incompleteness. Differences in the distribution of STI reasons between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) are statistically significant at the 5-percent level for sea tours with 48- and 60-month PSTs but statistically insignificant for sea tours with 36-month PSTs.

We find that attrition accounts for 5 to 12 percent of STIs, EAOS losses are responsible for another 41 to 48 percent, and officer commissioning explains another 2 to 6 percent. The remaining STIs are split between reasons we can identify in our data (LIMDU, military spouse, recruiter duty, instructor billets, or DOD area tour—but not pregnancy/ maternity because these results are for men), approximately 17 to 25 percent, and those we cannot identify in our data (which we label “other shore”), approximately 16 to 26 percent.

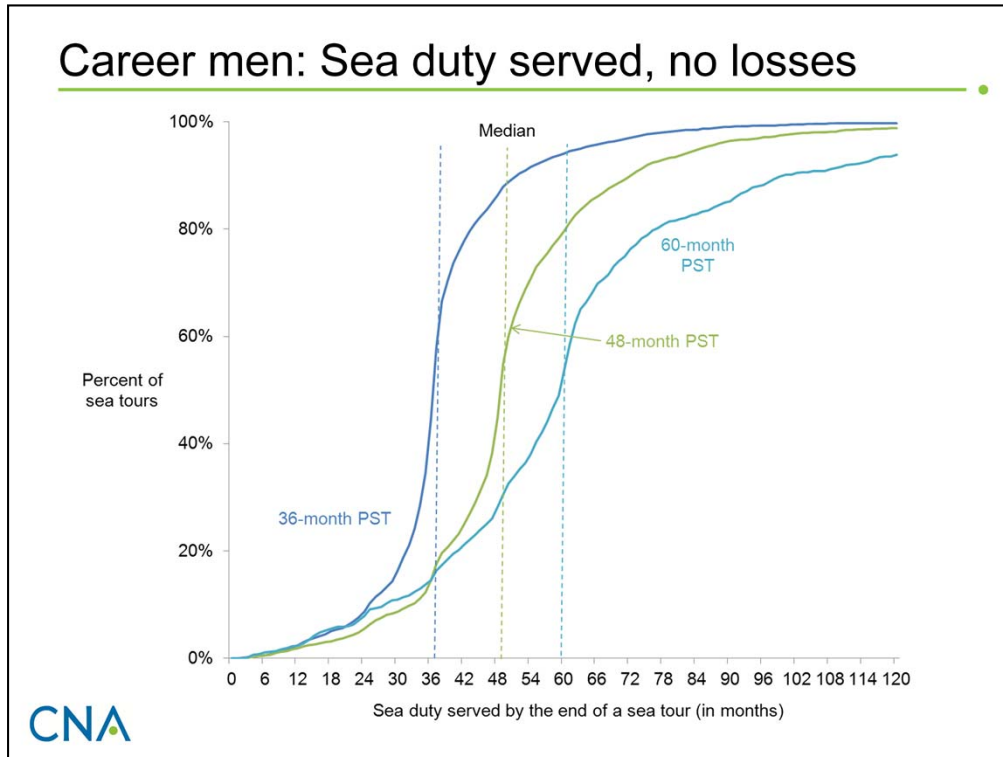


## Career men: Reasons for STIs, no losses

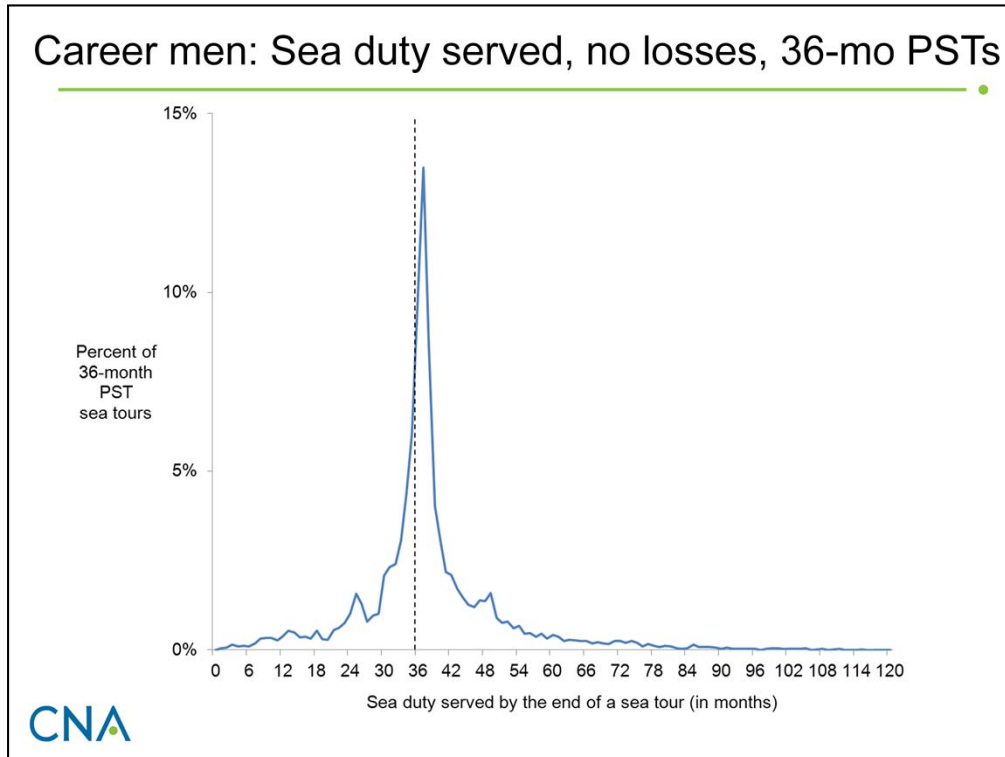


After removing sea tours that were incomplete due to enlisted Navy losses, we reexamine reasons for STIs. Differences in the distribution of STI reasons between the earlier years of our sample (FY94–06) and the five most recent years (FY07–11) are statistically significant at the 5-percent level for all sea tours. This figure shows that LIMDU accounts for no more than 13 percent of non-loss STIs. Having a military spouse or going to a recruiter or instructor billet accounts for a larger share of non-loss STIs. Together, these reasons account for 14 to 33 percent of non-loss STIs. In addition, sea tours that were DOD area tours account 13 to 18 percent of non-loss STIs. However, the largest group, comprising roughly half of non-loss STIs, is the “other shore” group for which we cannot identify a specific reason for the early roll to shore.

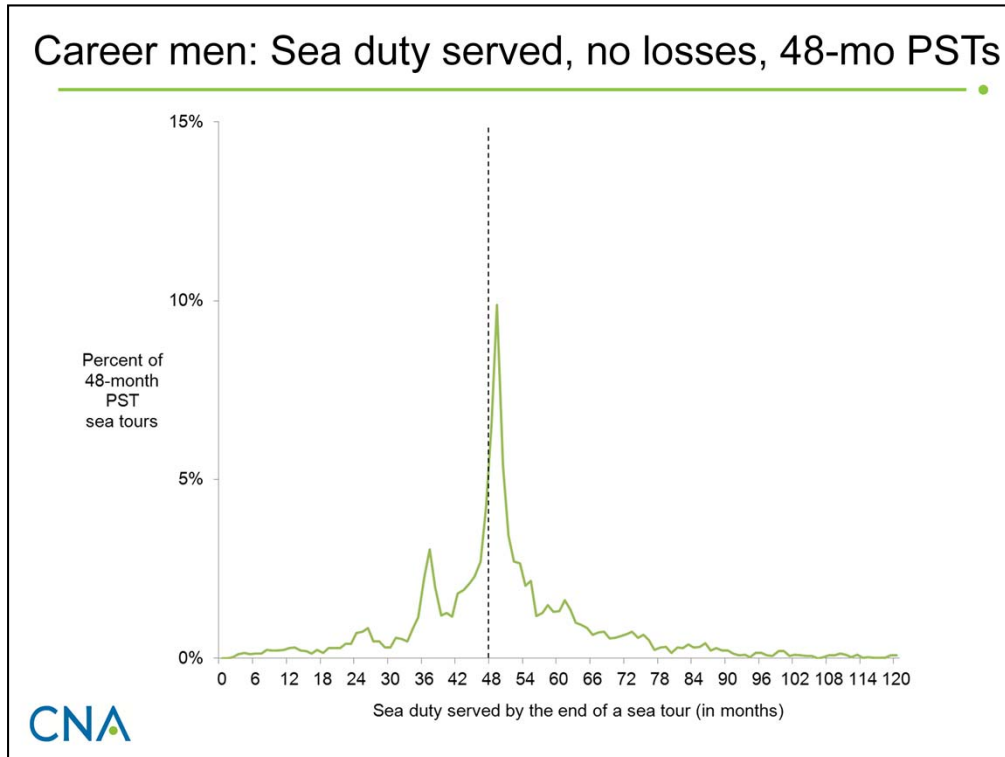
## Career men: Sea duty served, no losses



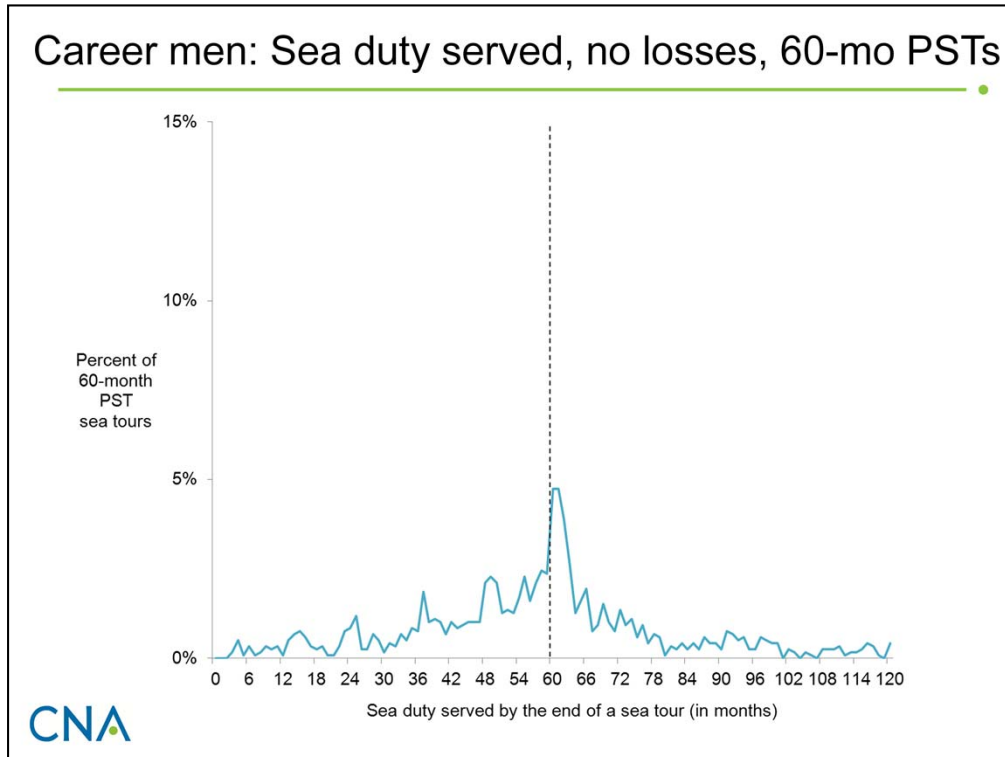
This figure shows the cumulative distribution of sea duty served by PST for men's career sea tours ending in FY07-11, excluding sea tours that were incomplete because of enlisted Navy losses. There is considerable variation in sea tour lengths that is not conveyed when simply examining the median. Indeed, for each of the PSTs shown, more than one-eighth of sea tours are *shorter* than the PST by 6 months or more, while more than one-fifth of sea tours are *longer* than the PST by 6 months or more.



This figure shows the histogram of sea duty served for sea tours with 36-month PSTs for men’s career sea tours ending in FY07–11 excluding sea tours that were incomplete due to enlisted Navy losses. A little less than half of the mass of this histogram is within 6 months of the 36-month PST. Also of note are the long tails on either end of the histogram, again showing the variation in sea duty served across the sample.



This figure shows the histogram of sea duty served for sea tours with 48-month PSTs for men’s career sea tours ending in FY07–11, excluding sea tours that were incomplete because of enlisted Navy losses. Again, a majority of the mass of this histogram is within 6 months of the 48-month PST. However, there is a small, but nontrivial, spike at 37 months at sea, which was also the case for first-term sea tours with 48-month PSTs. Again, the histogram has long tails on both ends of the distribution, showing the variation in sea duty served across the sample.



This figure shows the histogram of sea duty served for sea tours with 60-month PSTs for men’s career sea tours ending in FY07–11, excluding sea tours that were incomplete due to enlisted Navy losses. This histogram stands in stark contrast to the other histograms we have discussed. Here, only one-third of the mass of this histogram is within 6 months of the 60-month PST. There are no notable spikes outside that 12-month window; instead, there is considerable mass in the tails of the distribution.

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