

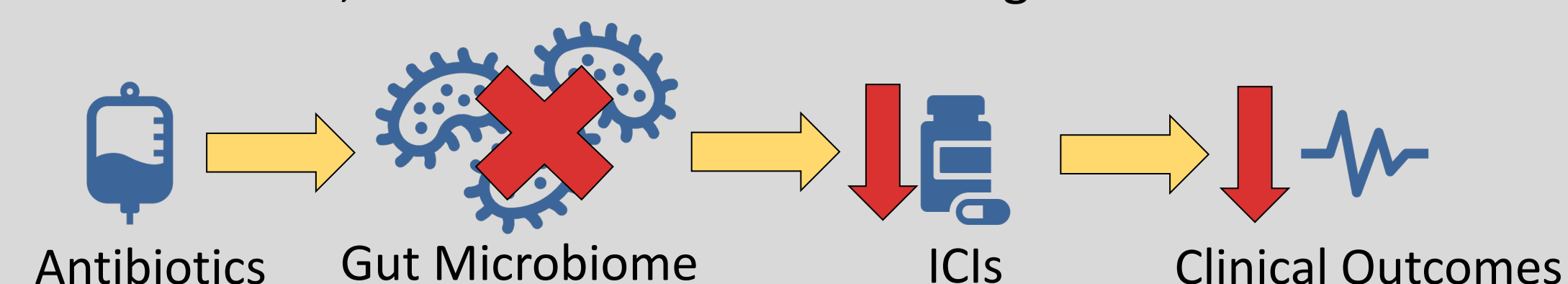
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## Introduction

Immune checkpoint inhibitors (ICIs) have advanced cancer treatment by promoting the immune response to cancer cells. Recent studies have suggested that antibiotic (Abx) use and resulting changes in the gut microbiome alter the effectiveness of ICI treatment, but detailed data are lacking.



## Objectives

- Describe cohort characteristics and antibiotic exposure profile in individuals with Stage IV non-small cell lung cancer (NSCLC)
- Characterize the association between antibiotic exposure in the immediate 60 days before and after the start of ICI therapy and clinical outcomes in individuals with Stage IV NSCLC

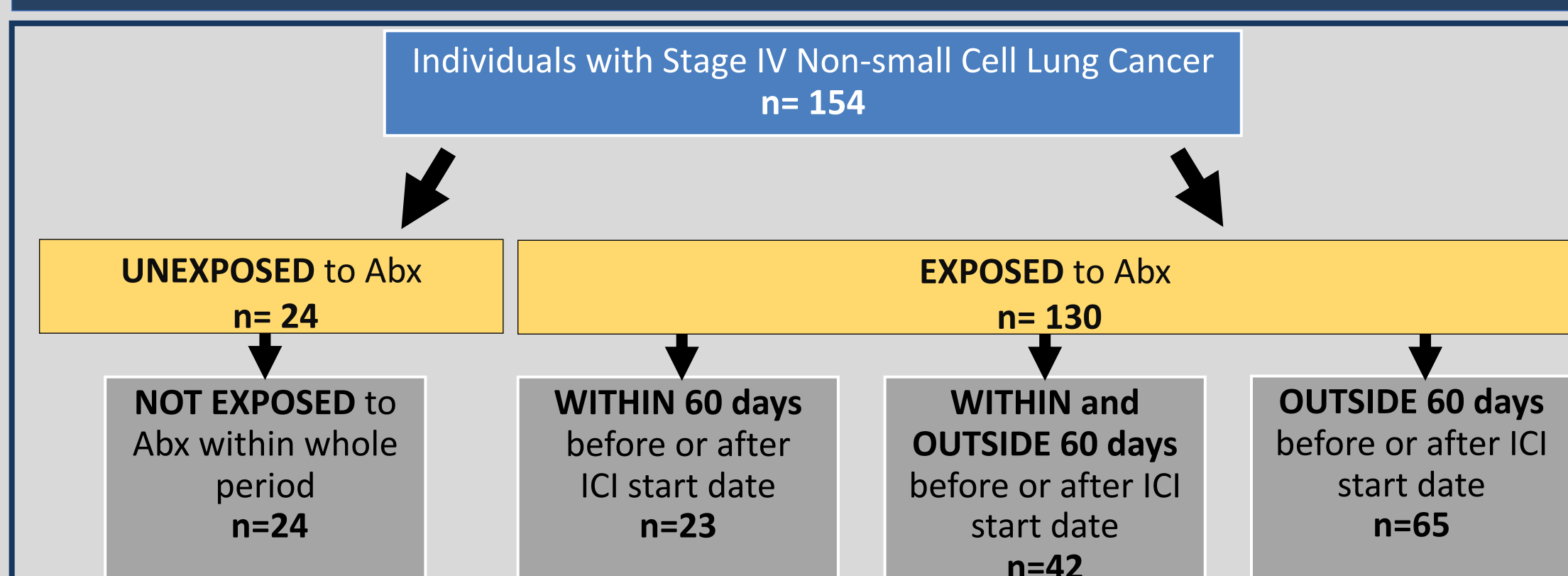
## Methods

**Population:** Individuals with Stage IV NSCLC treated with ICIs between 9/25/2014 - 6/30/2020 within an academic medical system

**Data Collection:** Demographics, immune checkpoint inhibitor and antibiotic treatments, tumor characteristics, and progression and survival data (defined by radiological evidence or provider notes) was extracted from the electronic medical record and verified by chart review

**Analysis:** Data analysis was completed using R and Microsoft Excel

## Results



**Figure 1 – Antibiotic exposure stratification flow chart**

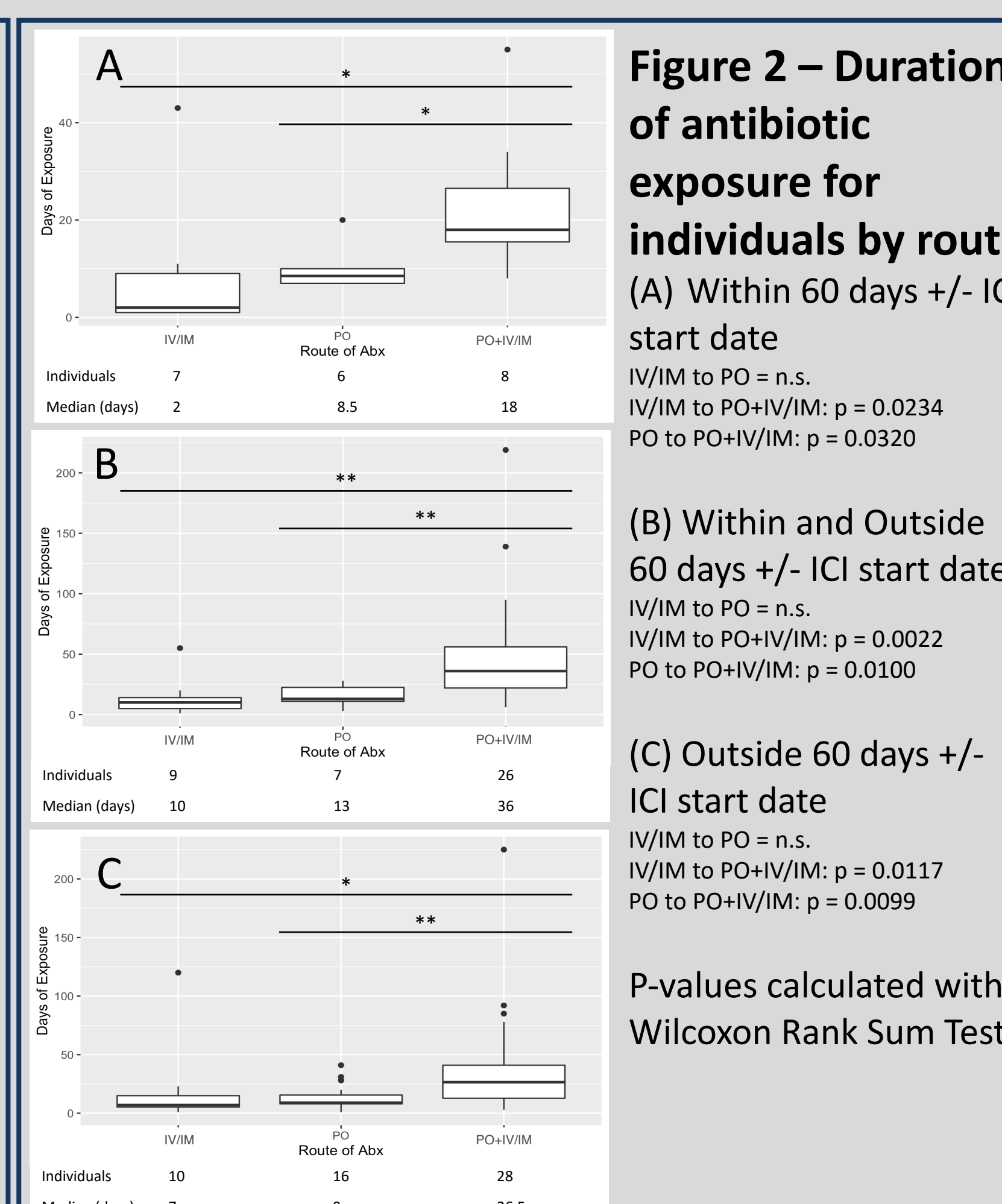
Other anti-infectives (e.g., anti-fungal), and non-systemic (e.g., topical) antibiotics were excluded

## Results

Abx Exposure	Unexposed	Within 60d +/- ICI start date	Within and Outside 60d +/- ICI start date	Outside 60d +/- ICI start date	Total
Age - Median (range)	66 (49-83)	68 (42-85)	68 (36-86)	66 (42-83)	67 (46-87)
Sex - n (%)					
Male	13 (54%)	12 (52%)	20 (48%)	29 (45%)	74 (48%)
Female	11 (46%)	11 (48%)	22 (52%)	36 (55%)	80 (52%)
Race - n (%)					
White	18 (75%)	14 (61%)	29 (69%)	48 (74%)	109 (71%)
Non-White	6 (25%)	9 (39%)	13 (31%)	17 (26%)	45 (29%)
Smoking Status - n (%)					
Current/Former	22 (92%)	19 (83%)	33 (78%)	56 (86%)	130 (84%)
Never	2(8%)	4 (17%)	9 (21%)	9 (14%)	24 (16%)
ECOG - n (%)					
0-1	21 (88%)	18 (78%)	30 (71%)	59 (91%)	128 (83%)
2-3	3 (13%)	5 (22%)	12 (29%)	6 (9%)	26 (17%)
Line of Therapy - n (%)					
1	9 (38%)	10 (43%)	19 (45%)	27 (42%)	65 (42%)
2+	15 (63%)	13 (57%)	23 (55%)	38 (58%)	89 (58%)
Therapy Type - n (%)					
ICI	15 (63%)	14 (61%)	26 (62%)	33 (51%)	88 (57%)
ICI + Chemotherapy	5 (21%)	2 (9%)	8 (19%)	16 (25%)	31 (20%)
Other	4 (17%)	7 (30%)	8 (19%)	16 (25%)	35 (23%)
Abx Route - n (%)					
PO	-	8 (35%)	7 (17%)	27 (42%)	42 (32%)
IV/IM	-	6 (26%)	5 (12%)	8 (12%)	19 (15%)
PO+IV/IM	-	9 (39%)	30 (71%)	30 (46%)	69 (53%)
Total	24	23	42	65	154

**Table 1 – Demographics**

ECOG: Eastern Cooperative Oncology Group Performance Status



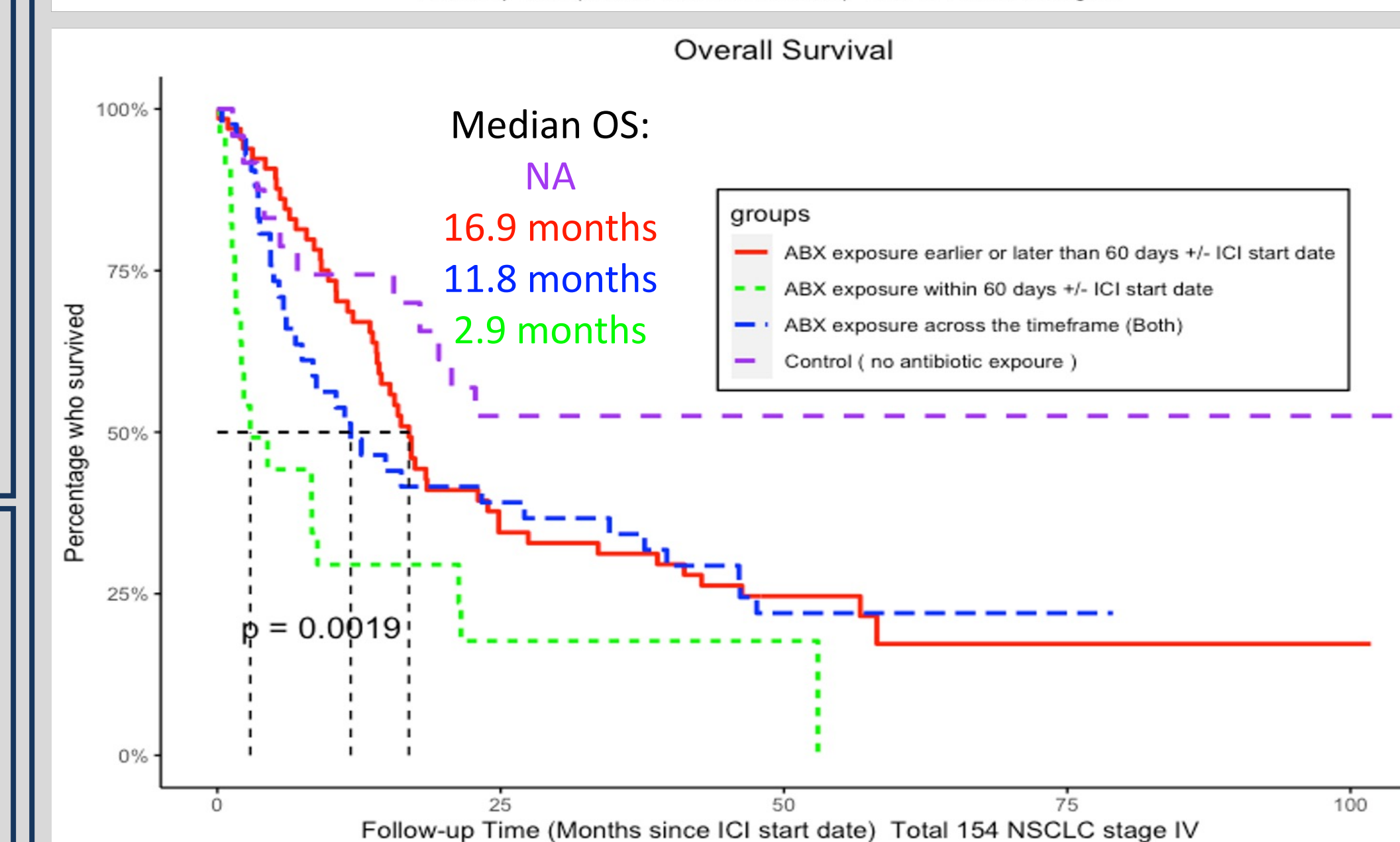
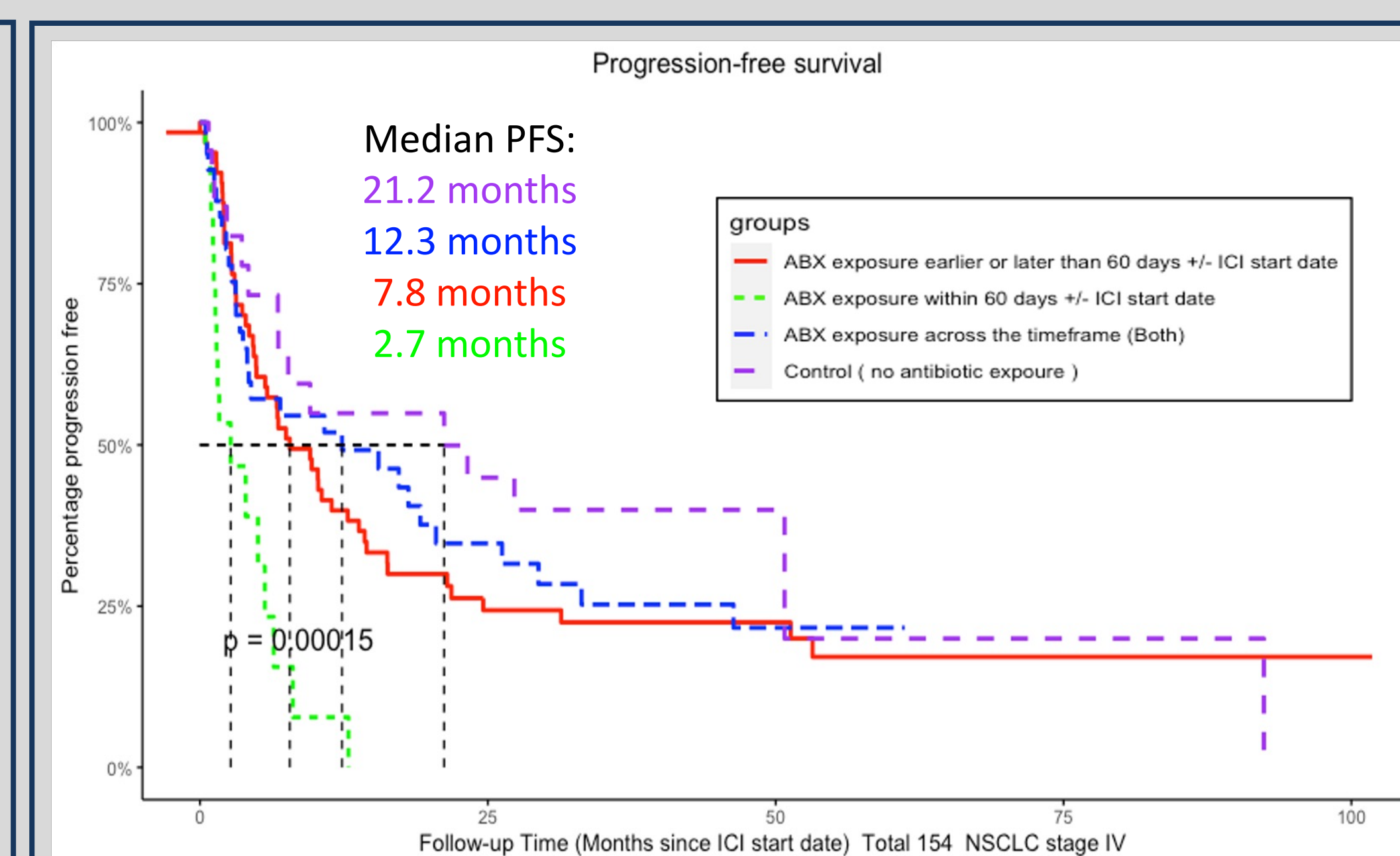
**Figure 2 – Duration of antibiotic exposure for individuals by route**

(A) Within 60 days +/- ICI start date  
 IV/IM to PO = n.s.  
 IV/IM to PO+IV/IM: p = 0.0234  
 PO to PO+IV/IM: p = 0.0320

(B) Within and Outside 60 days +/- ICI start date  
 IV/IM to PO = n.s.  
 IV/IM to PO+IV/IM: p = 0.0022  
 PO to PO+IV/IM: p = 0.0100

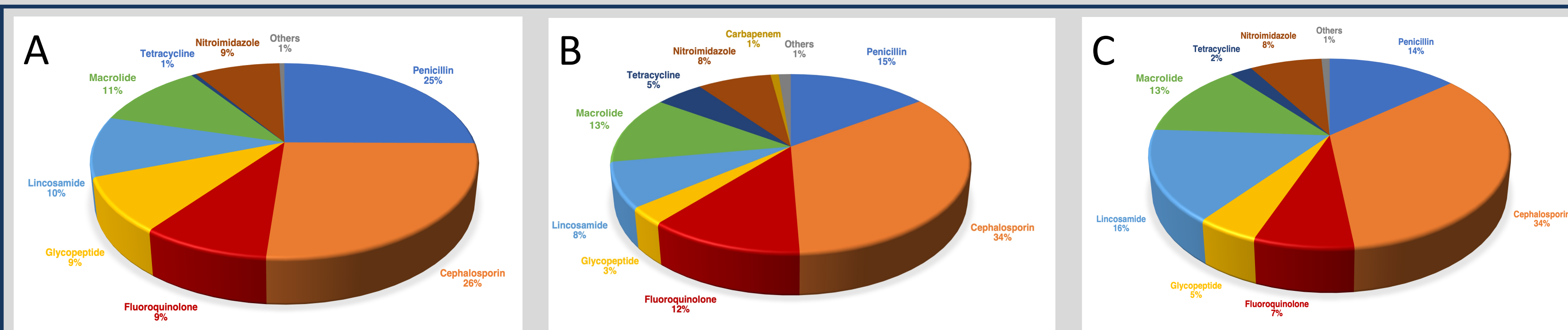
(C) Outside 60 days +/- ICI start date  
 IV/IM to PO = n.s.  
 IV/IM to PO+IV/IM: p = 0.0117  
 PO to PO+IV/IM: p = 0.0099

P-values calculated with Wilcoxon Rank Sum Test



**Figure 4 – Kaplan-Meier survival analyses of progression-free survival (PFS) and overall survival (OS)**

P-values calculated with Log-rank test



**Figure 3 – Distribution of antibiotic class**

Abx exposure: (A) Within 60 days / (B) Within and Outside 60 days / (C) Outside 60 days +/- ICI start date  
 Others: Includes Nitrofurans and Isonicotinic Acid Derivatives (e.g., isoniazid)

## Conclusions

- Antibiotic exposure within 60 days of ICI start was associated with significantly decreased progression-free and overall survival in individuals with stage IV NSCLC compared to unexposed individuals.
- Any antibiotic exposure was associated with worse overall survival compared to unexposed individuals.
- Individuals that received PO+IV/IM antibiotics had significantly longer durations of exposure than those that received just IV/IM or PO antibiotics.
- Most individuals received a combination of PO and IV/IM antibiotics, of which the most frequently prescribed classes were penicillins and cephalosporins (48%-51% of total antibiotic exposures in both time periods).
- Further work is ongoing in a larger cohort of individuals across multiple tumor types with multivariate analyses planned.

## More Information

See the poster in the IDWeek app:

