

Immunotherapy in Kidney & Bladder Cancers

New Orleans
October 8, 2022

Vadim S Koshkin, MD
Assistant Professor

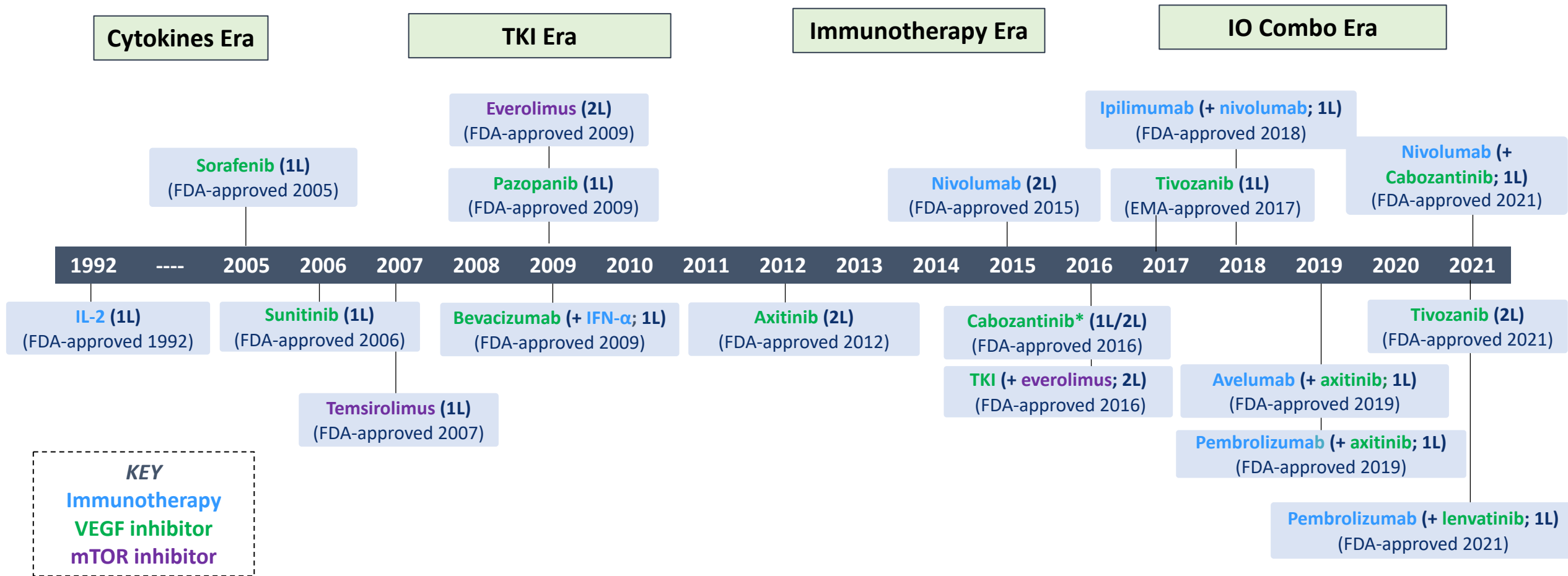
Helen Diller Family Comprehensive Cancer Center
University of California, San Francisco

 @koshkin85

UCSF Helen Diller Family
Comprehensive
Cancer Center

Renal Cell Cancer

Evolution of Systemic Therapy in Metastatic RCC



1L = first line; 2L= second line; IFN- α = interferon alpha; IL = interleukin; IO = immunotherapy; mTOR, mammalian target of rapamycin;TKI = tyrosine kinase inhibitor; VEGF, vascular endothelial growth factor; VEGFR-2 = VEGF receptor-2

*Cabozantinib inhibits VEGFR-2, but also c-MET and AXL.22.

Dizman N, et al. *Nature Reviews Nephrol.* 2020;16:435–451.

Food and Drug Administration. Drug Approvals and Databases. <https://www.fda.gov/drugs/development-approval-process-drugs/drug-approvals-and-databases>.

Metastatic RCC– Frontline

NCCN Recommendations in ccRCC

FIRST-LINE THERAPY FOR CLEAR CELL HISTOLOGY			
Risk	Preferred Regimens	Other Recommended Regimens	Useful in Certain Circumstances
Favorable^a	<ul style="list-style-type: none"> • Axitinib + pembrolizumab^b (category 1) • Cabozantinib + nivolumab^b (category 1) • Lenvatinib + pembrolizumab^b (category 1) 	<ul style="list-style-type: none"> • Axitinib + avelumab^b • Cabozantinib (category 2B) • Ipilimumab + nivolumab^b • Pazopanib • Sunitinib 	<ul style="list-style-type: none"> • Active surveillance^c • Axitinib (category 2B) • High-dose IL-2^d (category 2B)
Poor/ intermediate^a	<ul style="list-style-type: none"> • Axitinib + pembrolizumab^b (category 1) • Cabozantinib + nivolumab^b (category 1) • Ipilimumab + nivolumab^b (category 1) • Lenvatinib + pembrolizumab^b (category 1) • Cabozantinib 	<ul style="list-style-type: none"> • Axitinib + avelumab^b • Pazopanib • Sunitinib 	<ul style="list-style-type: none"> • Axitinib (category 2B) • High-dose IL-2^d (category 3) • Temsirolimus^e (category 3)

Results From Front-Line IO-Combination Trials

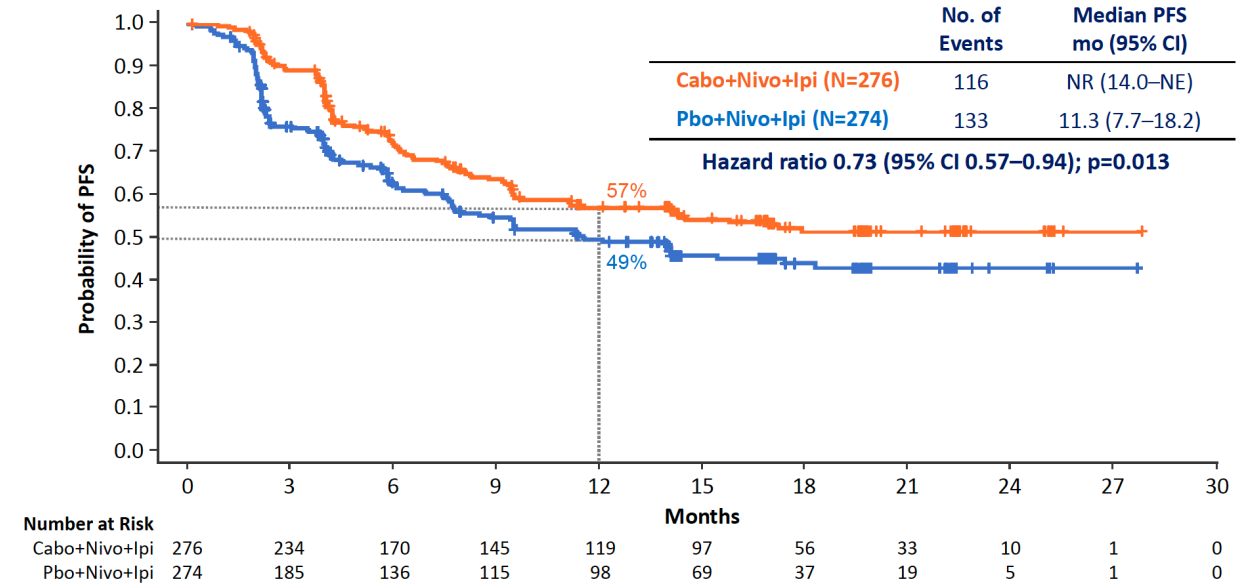
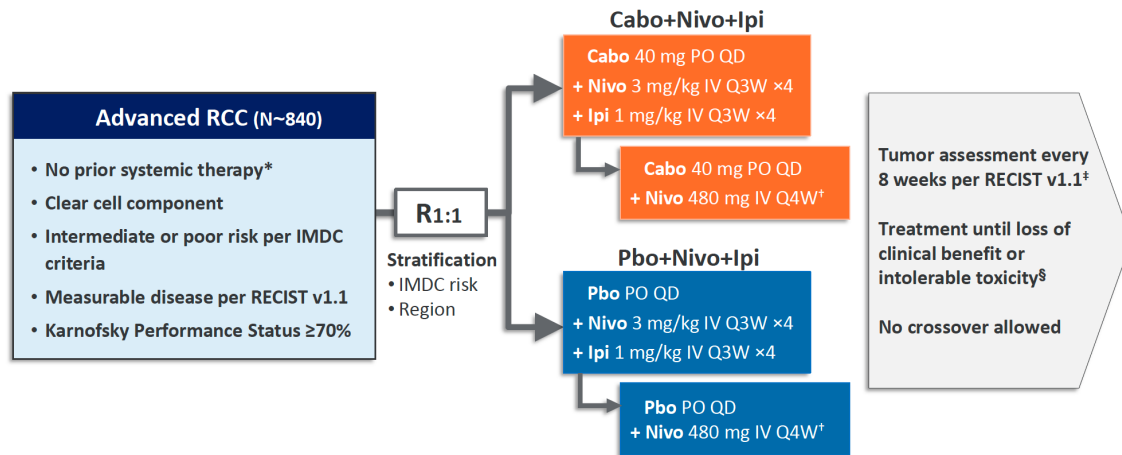
	CheckMate 214 (Ipi/Nivo) ¹ (n=550 vs n=546)	KEYNOTE-426 (Axi/Pembro) ² (n=432 vs n=429)	CheckMate 9ER (Cabo/Nivo) ³ (n=323 vs n=328)	CLEAR (Len/Pembro) ⁴ (N=355 vs n=357)
HR	0.72	0.73	0.70	0.72
mOS, months	55.7 vs 38.4	45.7 vs 40.1	37.7 vs 34.3	NR vs NR
Landmark OS 12 mo	83% vs. 78%	90% vs. 79%	86% vs. 76%	90% vs 79% (est.)
Landmark OS 24 mo	71% vs. 61%	74% vs. 66%	70% vs 60%	79% vs. 70%
HR	0.86	0.68	0.56	0.39
mPFS, months	12.3 vs 12.3	15.7 vs 11.1	16.6 vs 8.3	23.9 vs 9.2
ORR, %	39 vs 32	60 vs 40	56 vs 28	71 vs 36
CR, %	12 vs 3	10 vs 4	12 vs 5	16 vs 4
Med f/u, months	67.7	42.8	32.9	33.7
Primary PD, %	18	11	6	5

1. Consistent OS benefit relative to sunitinib control arm; median survival immature for IO/TKIs
2. IO/TKIs with higher ORR (more tumor shrinkage), longer PFS and less early PD
3. Ipi/Nivo has the longest follow-up and potentially most durable benefit

Triplet Therapy: COSMIC 313

Progression-Free Survival: Final Analysis (PITT Population)

COSMIC-313 Study Design



- First trial to use Ipi/Nivo doublet as the comparator arm
- Met primary endpoint of PFS
- Greater toxicity in Ipi/Nivo/Cabo arm
- OS data immature

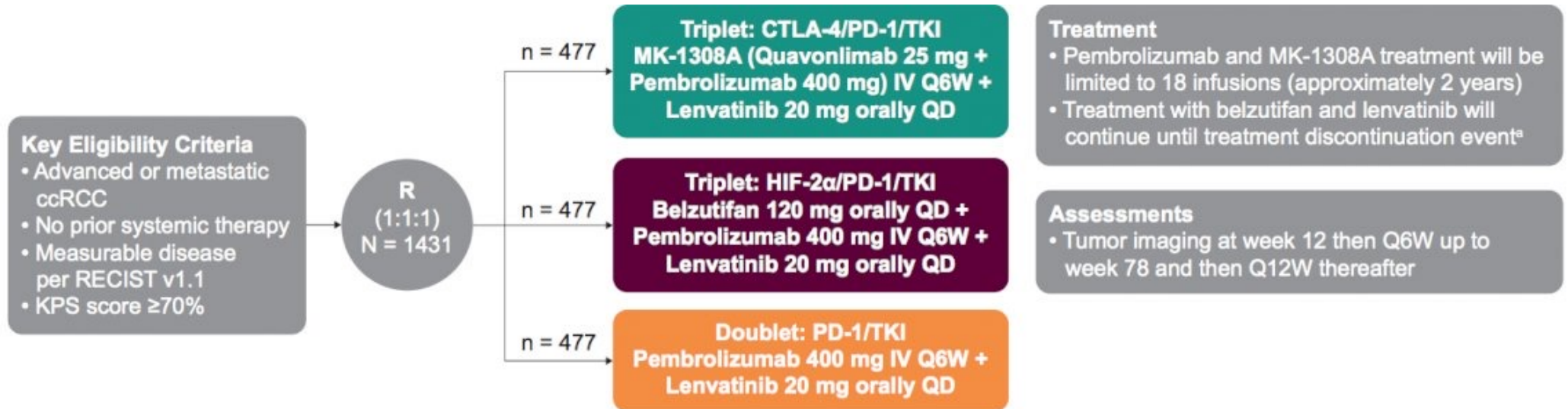
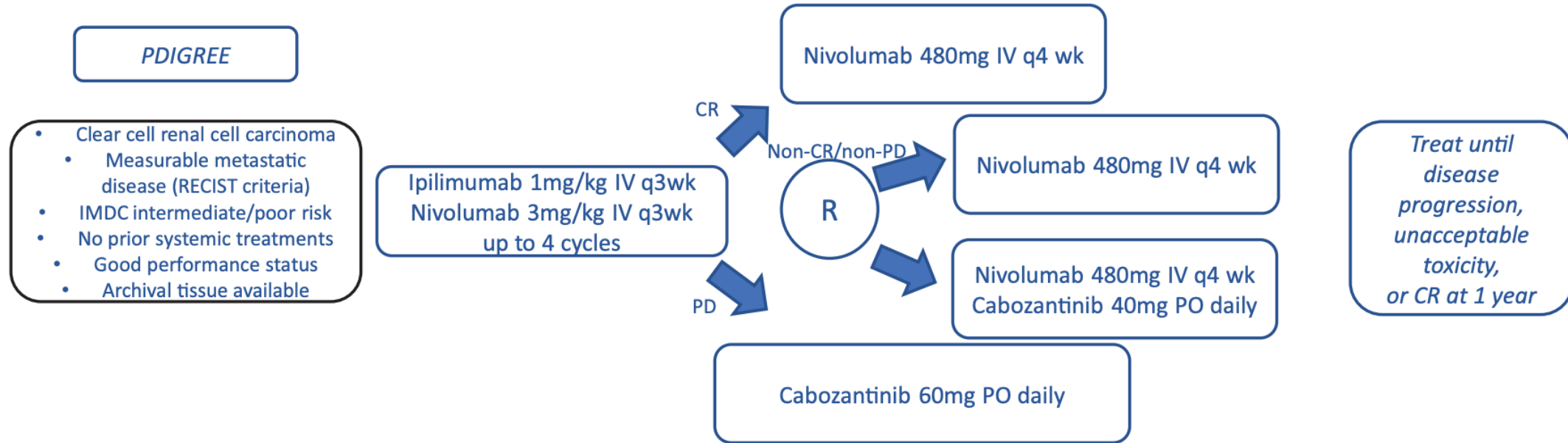
Tumor Response (PITT Population)

	Cabo+Nivo+Ipi (N=276)	Pbo+Nivo+Ipi (N=274)
Objective response rate (95% CI), %	43 (37.2-49.2)	36 (30.1-41.8)
Best overall response, n (%)		
Complete response	7 (3)	9 (3)
Partial response	112 (41)	89 (32)
Stable disease	119 (43)	100 (36)
Progressive disease	23 (8)	55 (20)
Not evaluable	15 (5)	21 (8)
Disease control rate, %	86	72
Median time to objective response (range), mo	2.4 (1.5-17.1)	2.3 (1.9-16.8)
Median duration of response (95% CI), mo	NR (20.2-NE)	NR (NE-NE)

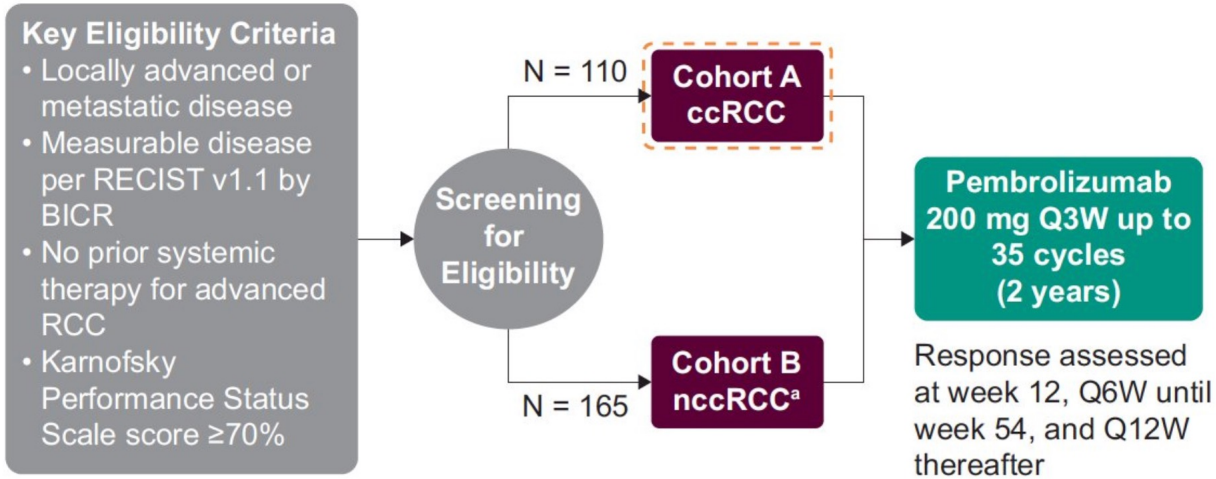
Tumor response per RECIST v1.1 by BIRC

Disease control rate = complete response + partial response + stable disease

Ongoing Studies: PDIGREE and MK3475-03A



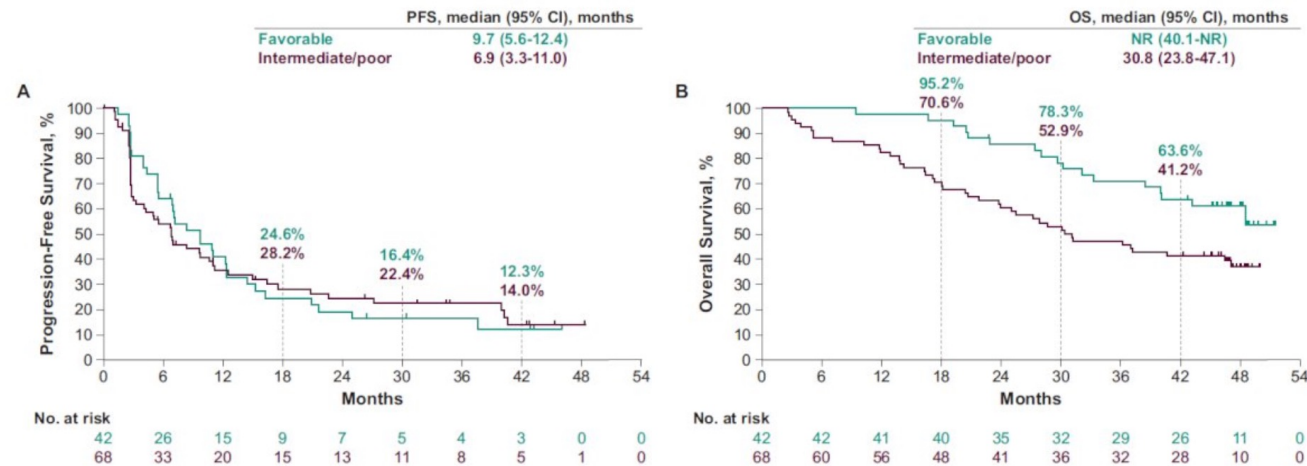
Single Agent IO Data: Keynote-427



End Points

- **Primary:** ORR (RECIST v1.1 by BICR)
- **Secondary:** OS, PFS, DOR, DCR (RECIST v1.1 by BICR), and safety

Cohort A: ORR 36 %



RCC--Second Line and Beyond

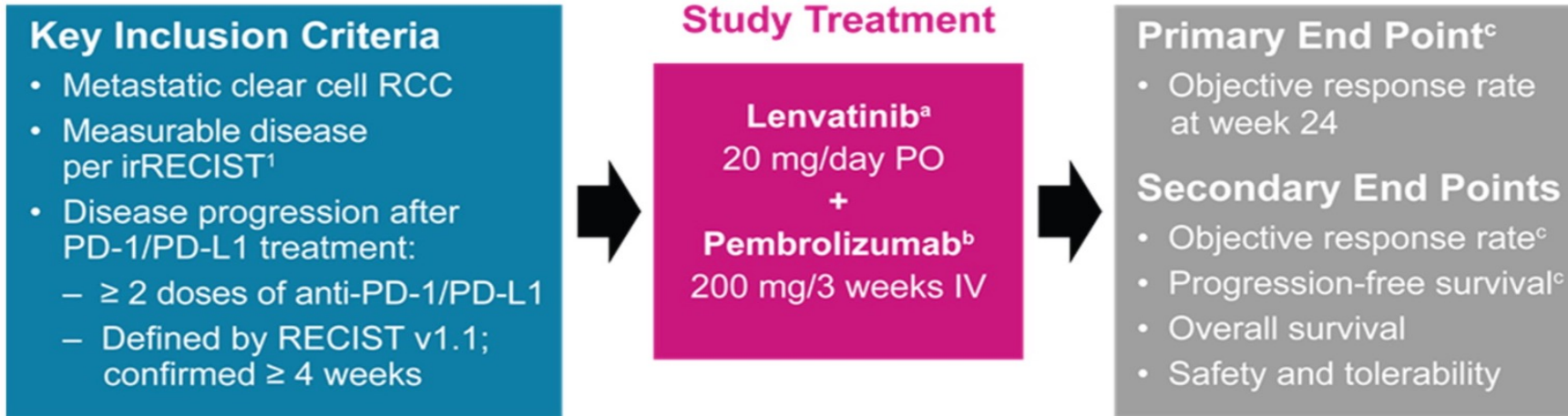
Second-Line Therapy: Preferred NCCN Recommendations

	Nivolumab vs evero ² N = 821	Cabozantinib vs evero ³ N = 658	Lenvatinib + evero vs lenvatinib or evero ⁴ N = 153
Trial	Phase 3 CM-025	Phase 3 METEOR	Phase 2 Study 205
Patient population	TKI-refractory (72% 1 prior)	TKI-refractory (71% 1 prior)	TKI-refractory (100% 1 prior)
Primary end point	OS	PFS (IRC)	PFS (INV)
Risk, favorable/int/poor	35/49/16	45/42/12	24/37/39
ORR, %	25	17	43
PFS, mo	4.6	7.4 (HR 0.51; 95% CI, 0.41–0.62; P <.0001)	14.6 (HR, 0.40; 95% CI, 0.24-0.68; P = .0005 vs evero)
OS, mo	25.0 (HR, 0.73; 95% CI, 0.57-0.93; P =.002)	21.4	25.5
Dose reductions	N/A	62%	71%
AE discontinuation	8%	12%	24%
Toxicity	18% G3 1% G4 (tx-related)	71% G3/4	57% G3 14% G4

AE, adverse event; discontinuation; evero, everolimus; tx, treatment.

1. Rini et al., *Lancet*. 2011;378:1931; 2. Motzer et al., *N Engl J Med*. 2015;373:1803;
3. Choueiri et al., *Lancet Oncol*. 2016;17:917-927; 4. Motzer et al., *Lancet Oncol*. 2015;16:1473

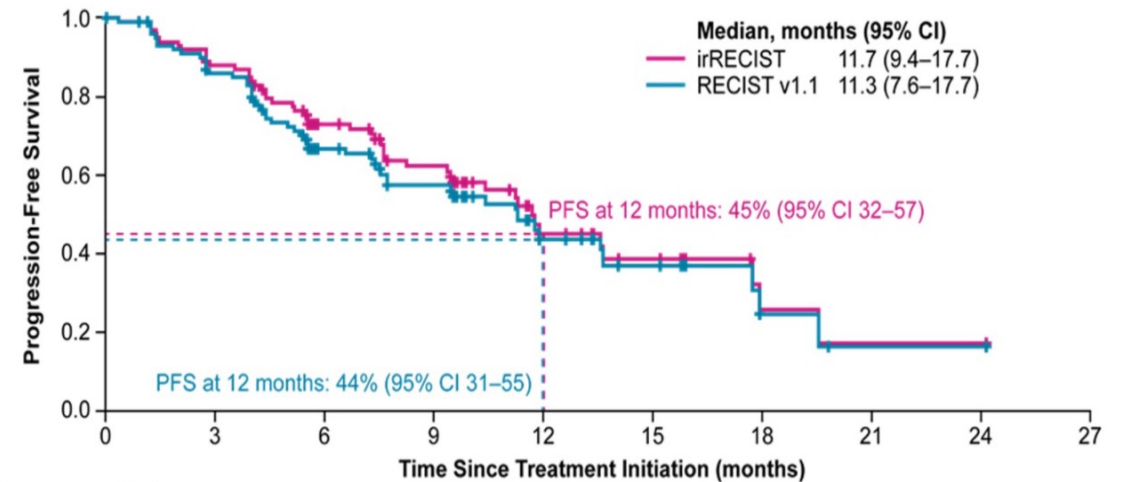
Post-IO Treatment



Tumor Response by Investigator Assessment

Parameter	irRECIST N = 104	RECIST v1.1 ^a N = 104
ORR at week 24, % (95% CI)	51 (41–61)	–
ORR, % (95% CI)	55 (45–65)	52 (42–62)
Best objective response, %		
Partial response	55	52
Stable disease	36	38
Progressive disease	5	6
Not evaluable	5	5
Median DOR, months (95% CI)	12 (9–18)	12 (9–18)

PFS Kaplan–Meier Curves by irRECIST^a and RECIST v1.1^{a,b}

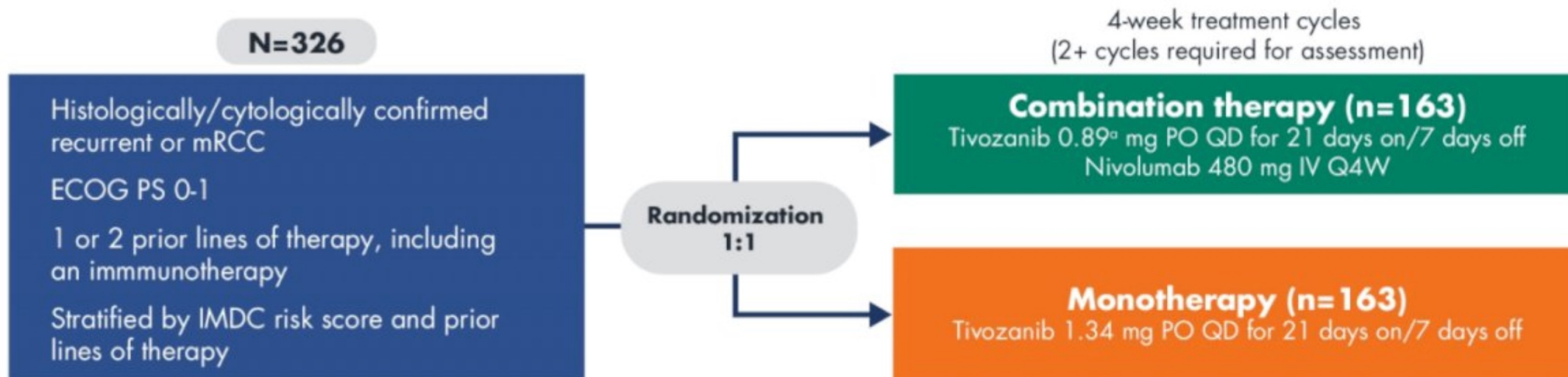
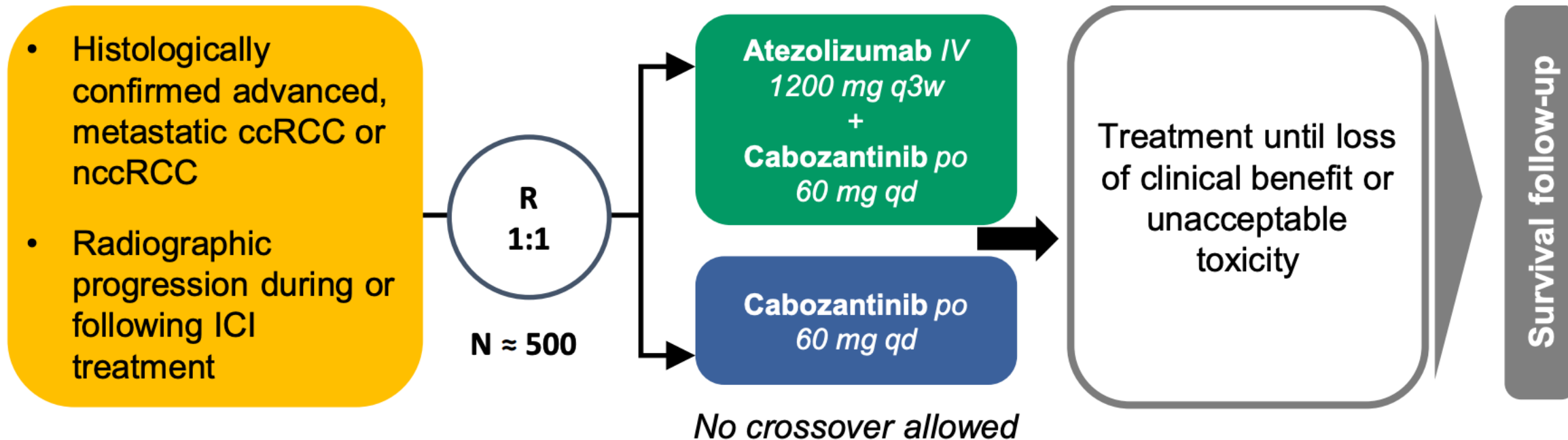


Number of Patients at Risk:

	0	3	6	9	12	15	18	21	24	
irRECIST	104	86	58	45	18	11	3	1	1	0
RECIST v1.1	104	84	53	41	17	10	3	1	1	0

^a Up to 10 target lesions could be selected (up to 5 per organ).

Ongoing Studies of Post-IO Treatment: CONTACT-03 and TINIVO-2



Non-Clear Cell RCC

KEYNOTE-B61: Pembrolizumab + Lenvatinib in nccRCC

Study Design of KEYNOTE-B61 (NCT04704219)

Key Eligibility Criteria

- Histologically confirmed diagnosis of nccRCC (per investigator)
- Locally advanced/metastatic disease
- No prior systemic therapy
- Measurable disease per RECIST v1.1
- Tumor tissue sample available
- KPS \geq 70%

N \approx 152
(planned)

Pembrolizumab
400 mg IV Q6W for
 \leq 18 cycles^a (~2 years)
+
Lenvatinib
20 mg PO QD

Tumor Assessments

- 12 weeks from allocation then Q6W for 54 weeks then Q12W thereafter

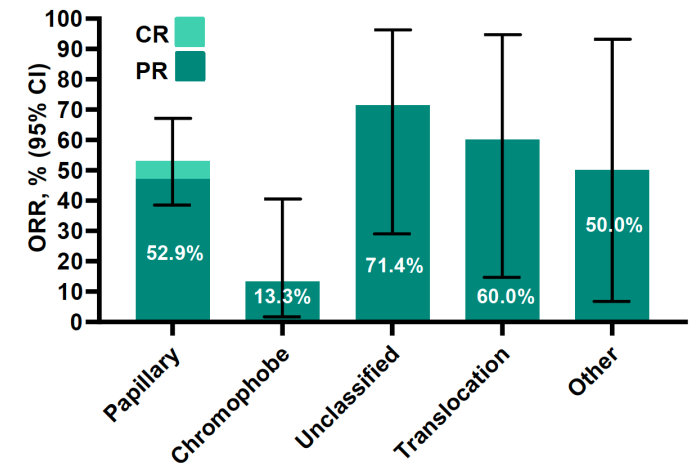
End Points

- Primary: ORR per RECIST v1.1 by BICR
- Secondary: CBR, DCR, DOR, and PFS per RECIST v1.1 by BICR; OS, safety and tolerability

Best Confirmed Objective Response: Efficacy Population^a

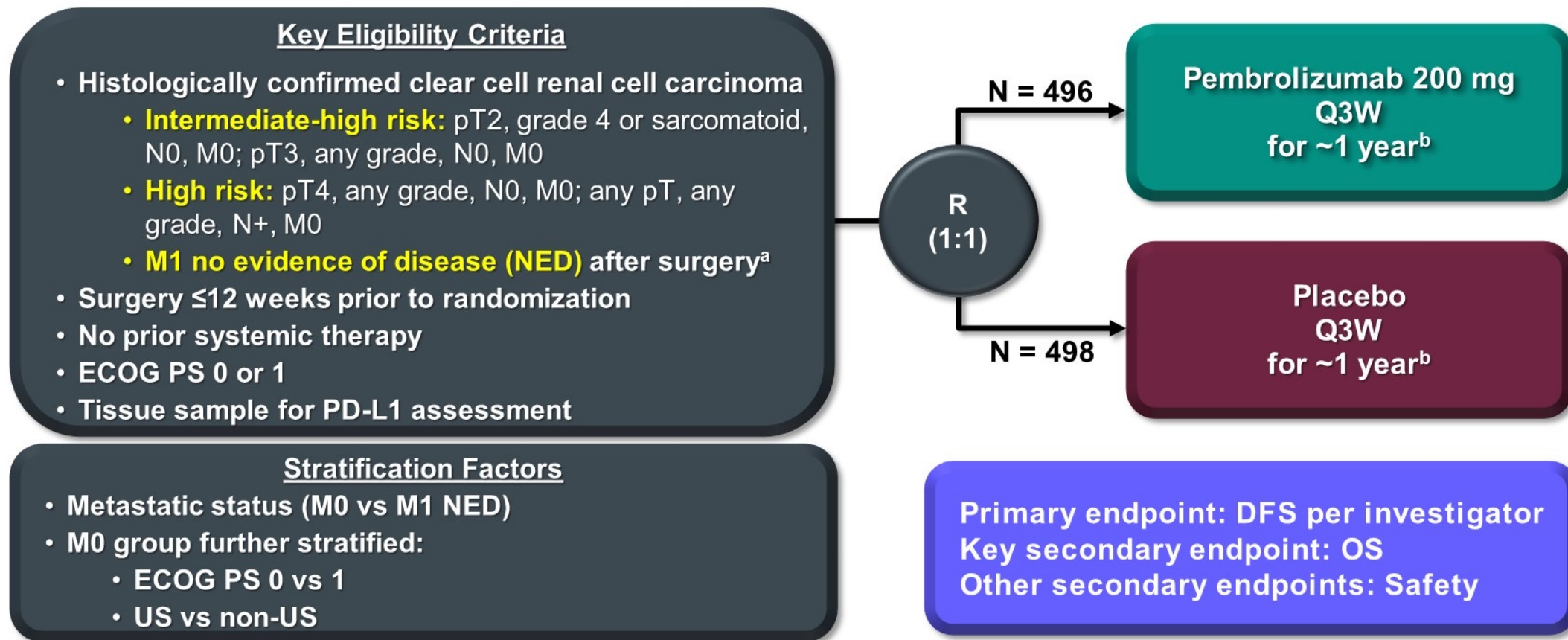
	Efficacy Population n = 82
ORR (CR + PR), % (95% CI)	47.6 (36.4-58.9)
DCR (CR + PR + SD), % (95% CI)	79.3 (68.9-87.4)
Best response, n (%)	
CR	3 (3.7)
PR	36 (43.9)
SD	26 (31.7)
PD	9 (11.0)
NE ^b	1 (1.2)
NA ^c	7 (8.5)

Response by histology subgroup



RCC– Adjuvant Therapy

KEYNOTE-564 (NCT03142334) Study Design



- Median (range) time from randomization to cutoff: 30.1 (20.8–47.5) months

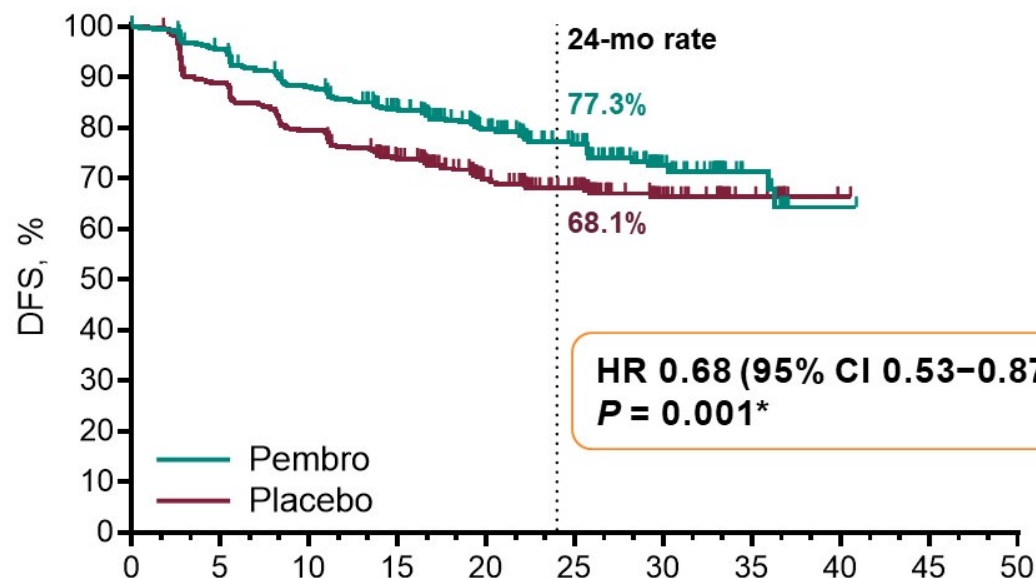
Q3W, every 3 weeks.

^aM1 NED: no evidence of disease after primary tumor + soft tissue metastases completely resected ≤1 year from nephrectomy; ^b≤17 cycles of treatment were equivalent to ~1 year.

Data cutoff date: June 14, 2021.

Primary Endpoint: DFS, ITT Population

Primary Analysis: 24.1 mo Follow-Up

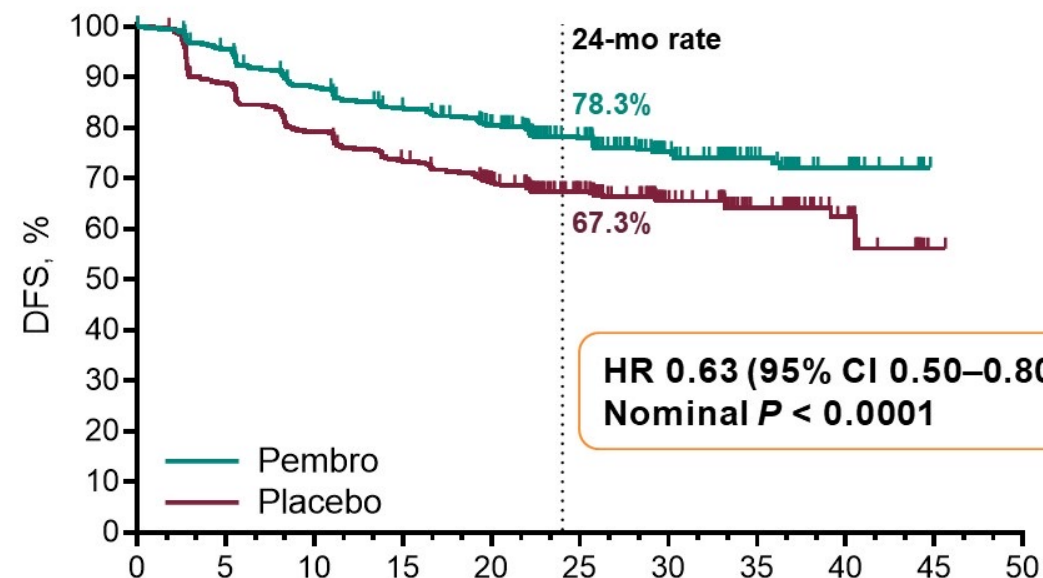


No. at risk

	0	5	10	15	20	24.1	30	35	40	45	50
Pembro	496	457	414	371	233	151	61	21	1	0	0
Placebo	498	436	389	341	209	145	56	19	1	0	0

	Pts w/ Event	Median, mo (95% CI)
Pembro	109	NR (NR–NR)
Placebo	151	NR (NR–NR)

Updated Analysis: 30.1 mo Follow-Up



No. at risk

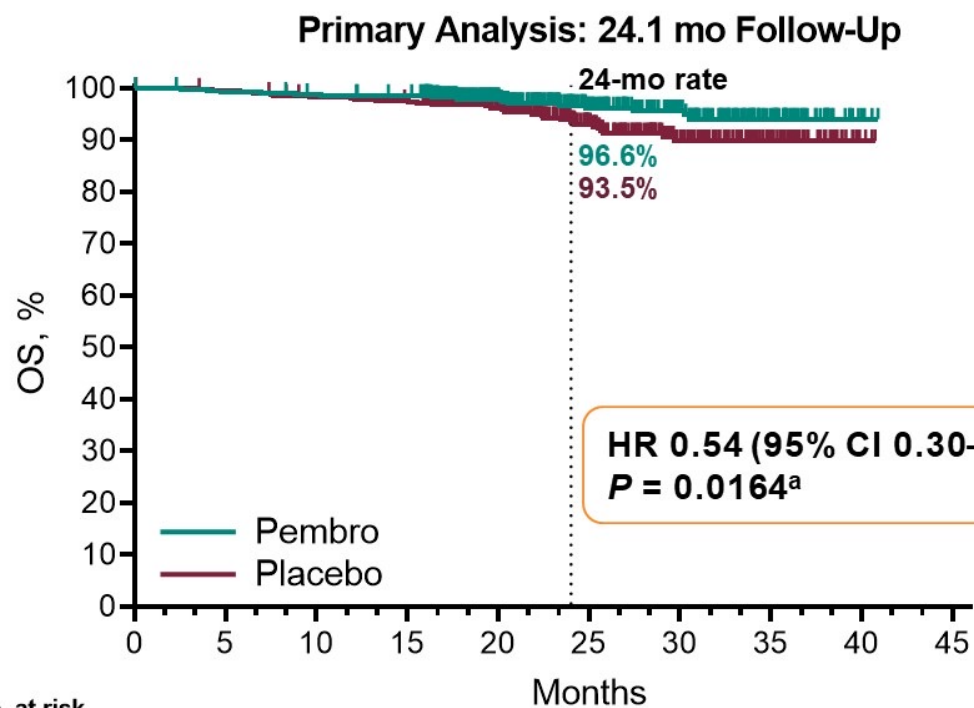
	0	5	10	15	20	24.1	30.1	35	40	45	50
Pembro	496	458	416	389	361	255	135	77	37	0	0
Placebo	498	437	389	356	325	230	125	74	33	1	0

	Pts w/ Event	Median, mo (95% CI)
Pembro	114	NR (NR–NR)
Placebo	169	NR (40.5–NR)

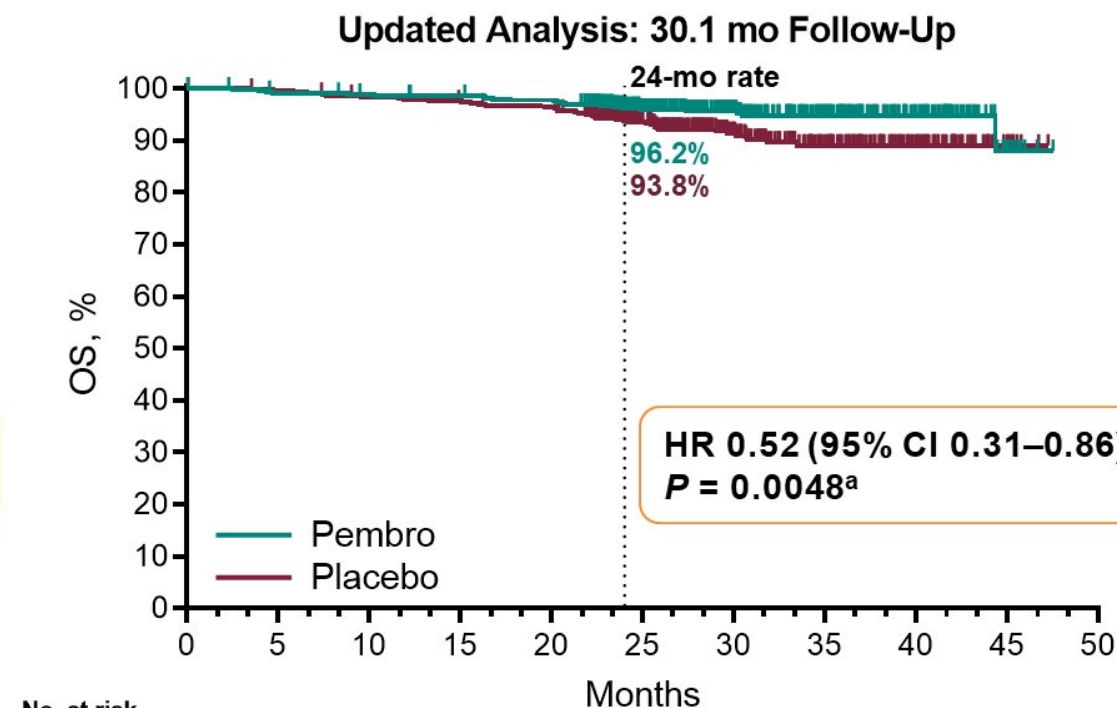
* denotes statistical significance.

ITT population included all randomized participants. DFS, disease-free survival; NR, not reached. Primary analysis data cutoff date: December 14, 2020. Updated analysis data cutoff date: June 14, 2021.

Key Secondary Endpoint: OS, ITT Population



No. at risk	0	5	10	15	20	25	30	35	40	45
Pembro	496	490	486	482	338	215	124	51	3	0
Placebo	498	494	485	480	336	209	117	48	3	0



No. at risk	0	5	10	15	20	25	30	35	40	45	50
Pembro	496	489	485	482	477	360	231	146	63	8	0
Placebo	498	494	486	481	474	352	219	138	61	9	0

	Pts w/ Event	Median, mo (95% CI)
Pembro	18	NR (NR–NR)
Placebo	33	NR (NR–NR)

	Pts w/ Event	Median, mo (95% CI)
Pembro	23	NR (NR–NR)
Placebo	43	NR (NR–NR)

^aDid not cross prespecified p-value boundary for statistical significance.

ITT population included all randomized participants. NR, not reached. Primary analysis data cutoff date: December 14, 2020. Updated analysis data cutoff date: June 14, 2021.

Adjuvant IO Trials in RCC

Trial	Number of Patients	Inclusion Criteria	Treatment	Primary Endpoint	Results
Keynote-564¹	994	pT2G4, pT3aG3-4, pT3b-T4Gx, pTxN1, pTxNxM1 (resected to NED within 1 year); clear cell	Pembrolizumab vs placebo	DFS	Met Primary Endpoint
IMmotion010²	778	pT2G4, pT3aG3-4, pT3b-T4Gx, pTxN1, pTxNxM1 (resected to NED*); clear cell	Atezolizumab vs placebo	DFS	Negative Study
CheckMate-914³	1600	pT2aG3-4N0, pT2b-T4GxN0, pTxGxN1; clear cell	Nivolumab + ipilimumab vs. nivolumab + placebo vs placebo (6 months)	DFS	Negative Study
PROSPER RCC⁴	766	T2Nx, TxN1, TxNxM1 (resected to NED); any RCC histology	Nivolumab vs observation	EFS	Negative Study
RAMPART⁵	1750	Leibovich score 3-11; any RCC histology	Durvalumab + tremelimumab vs durvalumab vs observation	DFS, OS	Expected 7/2024

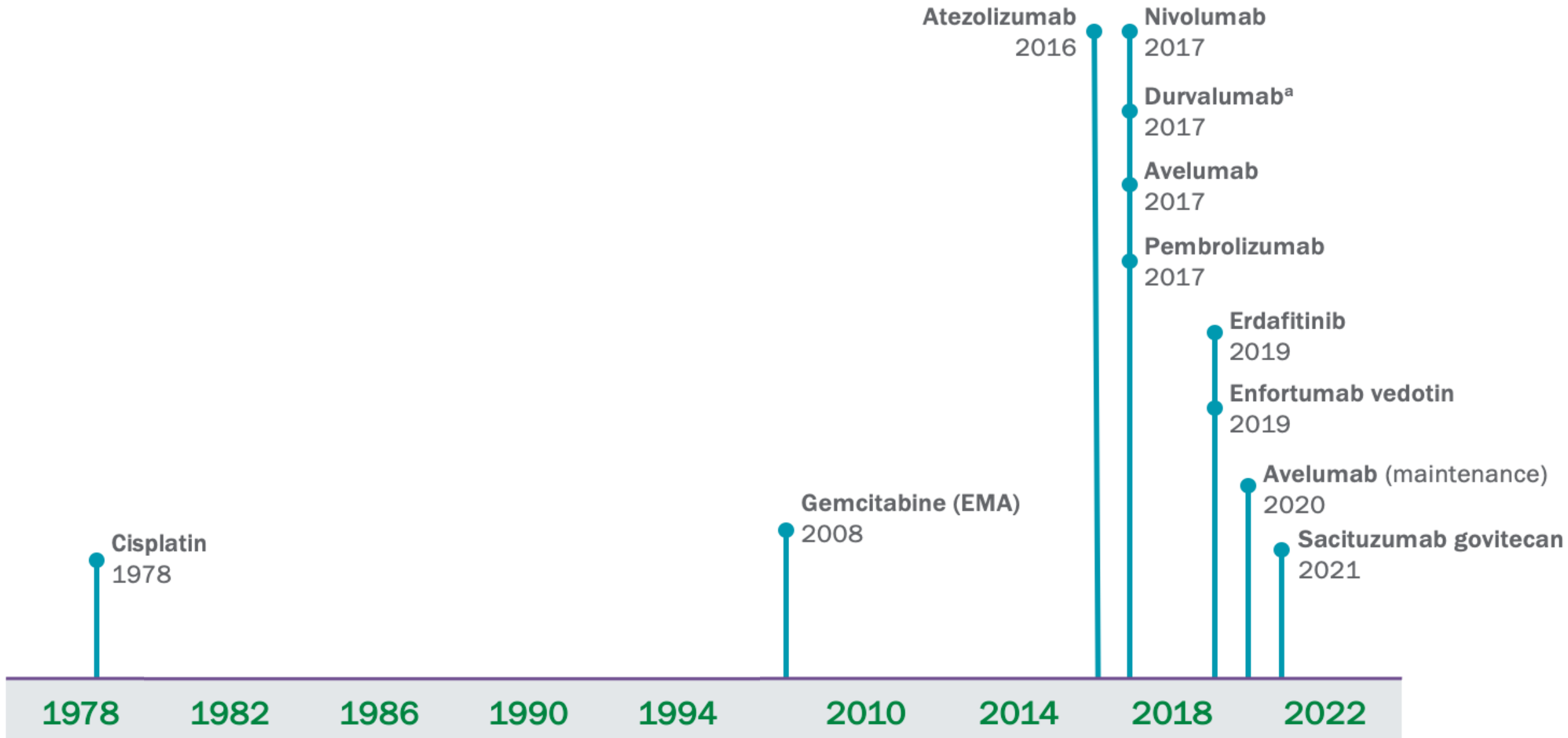
*Metachronous pulmonary, lymph node, or soft tissue recurrence >12 months from nephrectomy.
 DFS, disease-free survival; EFS, event-free survival; NED, no evidence of disease; RCC, renal cell carcinoma; OS, overall survival.
 1. Choueiri TK et al. *N Engl J Med*. 2021;385:683-694. 2. NCT03024996. 3. NCT03138512. 4. NCT03055013. 5. NCT03288532.

RCC Summary

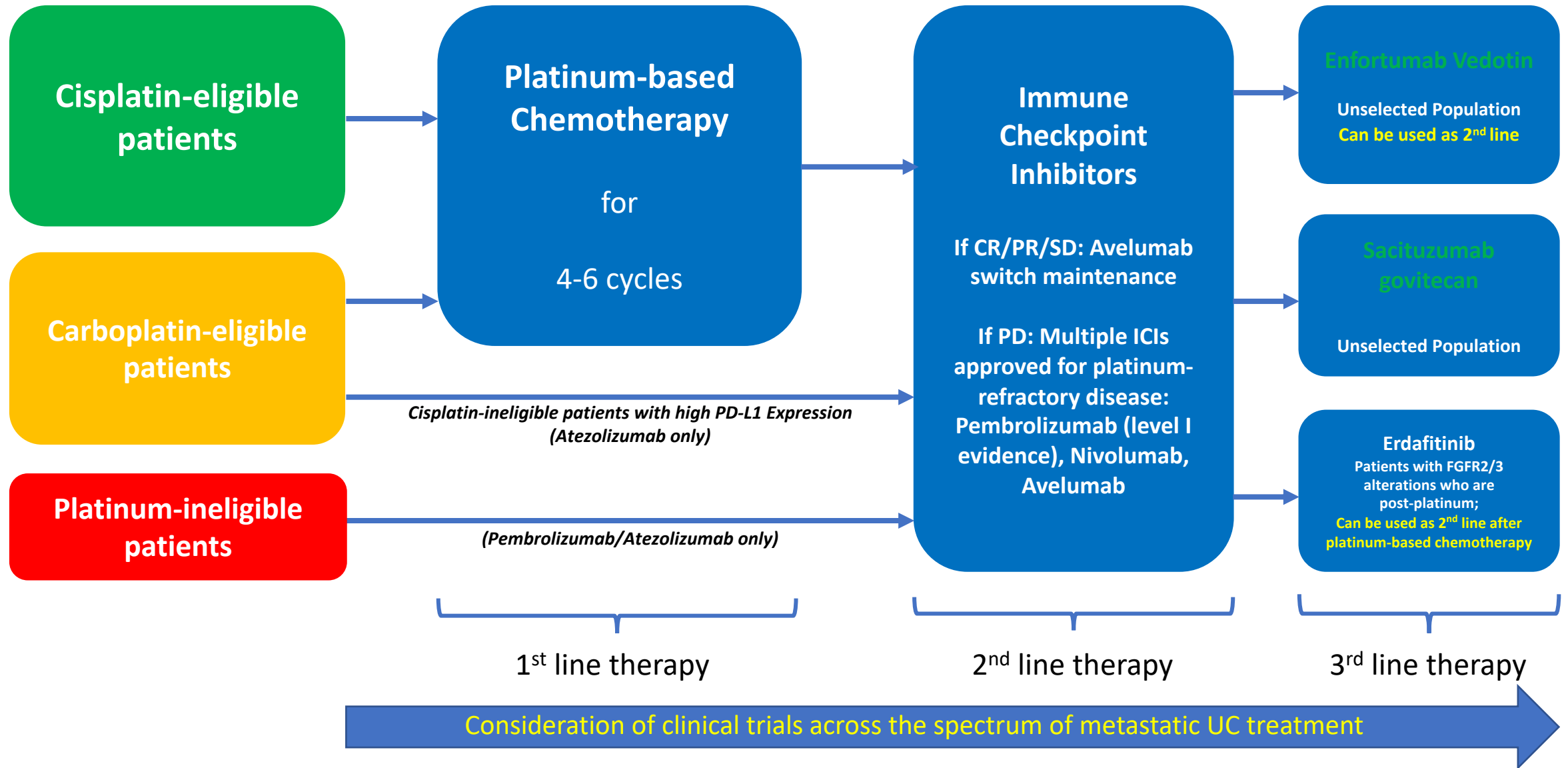
- Pembrolizumab is the only immune checkpoint inhibitor approved as adjuvant treatment for RCC
 - Approval for pembrolizumab based on DFS endpoint with OS still pending
 - Several other negative adjuvant IO studies (atezolizumab, nivolumab, ipi/nivo)
- IO/TKI combinations remain the gold standard for treatment-naïve patients with metastatic RCC
- TKIs remain the current SOC for most patients in the treatment-refractory space, however nivolumab is also an option
- Rechallenge with IO/TKI combinations emerging as potential option in the IO-refractory space
- nccRCC (papillary, unclassified, translocation, etc) might benefit from IO-TKI combinations

Urothelial Carcinoma

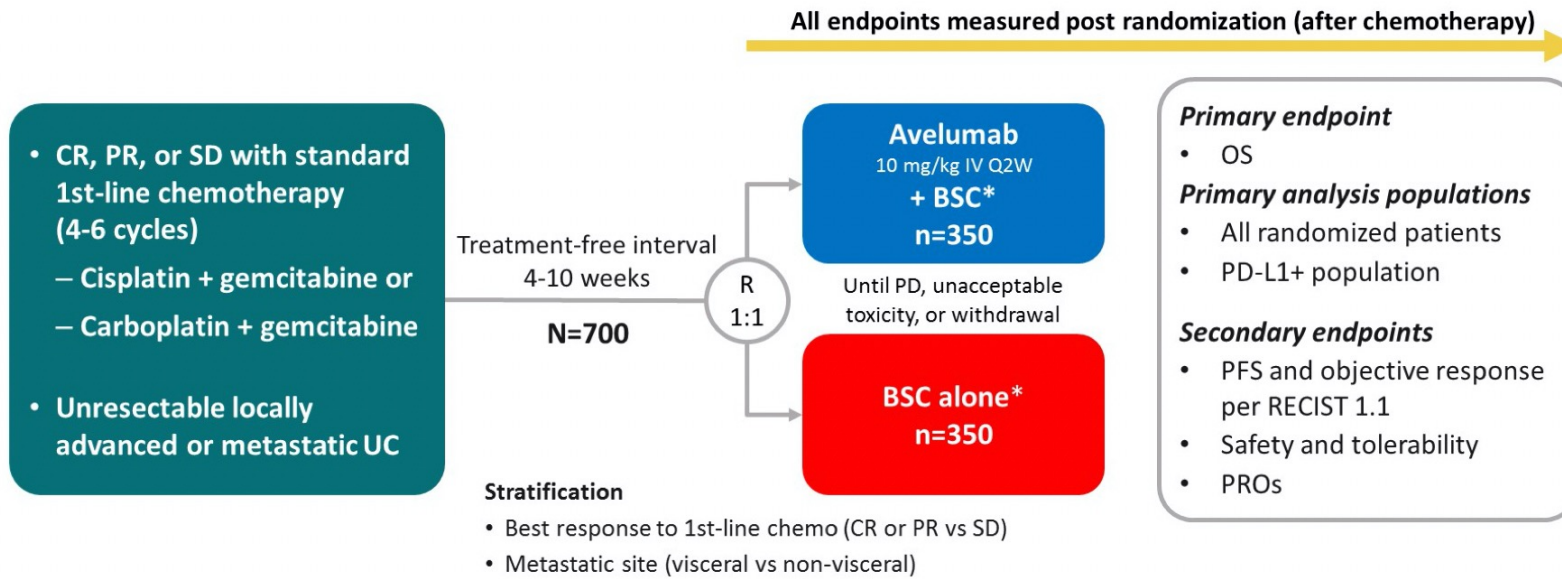
Drug Approvals in Metastatic Urothelial Carcinoma



Metastatic Urothelial Carcinoma: Current Treatment Landscape

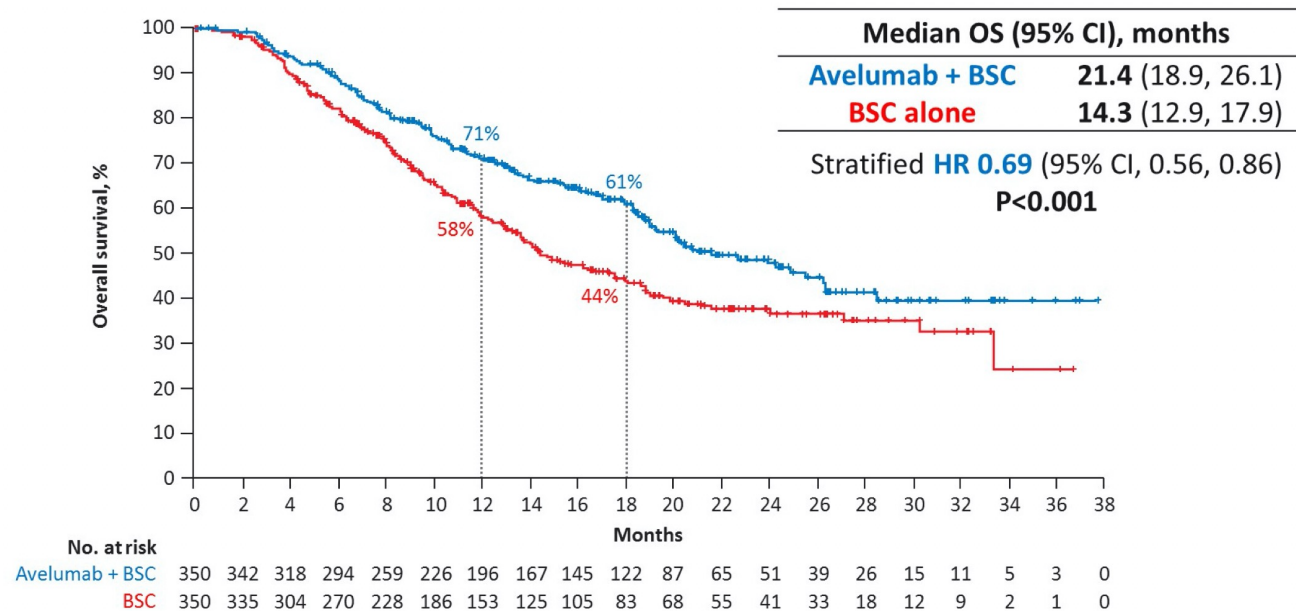


Switch-Maintenance ICI Therapy in mUC: Javelin Bladder 100 Study



Stratification

- Best response to 1st-line chemo (CR or PR vs SD)
- Metastatic site (visceral vs non-visceral)



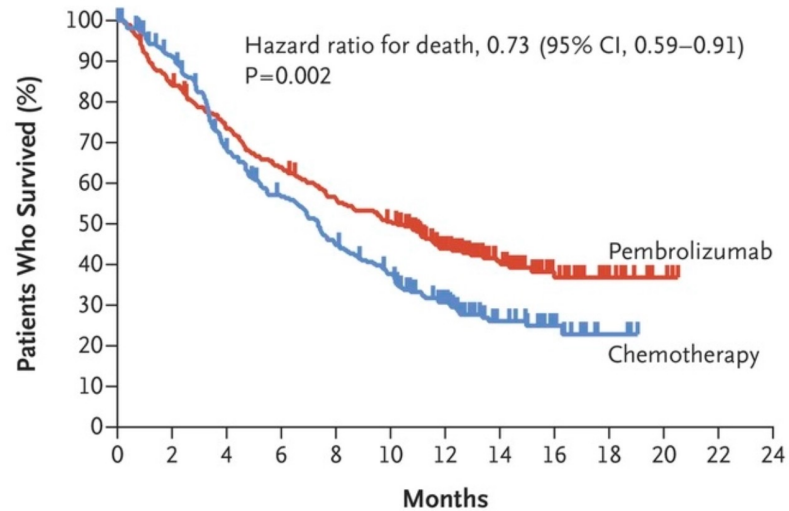
ICIs in Platinum-Refractory Setting

	Atezolizumab ¹	Pembrolizumab ²	Nivolumab ³	Durvalumab ⁴	Avelumab ⁵
Most Advanced Trial Phase	Phase III Randomized Trial (vs chemotherapy)	Phase III Randomized Trial (vs chemotherapy)	Phase II Single Arm	Phase I/II	Phase Ib
Number of Patients	931	542	265	191	161 (>6 months follow-up)
Dosing	1200mg IV every 3 weeks	200mg IV every 3 weeks	3mg/kg IV every 2 weeks	10 mg/kg IV every 2 weeks	10 mg/kg IV every 2 weeks
ORR	13.4%	21.1%	19.6%	17.8%	17.4%
ORR Among High PD-L1 Expressors	23% (among IC2/3)	21.6% (among CPS \geq 10%)	28.4% (among PD-L1 \geq 5%)	27.6% (among PD-L1 \geq 25%)	25.4% (among PD-L1 \geq 5%)
Median PFS	2.1 months	2.1 months	2.0 months	1.5 months	1.5 months
Median OS	8.6 months	10.3 months	8.7 months	18.2 months	7.4 months
Grade 3/4 TRAEs	20%	15%	18%	6.8%	8.0%

Pembrolizumab for Platinum-Refractory Bladder Cancer (Keynote 045)

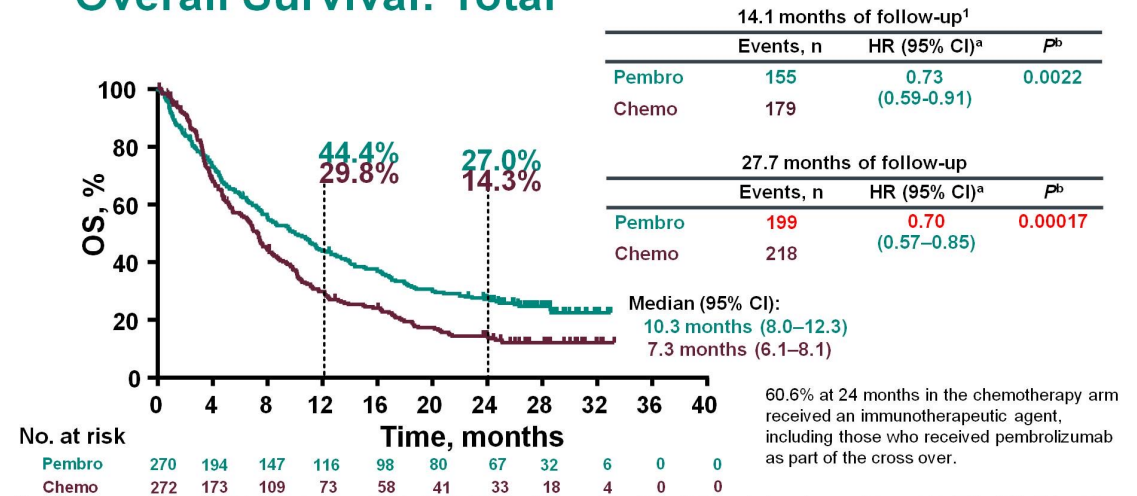
Randomized trial in platinum-refractory mUC patients comparing pembrolizumab vs chemotherapy (paclitaxel, docetaxel, vinflunine)

A Overall Survival



No. at Risk	0	2	4	6	8	10	12	14	16	18	20	22	24
Pembrolizumab	270	226	194	169	147	131	87	54	27	13	4	0	0
Chemotherapy	272	232	171	138	109	89	55	27	14	3	0	0	0

Overall Survival: Total

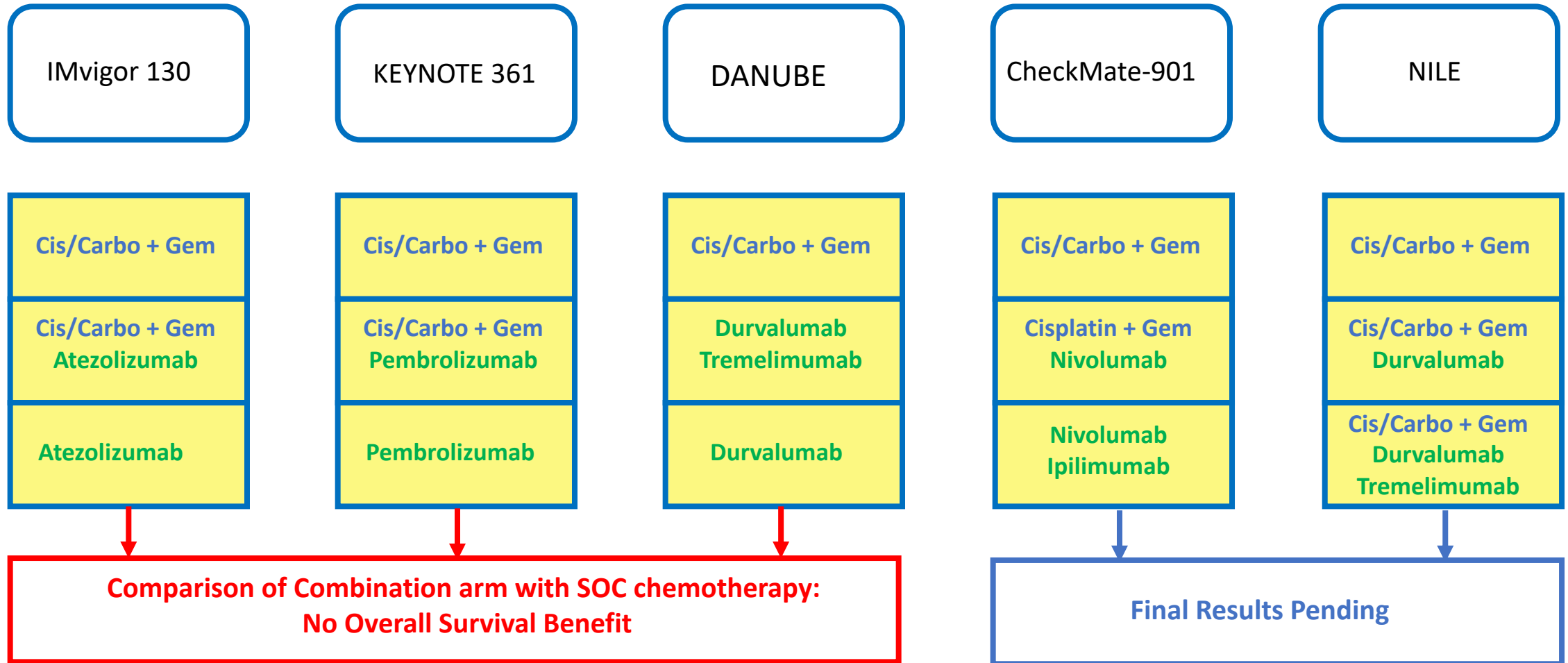


^aBased on Cox regression model with treatment as a covariate stratified by ECOG performance status (0/1 vs 2), liver metastases (yes vs no), hemoglobin (<10 vs ≥10 g/dL), and time from completion of chemotherapy (<3 vs ≥3 months). ^bOne-sided P value based on stratified log-rank test.
 Data cutoff date: October 26, 2017.
 1. Bellmunt J et al. *N Engl J Med*. 2017;376:1015-1026.

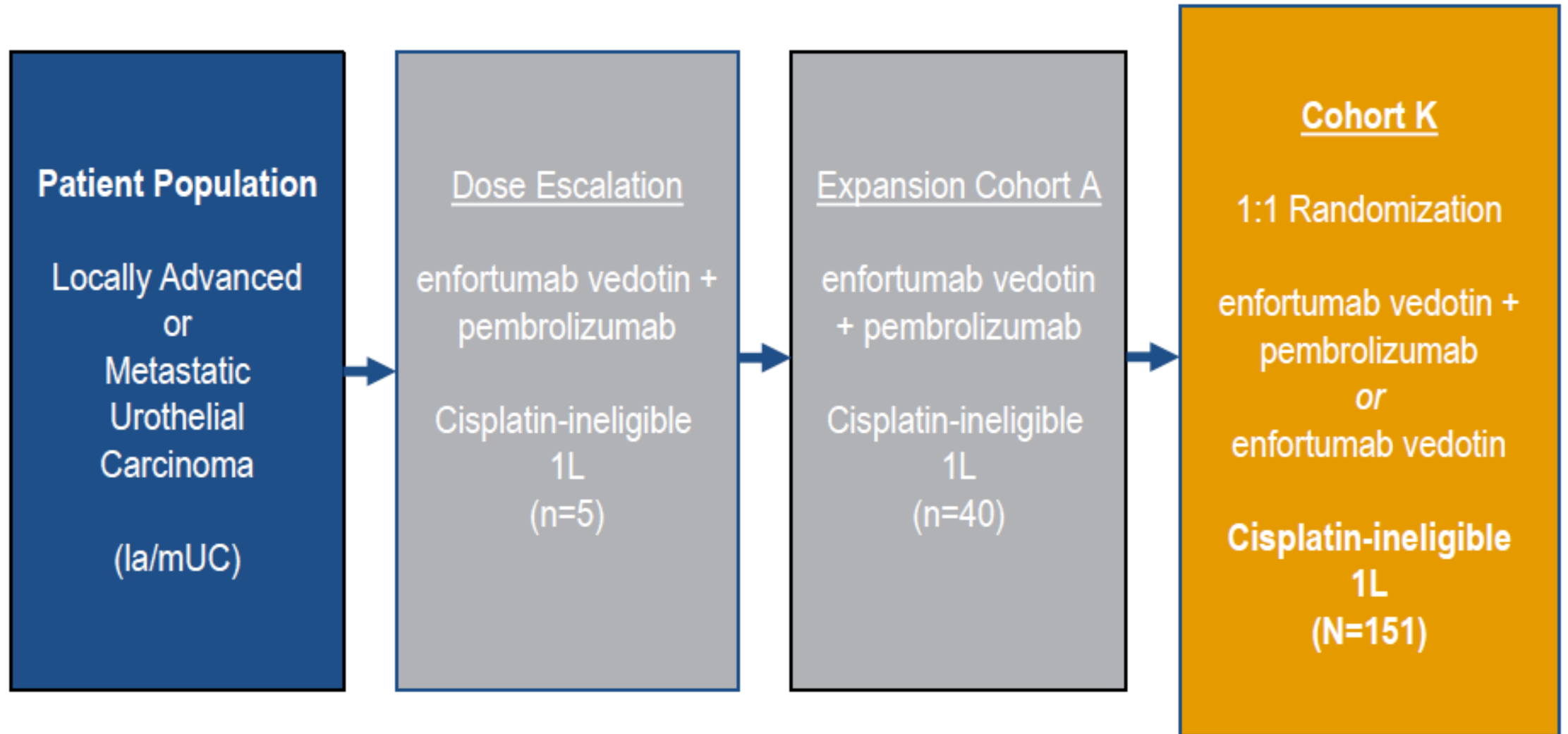
ICI in Front-Line Setting (Cisplatin-ineligible)

	Atezolizumab ¹	Pembrolizumab ²
Trial Phase	Phase II Single Arm	Phase II Single Arm
Number of Patients	119	370
Dosing	1200mg IV every 3 weeks	200mg IV every 3 weeks
ORR	23% (9% CRs)	28.6% (9% CRs)
ORR Among High PD-L1 Expressors	28% (among IC2/3)	47.3% (among CPS≥10%)
Median PFS	2.7 months	2 months
Median OS	15.9 months	11.3 months
Grade 3/4 TRAEs	16%	18%

Frontline ICI Clinical Trials in mUC

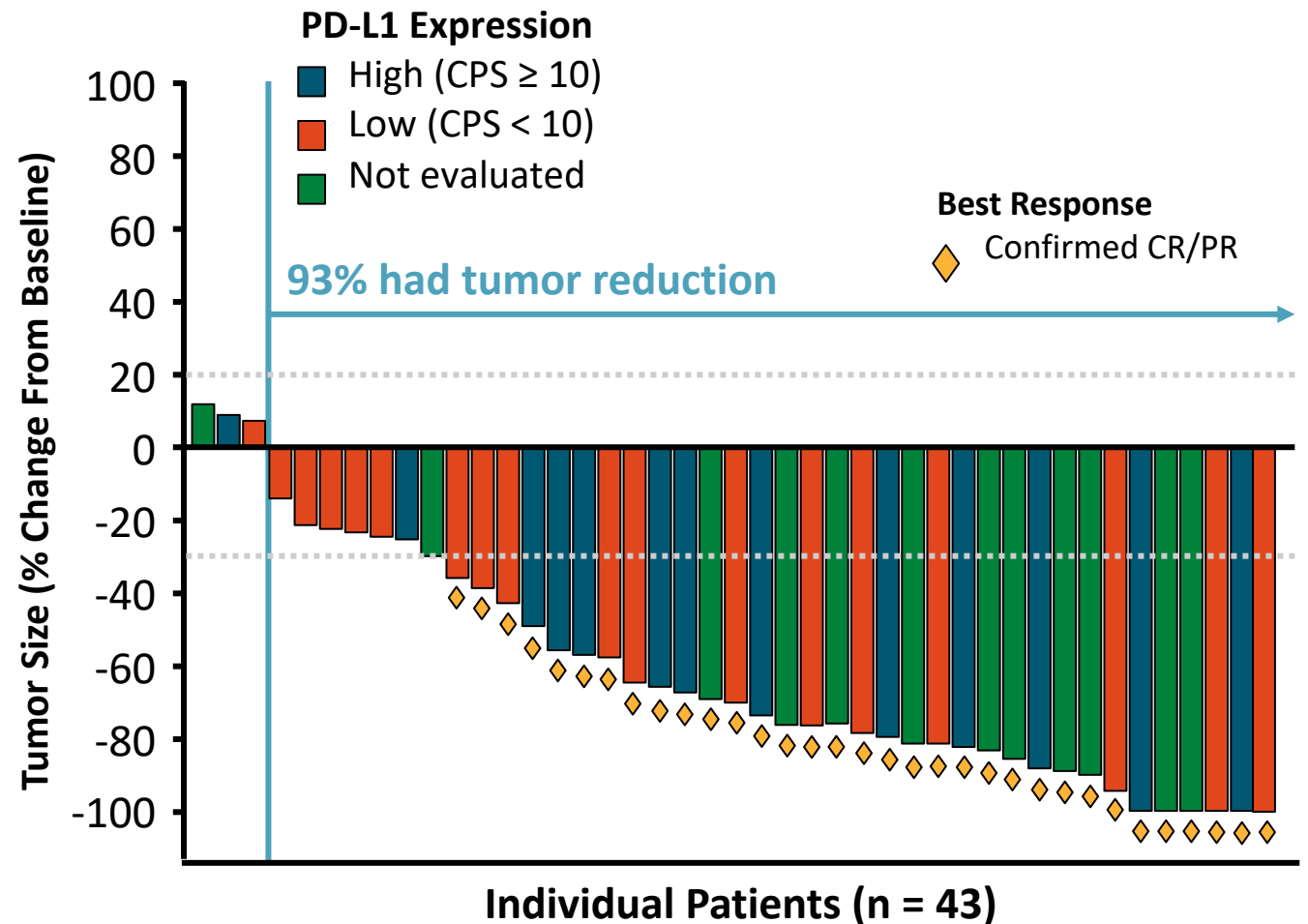


EV-103: Multicohort Study in mUC



EV-103 Cohort A: EV + Pembrolizumab

Best Overall Response	All Patients (N = 45)
Confirmed ORR, n (%) [95% CI]	33 (73.3) [58.1–85.4]
CR, n (%)	7 (15.6)
PR, n (%)	26 (57.8)
SD, n (%)	9 (20.0)
PD, n (%)	1 (2.2)
ORR in pts with liver mets, n/N (%)	8/14 (57.1)
Clinical Outcomes (Median Follow-Up 24.9 months)	All Patients (N = 45)
Median PFS, months, (95% CI)	12.3 (8.0, –)
Median OS, months, (95% CI)	26.1 (15.7, –)
Median DOR, months, (95% CI)	25.6 (8.3, –)



1. Presented by TW Friedlander at ASCO 2021 Annual Meeting June 4-8, 2021. Abstract 4528.

2. Rosenberg. ASCO 2020. Abstr 5044. Rosenberg. ASCO GU 2020. Abstr 441.

EV-103 Cohort K: Randomized cohort EV + Pembrolizumab vs EV

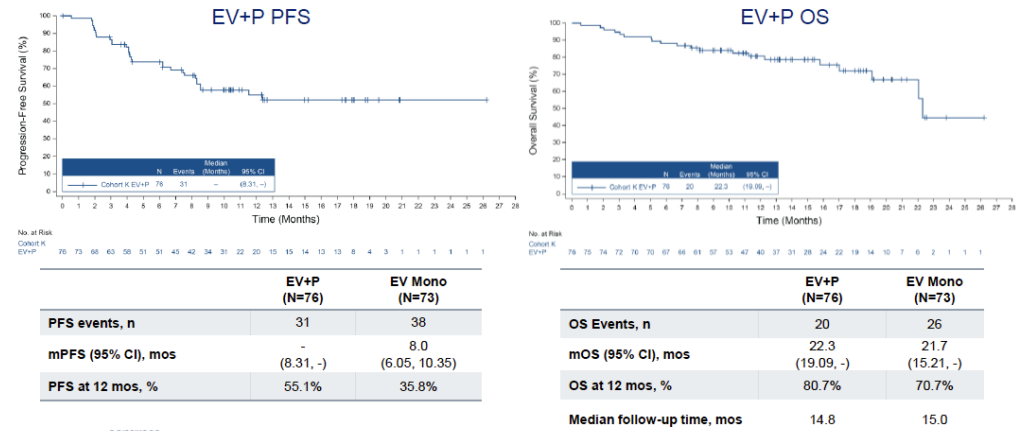
Overall Response Rate by BICR

EV+P: 64.5% confirmed ORR with rapid responses

	EV+P (N=76)	EV Mono (N=73)
Confirmed ORR, n (%) (95% CI)	49 (64.5) (52.7, 75.1)	33 (45.2) (33.5, 57.3)
Best overall response, n (%)		
Complete Response	8 (10.5)	3 (4.1)
Partial Response	41 (53.9)	30 (41.1)
Stable Disease	17 (22.4)	25 (34.2)
Progressive Disease	6 (7.9)	7 (9.6)
Not Evaluable	3 (3.9)	5 (6.8)
No Assessment	1 (1.3)	3 (4.1)
Median time to objective response (range), mos	2.07 (1.1, 6.6)	2.07 (1.9, 15.4)
Median number of treatment cycles (range)	11.0 (1, 29)	8.0 (1, 33)

Progression-Free Survival per BICR and Overall Survival

Secondary Endpoints: PFS and OS for EV+P; data expected to evolve with follow-up

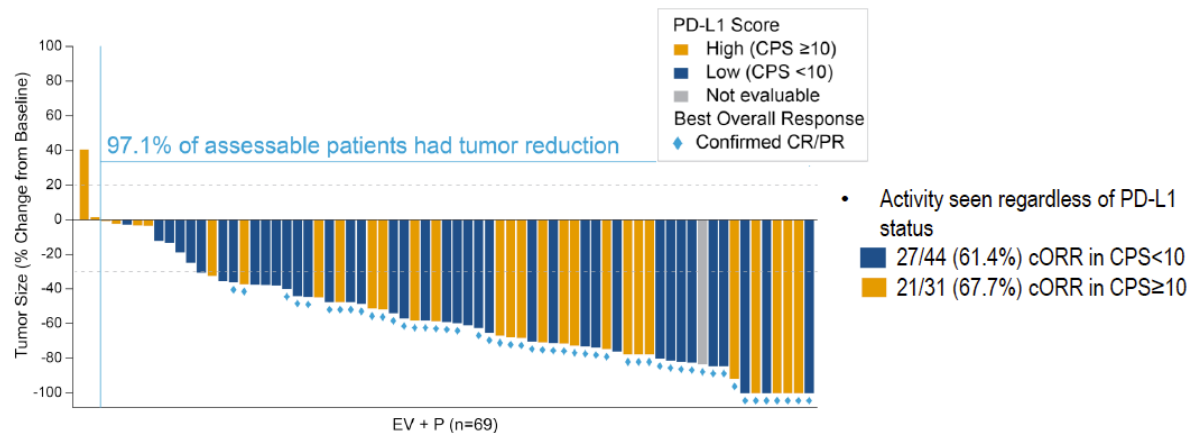


PARIS 2022 ESMO congress

Jonathan E. Rosenberg, MD

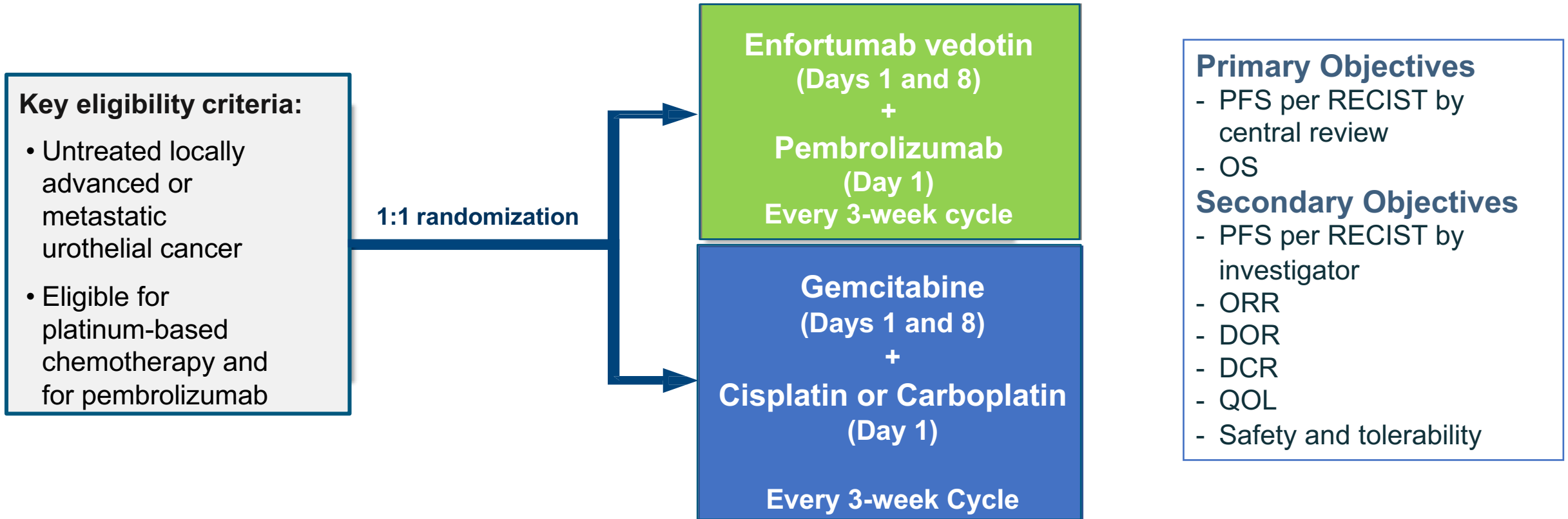
Content of this presentation is copyright and responsibility of the author. Permission is required for re-use.

EV+P: Maximum Percent Reduction from Baseline of Target Lesion by BICR



BICR: Blinded Independent Central Review; CPS: Combined Positive Score; CR: Complete Response; PD-L1: Programmed Death-Ligand 1 PR: Partial Response

EV-302: Randomized Phase 3 Study of Enfortumab Vedotin in Combination With Pembrolizumab Versus Chemotherapy



Perioperative Treatment for MIBC

Neoadjuvant Therapy: Selected Trials of ICIs for MIBC

Trial	ABACUS	PURE-01	NABUCCO	GU14-188 (Cis-ineligible cohort)	GU14-188 (Cis-eligible cohort)	BLASST-1
Treatment	Atezolizumab	Pembrolizumab	Ipilimumab/ Nivolumab	Pembrolizumab + Gemcitabine	Pembrolizumab + Gemcitabine/ Cisplatin	Nivolumab + Gemcitabine / Cisplatin
Patient Population	Cisplatin-ineligible	Cisplatin-ineligible	Cisplatin-ineligible	Cisplatin-ineligible	Cisplatin-eligible	Cisplatin-eligible
Patients (N)	88	114	24	37	43	41
pCR (pT0N0)	31%	37%	46%	45%	44%	40%
Downstaging (≤pT1N0)	39%	55%	58%	52%	61%	66%

- pCR and rates of downstaging comparable to SOC cisplatin-based chemotherapy
- Randomized phase III trials including ICI/chemo combinations are ongoing in this space
- Targeted agents increasingly used in this space as well

Adjuvant Therapy for High Risk MIBC

➤ MIBC with high-risk features at cystectomy
(ypT2-T4a / ypN+ with prior NAC OR pT3-T4a / pN+ not treated with NAC)

➤ IMvigor 010: Adjuvant **Atezolizumab** vs observation

Negative Trial

➤ CheckMate 274: Adjuvant **Nivolumab** vs placebo

★ FDA Approved ★

➤ AMBASSADOR: Adjuvant **Pembrolizumab** vs observation

Finished
Accrual

*One year of adjuvant treatment for all trials

CheckMate 274: DFS Benefit for Adjuvant Nivolumab

CheckMate 274

CheckMate 274

Study design

- CheckMate 274 is a phase 3, randomized, double-blind, multicenter study of adjuvant nivolumab versus placebo in patients with high-risk MIUC

N = 709

Key inclusion criteria

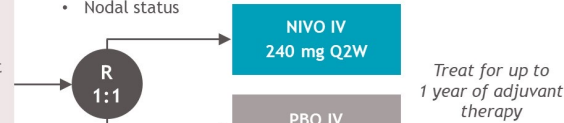
- Patients with ypT2-ypT4a or ypN+ MIUC who had neoadjuvant cisplatin chemotherapy
- Patients with pT3-pT4a or pN+ MIUC without prior neoadjuvant cisplatin chemotherapy and not eligible/refuse adjuvant cisplatin chemotherapy
- Radical surgery within the past 120 days
- Disease-free status within 4 weeks of dosing

Minimum follow-up, 5.9 months

Median follow-up in ITT population, 20.9 months (NIVO) and 19.5 months (PBO)

Stratification factors

- PD-L1 status (<1% vs $\geq 1\%$)^a
- Prior neoadjuvant cisplatin-based chemotherapy
- Nodal status



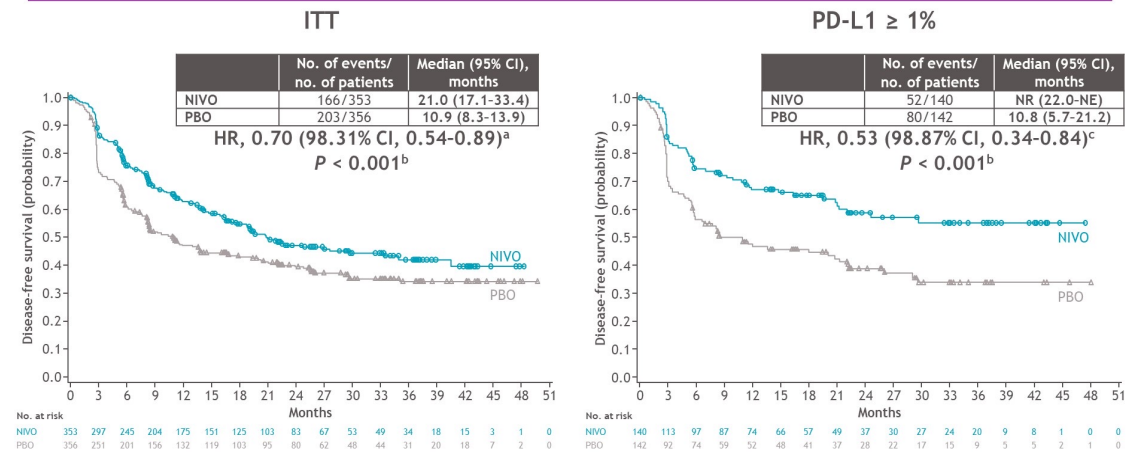
Primary endpoints: DFS in ITT population and DFS in all randomized patients with tumor PD-L1 $\geq 1\%$
Secondary endpoints: NUTRFS, DSS, and OS^b
Exploratory endpoints included: DMFS, safety, HRQoL

^aDefined by the percent of positive tumor cell membrane staining in a minimum of 100 evaluable tumor cells using the PD-L1 IHC 28-8 PharmDx immunohistochemistry assay.

^bOS data were not mature at the time of the first planned interim analysis. OS and DSS data are not presented.

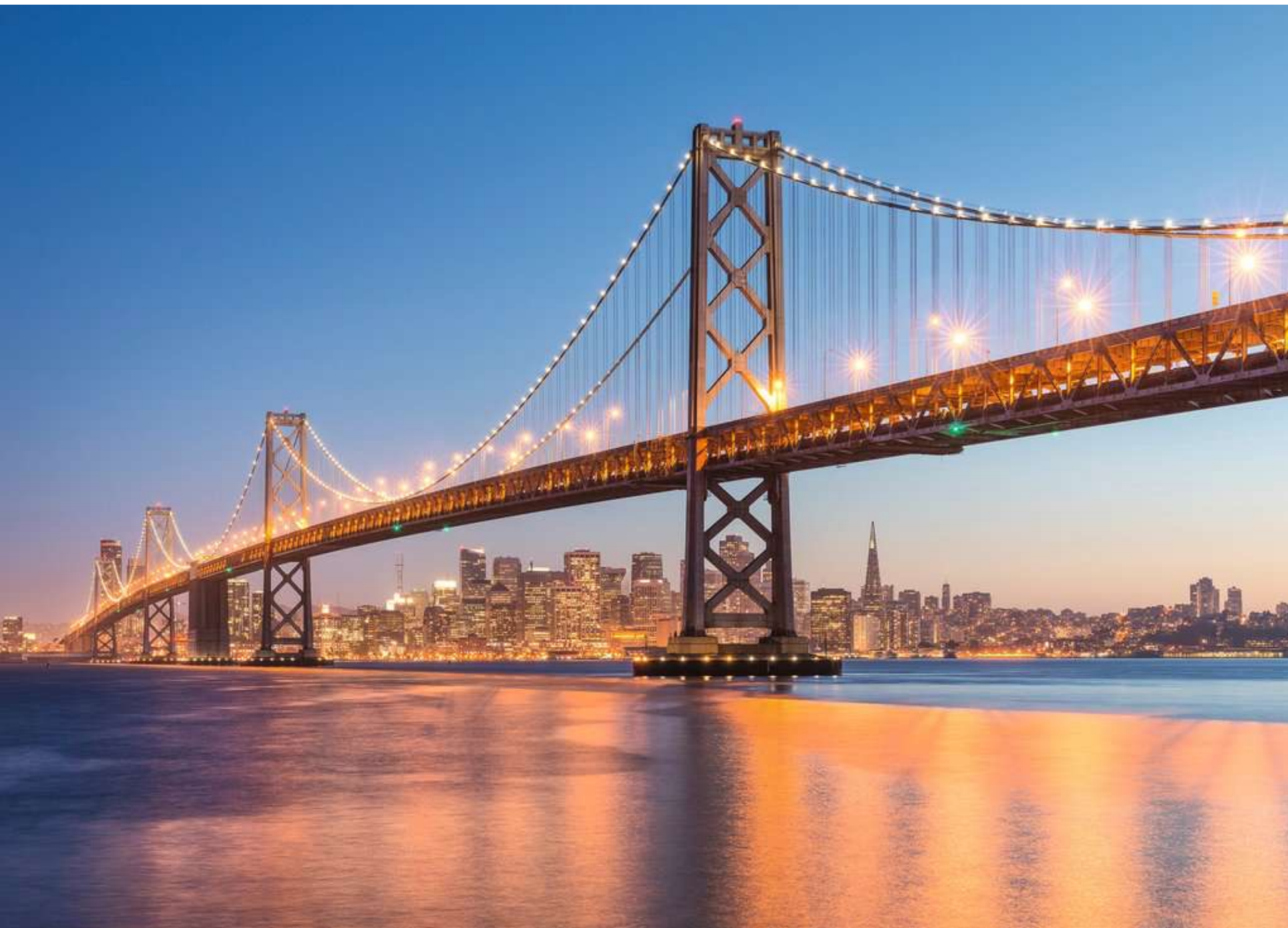
DFS, disease-free survival; DMFS, distant metastasis-free survival; DSS, disease-specific survival; HRQoL, health-related quality of life; IHC, immunohistochemistry; ITT, intent-to-treat; NUTRFS, non-urothelial tract recurrence-free survival; OS, overall survival; PD-L1, programmed death ligand 1; Q2W, every 2 weeks; R, randomized.

Disease-free survival



Urothelial Cancer Summary

- Immune checkpoint inhibitors play a significant role in the treatment of localized and advanced UC
 - Most UC patients without contraindications will likely receive an ICI
- Adjuvant nivolumab now approved for high-risk MIBC patients
 - Neoadjuvant trials of IO and IO combinations are ongoing
- Avelumab switch maintenance is SOC for patients who derive clinical benefit from frontline platinum-based chemotherapy
- Very promising activity of ADC-IO combinations
 - Enfortumab vedotin and pembrolizumab combination may become the new SOC for the treatment of cisplatin-ineligible patients in the frontline setting



Thank you!

vadim.koshkin@ucsf.edu

 @koshkin85