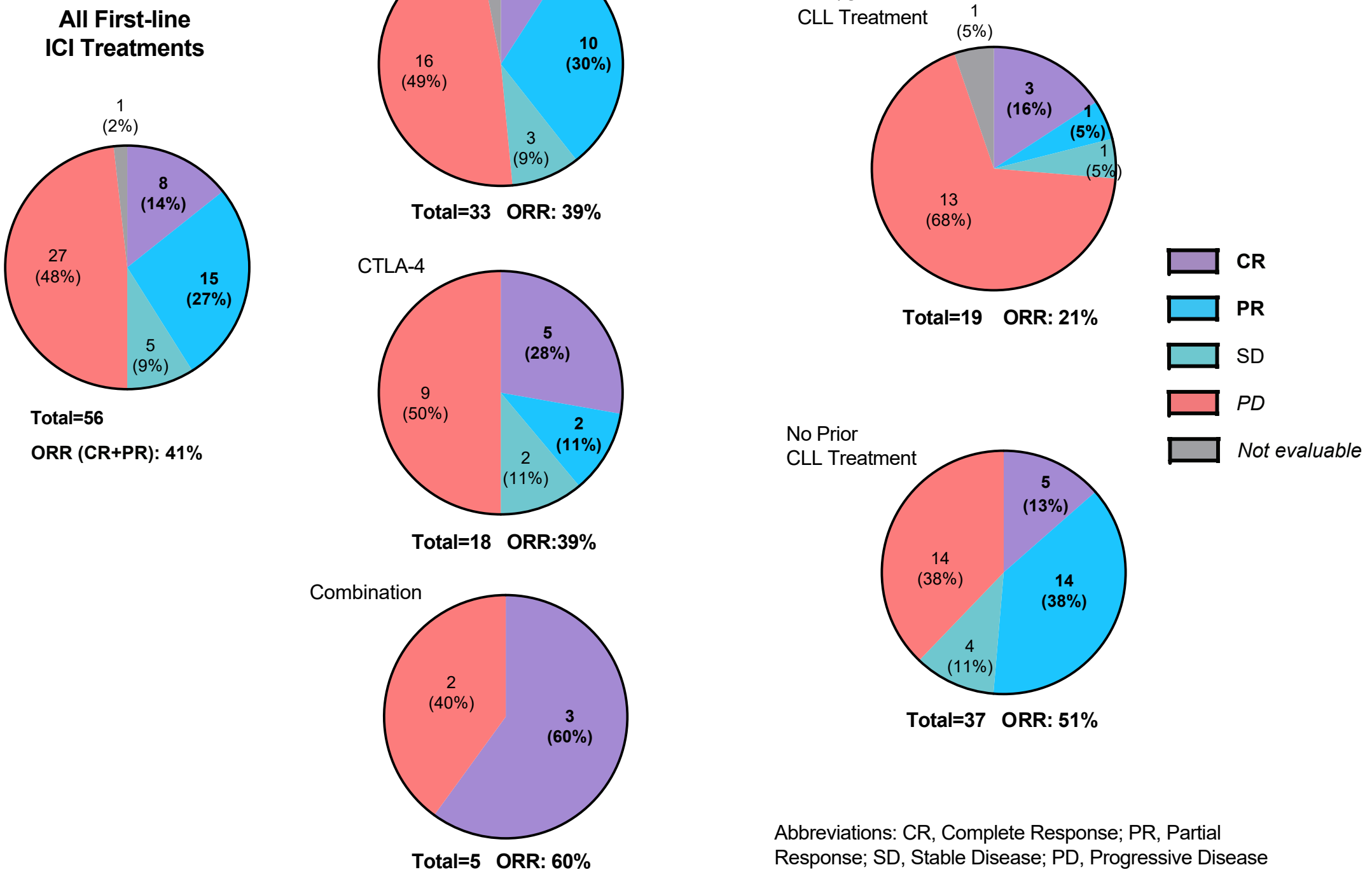
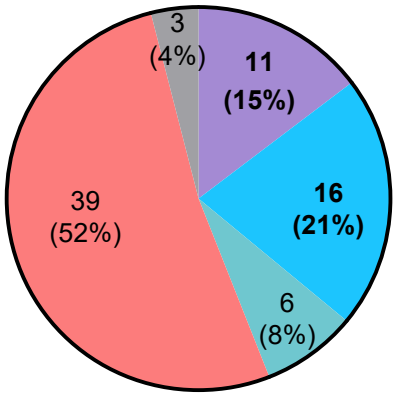
Supplementary Figure 1:
Melanoma objective response rates to first-line ICI



Abbreviations: CR, Complete Response; PR, Partial Response; SD, Stable Disease; PD, Progressive Disease

Supplementary Figure 2:
Melanoma objective response rates to all ICI treatments (first-line and subsequent treatments)

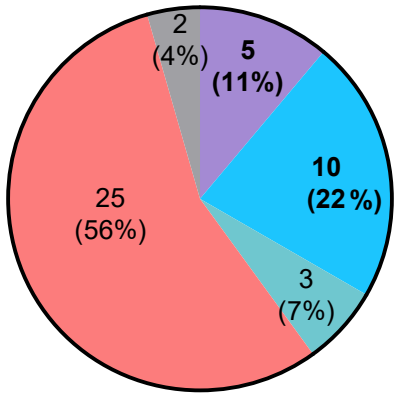


All ICI Treatments

Total=75

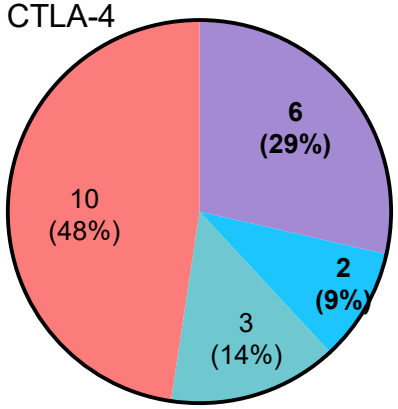
ORR (CR+PR): 36%

PD-1



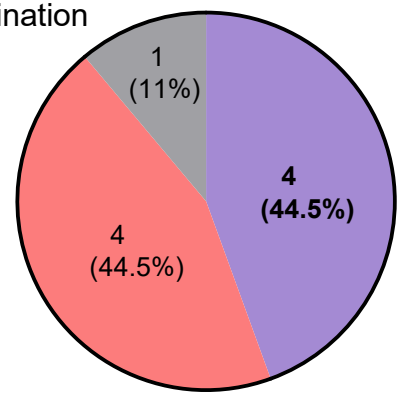
Total=45 ORR: 33%

CTLA-4



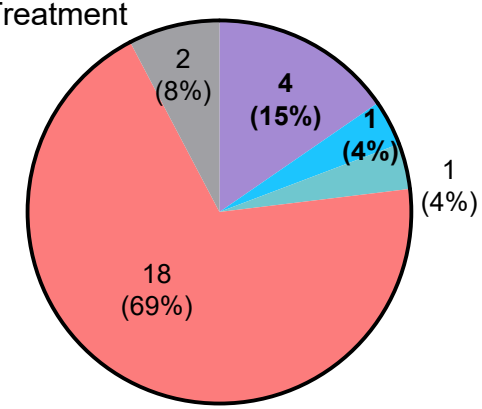
Total=21 ORR: 38%

Combination



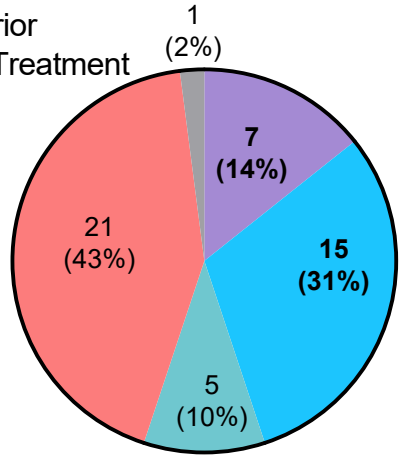
Total=9 ORR: 44.5%

Prior/Concurrent CLL Treatment



Total=26 ORR: 19%

No Prior CLL Treatment



Total=49 ORR: 45%

Abbreviations: CR, Complete Response; PR, Partial Response; SD, Stable Disease; PD, Progressive Disease

Supplemental Table 1: Clinicopathological characteristics of Australian cohorts with advanced melanoma, in the absence or presence of concomitant CLL

	AUS CLL & AM (*N*=19)		**AUS AM Alone Cohort** (*N*=148)		
	N	%	*N*	%	*P*
Demographics					
Age > 65 years at ICI	9	47%	116	78%	0.009
Gender, Male	12	63%	108	73%	0.42
Melanoma Characteristics					
Stage at ICI Initiation*					<.001
III	1	5%	1	1%	
IV M1a	0	0%	28	19%	
IV M1b	1	5%	23	16%	
IV M1c	7	37%	95	64%	
IV M1d	1	5·3%	1	1%	
IV unspecified	9	47%	0	0·0%	
Visceral Involvement	8	42%	118	80%	0.001
CNS Involvement	1	5%	1	1%	0.22
Melanoma Treatment					
First-line ICI					<.001
Anti-PD-1	13	68%	132	89%	
Anti-CTLA-4	5	26%	0	0·0%	
Combination Anti-PD-1/CTLA-4	1	5%	16	11%	
Received Melanoma Treatment Prior to ICI	2	11%	43	29%	0.10
Prior Therapies Described					
Targeted Therapy	2	11%	39	26%	0.90
Chemotherapy	0	0·0%	3	2%	
Combination of Agents	0	0·0%	1	1%	
CLL Characteristics					
CLL Therapy Prior to ICI			*Not applicable*		
None	13	68%			
Chemoimmunotherapy[1]	3	16%			
Targeted Therapy[2]	3	16%			
Labs at ICI Initiation			*N*=143		
LDH at ICI (U/L), Median [IQR]	277	[222-363]	243	[201-285]	0.15
			N=146		
ALC at ICI (10^3 cell/uL), Median [IQR]	8·1	[33·0-39·4]	1·3	[1·0-1·95]	<.001

Abbreviations: AUS, Australian; CLL, chronic lymphocytic leukemia; AM, advanced melanoma; ICI, immune checkpoint inhibitors; LDH, lactate dehydrogenase; ALC, absolute lymphocyte count; U/L, units per liter; uL, microliter; IQR, interquartile range.

*American Joint Committee on Cancer (AJCC) 8th edition melanoma staging system

[1] Chemoimmunotherapies included T-lymphocyte depleting agents bendamustine, fludarabine, and alemtuzumab

[2] Targeted therapies included non-T-lymphocyte depleting CLL therapies

Supplemental Table 2: Patient demographics and melanoma characteristics

	All Patients (*N*=58)		**No Prior CLL Treatment (*N*=37)**		**Prior/Concurrent CLL Treatment (*N*=21)**		
	N	**%**	***N***	**%**	***N***	**%**	***P***
Gender, Male	41	71%	26	73%	15	71%	0.93
First diagnosis							0.17
Melanoma	24	41%	18	49%	6	29%	
CLL	34	59%	19	51%	15	71%	
Age of Melanoma Diagnosis, years Median [IQR]	67	[59-74]	65	[59-74]	68	[63-74]	0.62
Time between Diagnoses (months), Median [IQR]	39	[3-96]	42	[2-112]	36	[5-78]	0.70
Stage at Diagnosis[1]							0.83
I-II	13	22%	8	22%	5	24%	
III	20	35%	12	32%	8	38%	
IV	25	43%	17	46%	8	38%	
Mutations Analysis (Melanoma)							
BRAF (*N*=39)*	19	49%	11	44%	8	43%	0.43
BRAF V600E (*N*=37)*	12	32%	8	35%	4	29%	0.70
TP53 (*N*=19) *	6	32%	5	40%	1	25%	0.75
NRAS (*N*=29) *	10	38%	9	43%	1	13%	0.12
KIT (*N*=27) *	2	7%	2	11%	0	0%	0.30
NF1 (*N*=19) *	4	21%	3	20%	1	25%	0.83
KDR (*N*=19) *	3	16%	3	20%	0	0%	0.33

Abbreviations: CLL, chronic lymphocytic leukemia; IQR, interquartile range.
[1]American Joint Committee on Cancer (AJCC) 8th edition melanoma staging system
* n refers to the number of patients with available data for each mutational assay

Supplemental Table 3: ICI treatment characteristics

	All Patients (*N*=58)		**No Prior CLL Treatment (*N*=37)**		**Prior/Concurrent CLL Treatment (*N*=21)**		
	N	**%**	***N***	**%**	***N***	**%**	***P***
Age >65 years at ICI	32	55%	22	60%	10	47.6%	0.42
Stage at ICI (Melanoma)[1]							0.85
III	5	9%	3	8%	2	9%	
IV	53	91%	34	92%	19	91%	
Melanoma Visceral Involvement at ICI initiation	32	55%	24	65%	8	38%	0.060
Melanoma CNS Involvement at ICI initiation	4	7%	1	3%	3	14%	0.13
Melanoma Treatments Prior to ICI	12	15%	11	22%	1	3%	0.040
Targeted Therapy Alone	3	4%	3	6%	0	0.0%	
Immune (Not ICI) Alone	6	8%	6	12%	0	0.0%	
Chemotherapy Alone	2	3%	2	4%	0	0.0%	
Combination of Agents	1	1%	0	0%	1	3%	
	N=50*		*N*=30*		*N*=20*		
LDH (U/L) at ICI Initiation, Median [IQR]	293	[212-462]	294	[214-427]	272	[192-470]	0.69
First-line ICI							0.37
Anti-PD-1	34	57.6%	19	5%	15	71%	
Anti-CTLA-4	18	30.5%	13	34%	5	24%	
Combination Anti-PD-1/CTLA-4	6	10.2%	5	13%	1	5%	
Subsequent ICI therapies							0.84
Anti-PD-1	12	57.1%	6	50%	6	67%	
Anti-CTLA-4	4	19.0%	3	25%	1	11%	
Combination Anti-PD-1/CTLA-4	5	23.8%	3	25%	2	22%	

Abbreviations: CLL, chronic lymphocytic leukemia; ICI, immune checkpoint inhibitors; U/L, units per litre.
[1]American Joint Committee on Cancer (AJCC) 8th edition melanoma staging system
* n refers to the number of patients with available data for each category

Supplemental Table 4: Immune-mediated adverse events following any ICI treatment (*N*=79) in patients with concomitant CLL and advanced melanoma

	Total ICI (*N*=79)	**Anti-PD-1 (*N*=46)**	**Anti-CTLA-4 (*N*=22)**	**Combination (*N*=11)**
Immune-mediated adverse event	31 (39.2%)	16 (34.8%)	8 (36.4%)	7 (63.6)
Fever	5 (6.3%)	2 (4.3%)	1 (4.6%)	2 (18.2%)
Thrombosis	7 (8.9%)	0 (0.0%)	2 (9.1%)	3 (27.3%)
Endocrine	5 (6.3%)	1 (2.2%)	2 (9.1%)	2 (18.2%)
Rash	11 (13.9%)	3 (6.5%)	7 (31.8%)	1 (9.1%)
Thrombocytopenia	7 (8.9%)	5 (10.9%)	1 (4.6%)	1 (9.1%)
Atrial Fibrillation	2 (2.5%)	0 (0.0%)	0 (0.0%)	2 (18.2%)
Colitis	1 (1.3%)	1 (2.1%)	0 (0.0%)	1 (9.1%)
Pneumonitis	3 (3.8%)	2 (4.3%)	0 (0.0%)	1 (9.1%)
Acute kidney injury	1 (1.3%)	1 (2.2%)	0 (0.0%)	0 (0.0%)
Transaminitis	9 (11.4%)	4 (8.7%)	3 (13.6%)	2 (18.2%)
Arthritis	6 (7.6%)	3 (6.5%)	1 (4.6%)	2 (18.2%)
Uveitis	3 (3.8%)	0 (0.0%)	1 (4.6%)	2 (18.2%)

Abbreviation: ICI, immune checkpoint inhibitor; CLL, chronic lymphocytic leukemia
Data described as n, number (%, percentage). An adverse event following ICI initiation was defined as a binary outcome (ie. an event occurred following ICI treatment, yes or no).