Full wwPDB NMR Structure Validation Report (i)

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PDB ID	:	2KJE
Title	:	NMR structure of CBP TAZ2 and adenoviral E1A complex
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Deposited on	:	2009-05-27

This is a Full wwPDB NMR Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/NMRValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The following versions of software and data (see references (i)) were used in the production of this report:

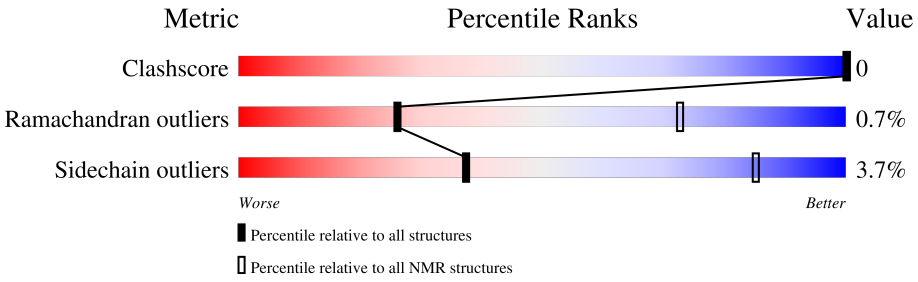
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	2.27
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.27

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and a grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Mol	Chain	Length	Quality of chain
1	A	92	83% 8% 10%
2	B	42	62% 38%

2 Ensemble composition and analysis

This entry contains 20 models. Model 19 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *lowest energy*.

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	**Residue range (total)**	**Backbone RMSD (Å)**	**Medoid model**
1	A:1770-A:1852, B:55-B:80 (109)	0.31	19

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 2 clusters and 5 single-model clusters were found.

Cluster number	Models
1	1, 2, 3, 4, 5, 6, 9, 10, 11, 13, 15, 17, 19
2	7, 14
Single-model clusters	8; 12; 16; 18; 20

3 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 2072 atoms, of which 1034 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called CREB-binding protein.

Mol	Chain	Residues	Atoms						Trace
1	A	92	Total	C	H	N	O	S	0
			1466	439	743	149	121	14	

- Molecule 2 is a protein called Early E1A 32 kDa protein.

Mol	Chain	Residues	Atoms						Trace
2	B	42	Total	C	H	N	O	S	0
			603	197	291	47	66	2	

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	50	SER	-	expression tag	UNP P03255
B	51	HIS	-	expression tag	UNP P03255
B	52	MET	-	expression tag	UNP P03255

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	
3	A	3	Total	Zn
			3	3

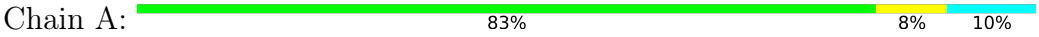
4 Residue-property plots

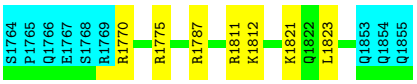
4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

• Molecule 1: CREB-binding protein

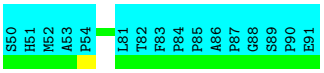
Chain A:





• Molecule 2: Early E1A 32 kDa protein

Chain B:



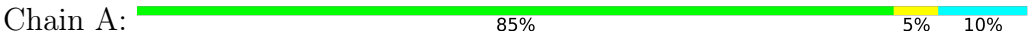
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

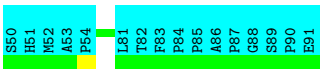
• Molecule 1: CREB-binding protein

Chain A:



• Molecule 2: Early E1A 32 kDa protein

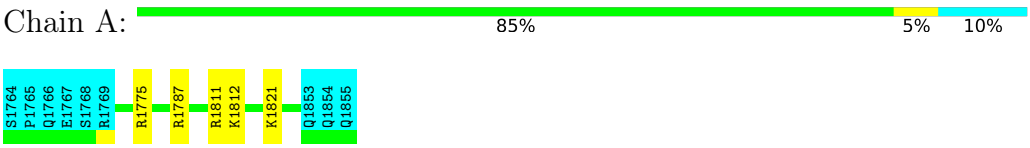
Chain B:



4.2.2 Score per residue for model 2

• Molecule 1: CREB-binding protein

Chain A:



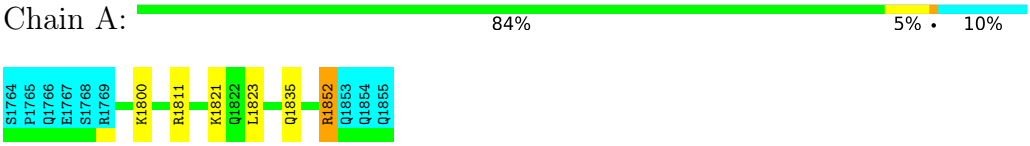
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.3 Score per residue for model 3

• Molecule 1: CREB-binding protein

Chain A:



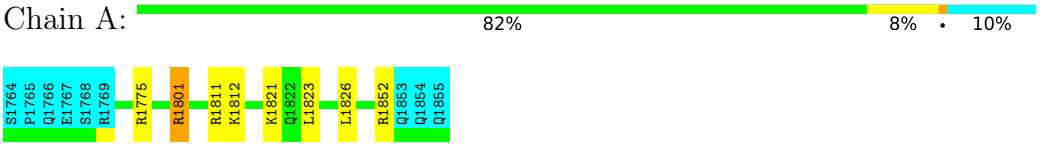
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.4 Score per residue for model 4

• Molecule 1: CREB-binding protein

Chain A:



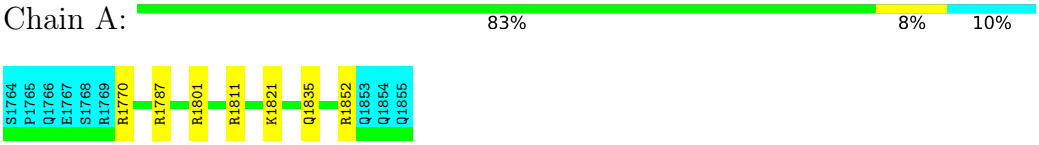
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.5 Score per residue for model 5

• Molecule 1: CREB-binding protein

Chain A:



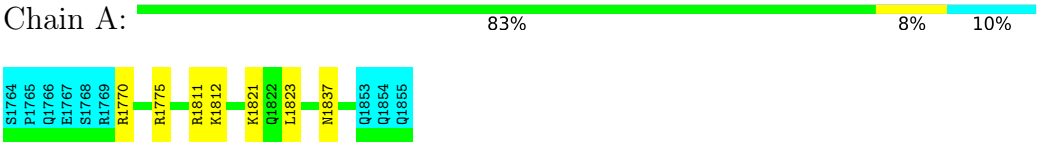
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.6 Score per residue for model 6

• Molecule 1: CREB-binding protein

Chain A:



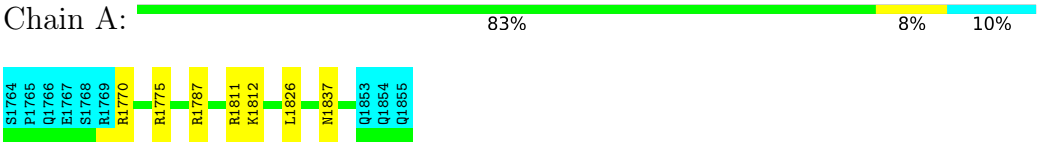
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.7 Score per residue for model 7

• Molecule 1: CREB-binding protein

Chain A:



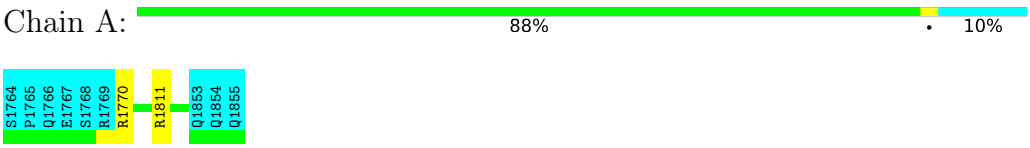
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.8 Score per residue for model 8

• Molecule 1: CREB-binding protein

Chain A:



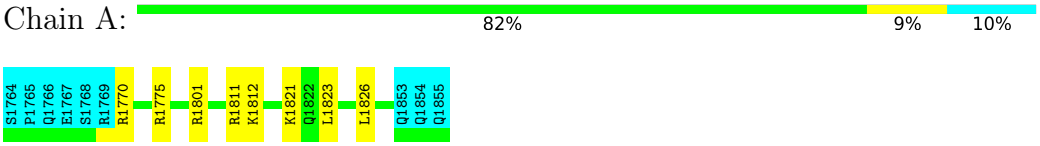
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.9 Score per residue for model 9

• Molecule 1: CREB-binding protein

Chain A:



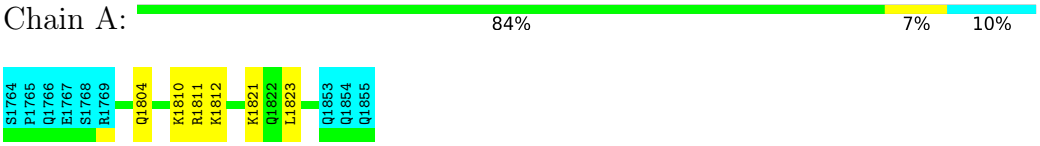
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.10 Score per residue for model 10

• Molecule 1: CREB-binding protein

Chain A:



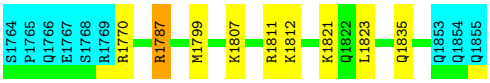
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.11 Score per residue for model 11

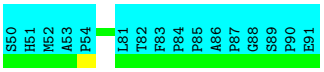
• Molecule 1: CREB-binding protein

Chain A:



• Molecule 2: Early E1A 32 kDa protein

Chain B:



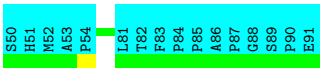
4.2.12 Score per residue for model 12

• Molecule 1: CREB-binding protein

Chain A:

• Molecule 2: Early E1A 32 kDa protein

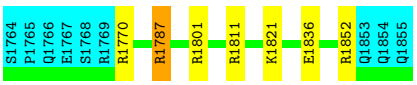
Chain B:



4.2.13 Score per residue for model 13

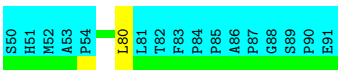
• Molecule 1: CREB-binding protein

Chain A:



• Molecule 2: Early E1A 32 kDa protein

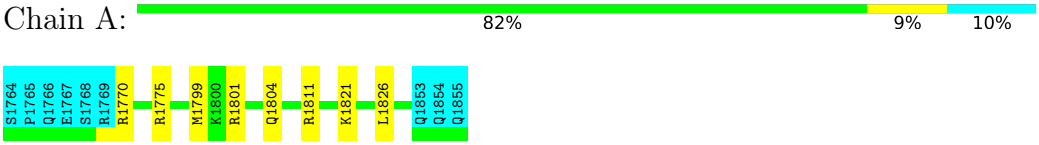
Chain B:



4.2.14 Score per residue for model 14

• Molecule 1: CREB-binding protein

Chain A:



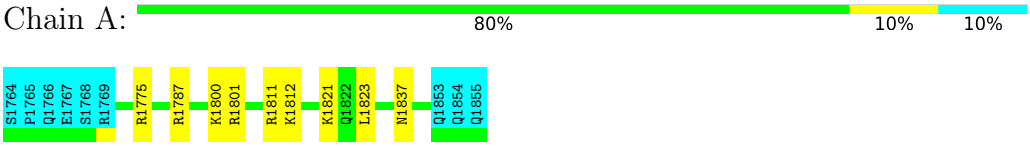
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.15 Score per residue for model 15

• Molecule 1: CREB-binding protein

Chain A:



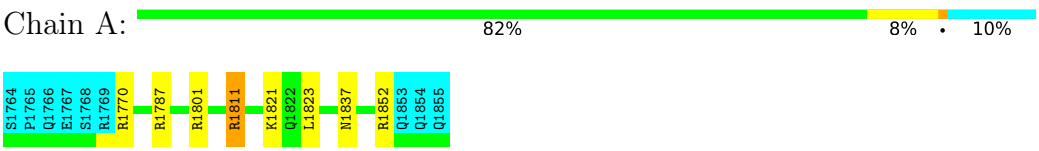
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.16 Score per residue for model 16

• Molecule 1: CREB-binding protein

Chain A:



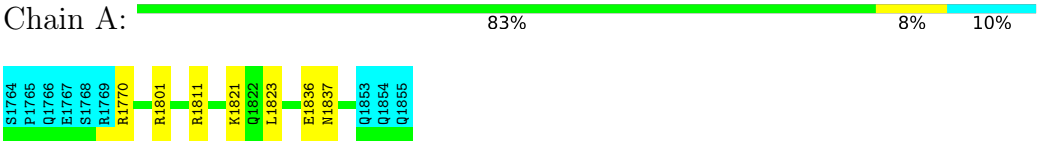
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.17 Score per residue for model 17

• Molecule 1: CREB-binding protein

Chain A:



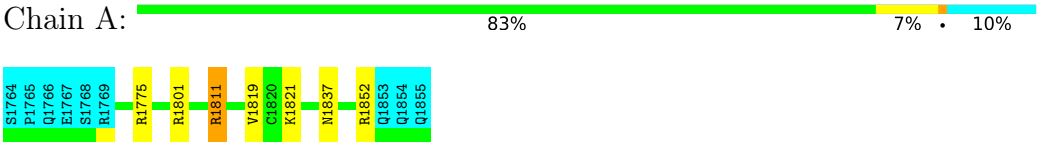
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.18 Score per residue for model 18

• Molecule 1: CREB-binding protein

Chain A:



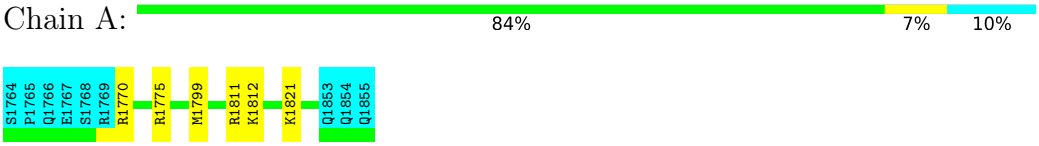
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.19 Score per residue for model 19 (medoid)

• Molecule 1: CREB-binding protein

Chain A:



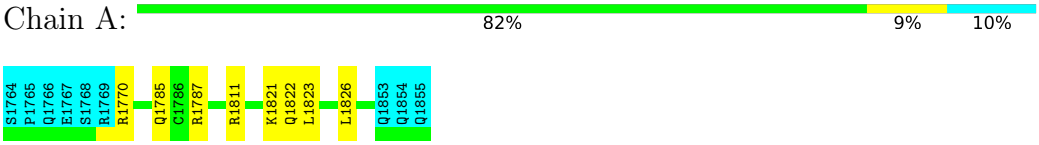
• Molecule 2: Early E1A 32 kDa protein

Chain B:

4.2.20 Score per residue for model 20

• Molecule 1: CREB-binding protein

Chain A:



• Molecule 2: Early E1A 32 kDa protein

Chain B:

5 Refinement protocol and experimental data overview

The models were refined using the following method: *molecular dynamics*.

Of the 200 calculated structures, 20 were deposited, based on the following criterion: *structures with the lowest energy*.

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
Amber	refinement	

No chemical shift data was provided.

6 Model quality

6.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the (average) root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#Z>5	RMSZ	#Z>5
1	A	0.60±0.00	0±0/659 (0.0± 0.0%)	1.00±0.02	3±1/882 (0.4± 0.1%)
2	B	0.60±0.01	0±0/201 (0.0± 0.0%)	0.91±0.03	0±0/275 (0.0± 0.0%)
All	All	0.60	0/17200 (0.0%)	0.98	67/23140 (0.3%)

There are no bond-length outliers.

All unique angle outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})	Models	
								Worst	Total
1	A	1775	ARG	NE-CZ-NH1	6.83	123.72	120.30	14	11
1	A	1770	ARG	NE-CZ-NH1	6.62	123.61	120.30	14	13
1	A	1852	ARG	NE-CZ-NH1	6.59	123.59	120.30	16	6
1	A	1787	ARG	NE-CZ-NH1	6.45	123.52	120.30	20	8
1	A	1811	ARG	NE-CZ-NH1	6.41	123.51	120.30	18	20
1	A	1801	ARG	NE-CZ-NH1	5.82	123.21	120.30	5	9

There are no chirality outliers.

There are no planarity outliers.

6.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in each chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
All	All	16980	17180	17180	-

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is -.

There are no clashes.

6.3 Torsion angles (i)

6.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all NMR entries. The Analysed column shows the number of residues for which the backbone conformation was analysed and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	83/92 (90%)	77±1 (93±2%)	5±1 (6±2%)	1±0 (1±1%)	26	73
2	B	26/42 (62%)	24±1 (92±5%)	2±1 (7±5%)	0±0 (1±2%)	24	71
All	All	2180/2680 (81%)	2023 (93%)	142 (7%)	15 (1%)	26	73

All 3 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	1812	LYS	11
2	B	79	ASP	3
2	B	72	LEU	1

6.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all NMR entries. The Analysed column shows the number of residues for which the sidechain conformation was analysed and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	76/85 (89%)	73±1 (96±2%)	3±1 (4±2%)	33	81
2	B	23/36 (64%)	23±1 (98±3%)	0±1 (2±3%)	62	94
All	All	1980/2420 (82%)	1907 (96%)	73 (4%)	37	85

All 24 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	1821	LYS	18
1	A	1823	LEU	11
1	A	1837	ASN	6
1	A	1826	LEU	5
1	A	1787	ARG	3
1	A	1835	GLN	3
2	B	59	GLU	3
1	A	1799	MET	3
1	A	1800	LYS	2
1	A	1804	GLN	2
1	A	1836	GLU	2
1	A	1811	ARG	2
2	B	76	GLU	2
2	B	71	MET	1
1	A	1852	ARG	1
1	A	1801	ARG	1
1	A	1810	LYS	1
1	A	1807	LYS	1
1	A	1795	SER	1
2	B	80	LEU	1
2	B	74	VAL	1
1	A	1819	VAL	1
1	A	1785	GLN	1
1	A	1822	GLN	1

6.3.3 RNA

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

6.5 Carbohydrates

There are no monosaccharides in this entry.

6.6 Ligand geometry

Of 3 ligands modelled in this entry, 3 are monoatomic - leaving 0 for Mogul analysis.

6.7 Other polymers (i)

There are no such molecules in this entry.

6.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

7 Chemical shift validation

No chemical shift data were provided