

# Results of Clinical Trial in a Dialysis Centre Fresenius - Torres Vedras & Alverca Locations

May 1st 2014  
-Confidential-





# Torres Vedras Facility



# Torres Vedras Initial Observations

---

- There was a clear and meaningful reduction of Bacteria and VOCs from the very start of the trial in both locations
- There is a small rise in VOC levels at the end of the trial (although still down significantly overall) which is in line with the use of quieter devices that moved less air
- The mould reduction results are indicative of the use of a HVAC system bringing in contaminated external air on a permanent basis
- For this document, we will show the summary results but there is little point in making any observations on mould reduction at this time



# Air Changes and Localisation

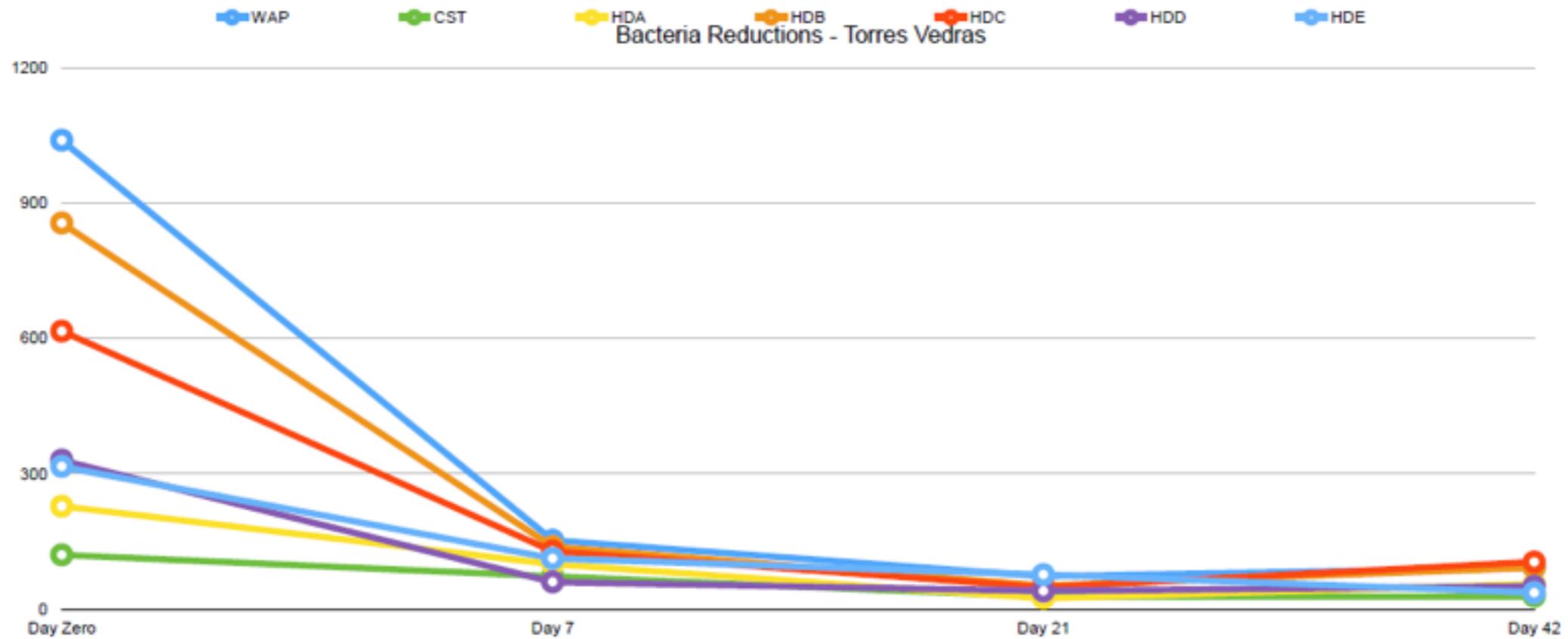
---

- Both Bacteria and VOCs are generated locally inside the space, and so can be reduced efficiently using the Novaerus technology by treating the air between 2 and 4 times per hour
- Moulds are generated externally to the space and are carried in by the HVAC system, which is changing the air between 6 and 20 times per hour
- Mould will not be reduced greatly unless it is treated in the HVAC ducts (this solution is currently under development by Novaerus - 6 month development timeline)



# Torres - Bacteria Reduction Summary

## Torres Vedras Summary

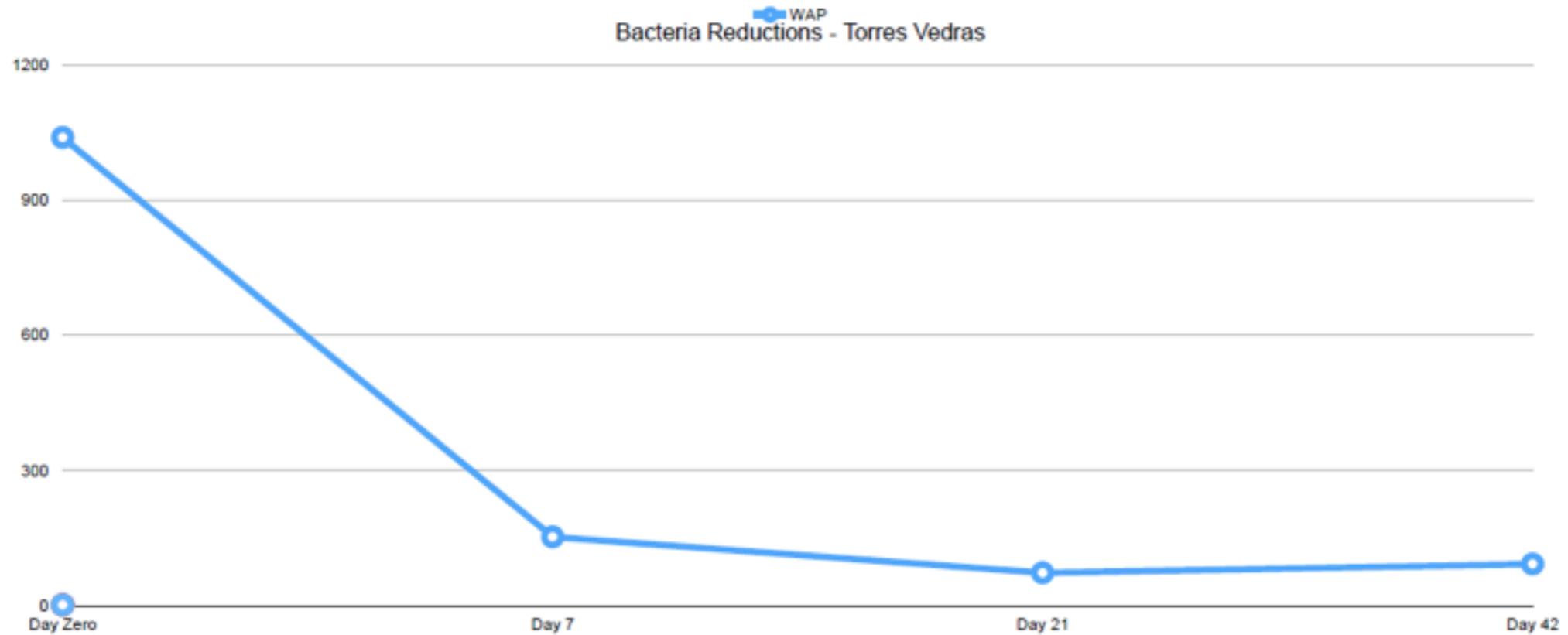


WAP	1040	152	85%	NO	72	93%	YES	92	91%
CST	120	72	40%	NO	28	77%	YES	28	77%
HDA	228	100	56%	NO	24	89%	YES	56	75%
HDB	856	138	84%	NO	52	94%	YES	92	89%
HDC	616	128	79%	NO	48	92%	YES	104	83%
HDD	330	60	82%	NO	40	88%	YES	50	85%
HDE	316	112	65%	NO	76	76%	YES	36	89%
<b>AVERAGE</b>			70%			87%			84%



# Torres - Bacteria (Waiting Area)

## Torres Vedras Summary

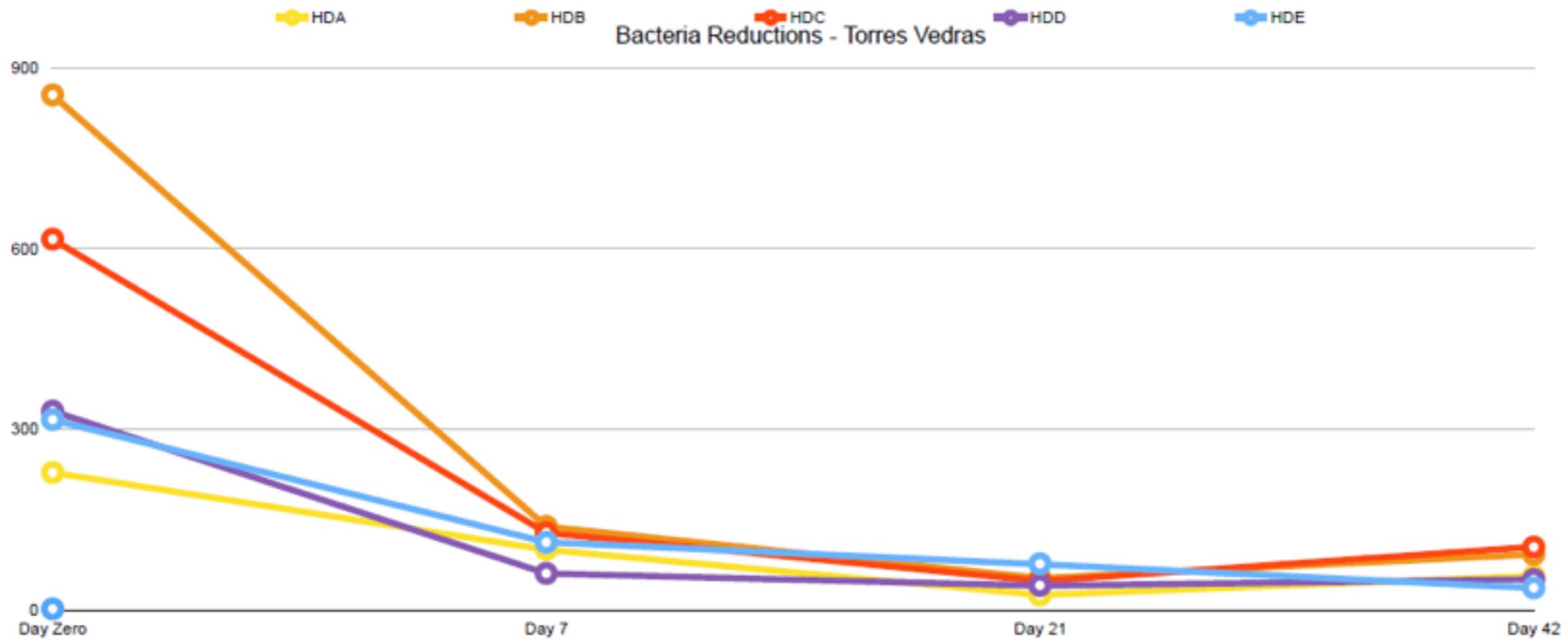


BACTERIA	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
WAP	1040	152	85%	NO	72	93%	YES	92	91%
AVERAGE			85%			93%			91%



# Torres - Bacteria (Dialysis Room)

## Torres Vedras Summary

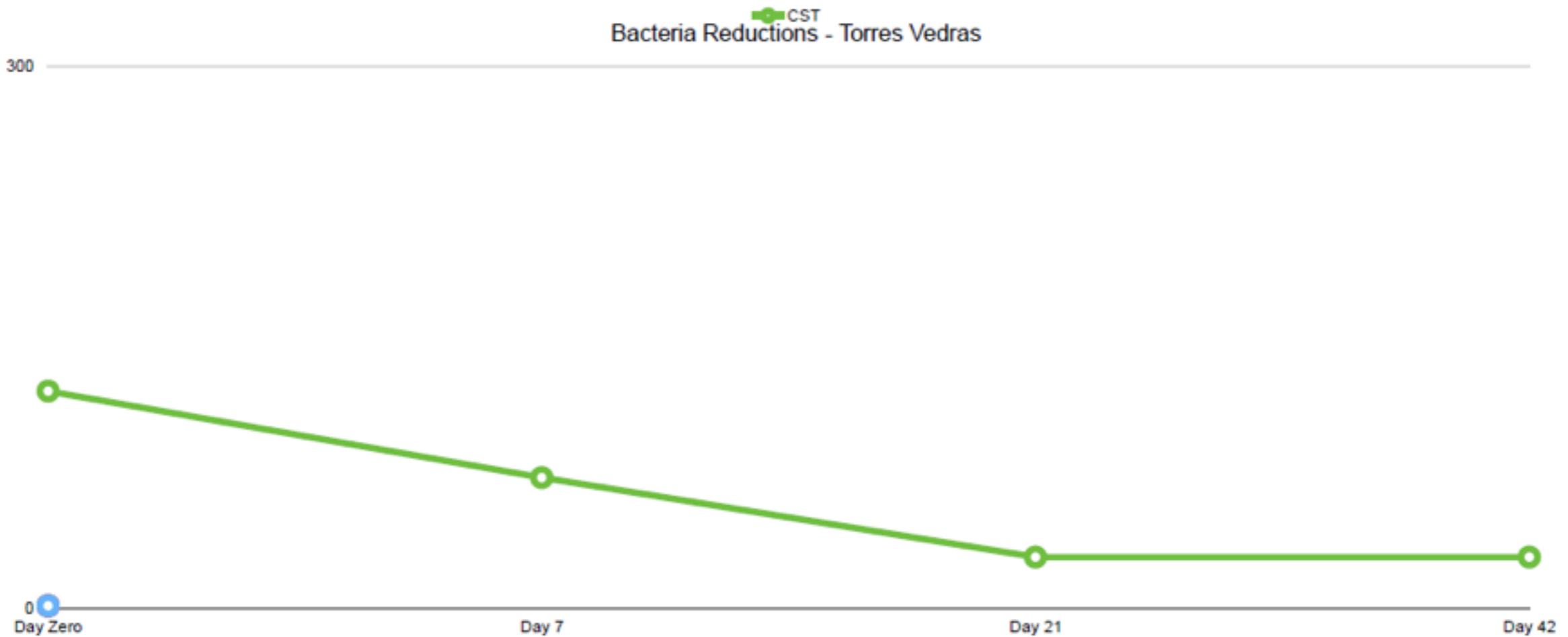


BACTERIA	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
HDA	228	100	56%	NO	24	89%	YES	56	75%
HDB	856	138	84%	NO	52	94%	YES	92	89%
HDC	616	128	79%	NO	48	92%	YES	104	83%
HDD	330	60	82%	NO	40	88%	YES	50	85%
HDE	316	112	65%	NO	76	76%	YES	36	89%
<b>AVERAGE</b>			73%			88%			84%



# Torres - Bacteria (Other Areas)

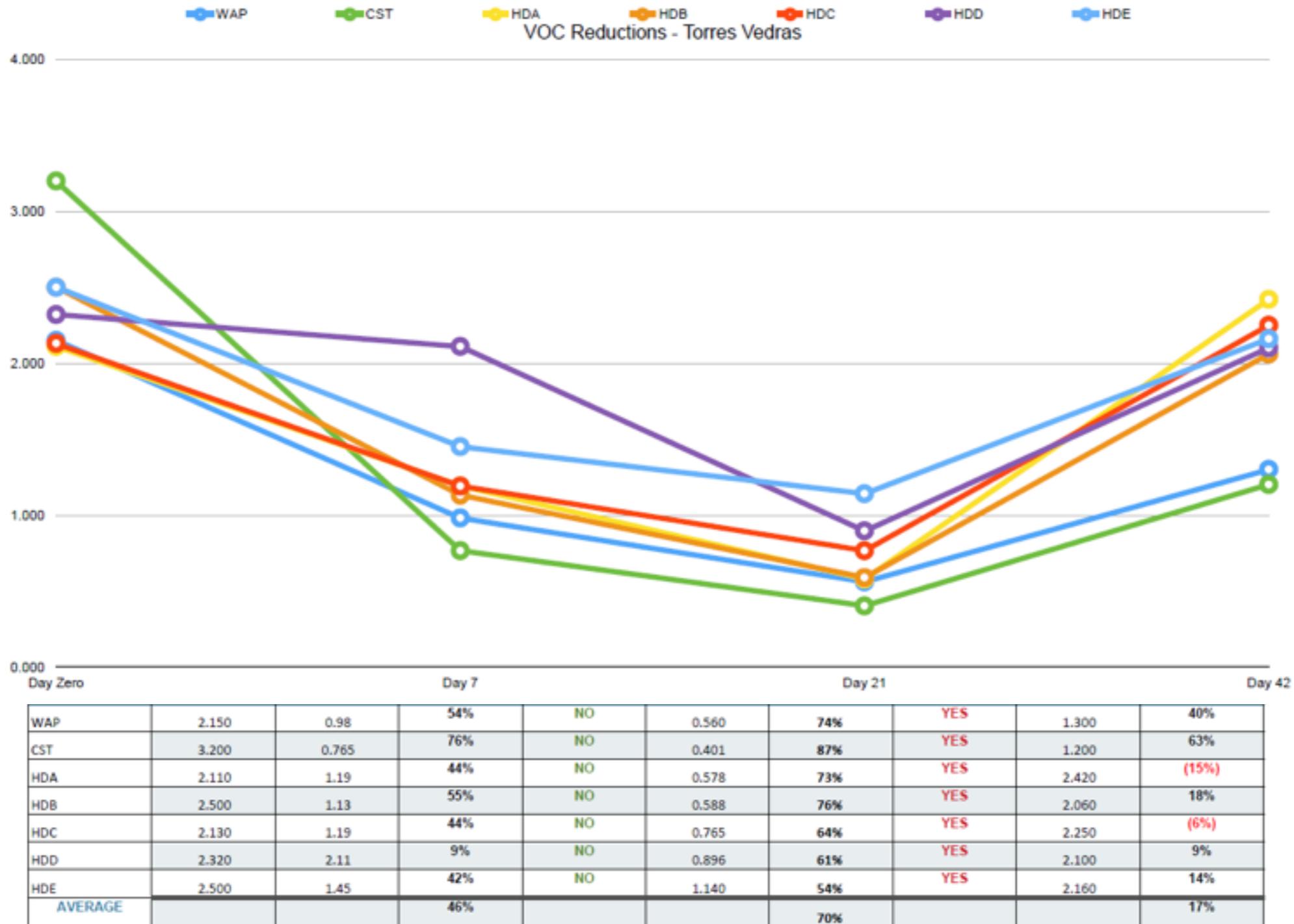
## Torres Vedras Summary



BACTERIA	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
CST	120	72	40%	NO	28	77%	YES	28	77%
AVERAGE			40%			77%			77%

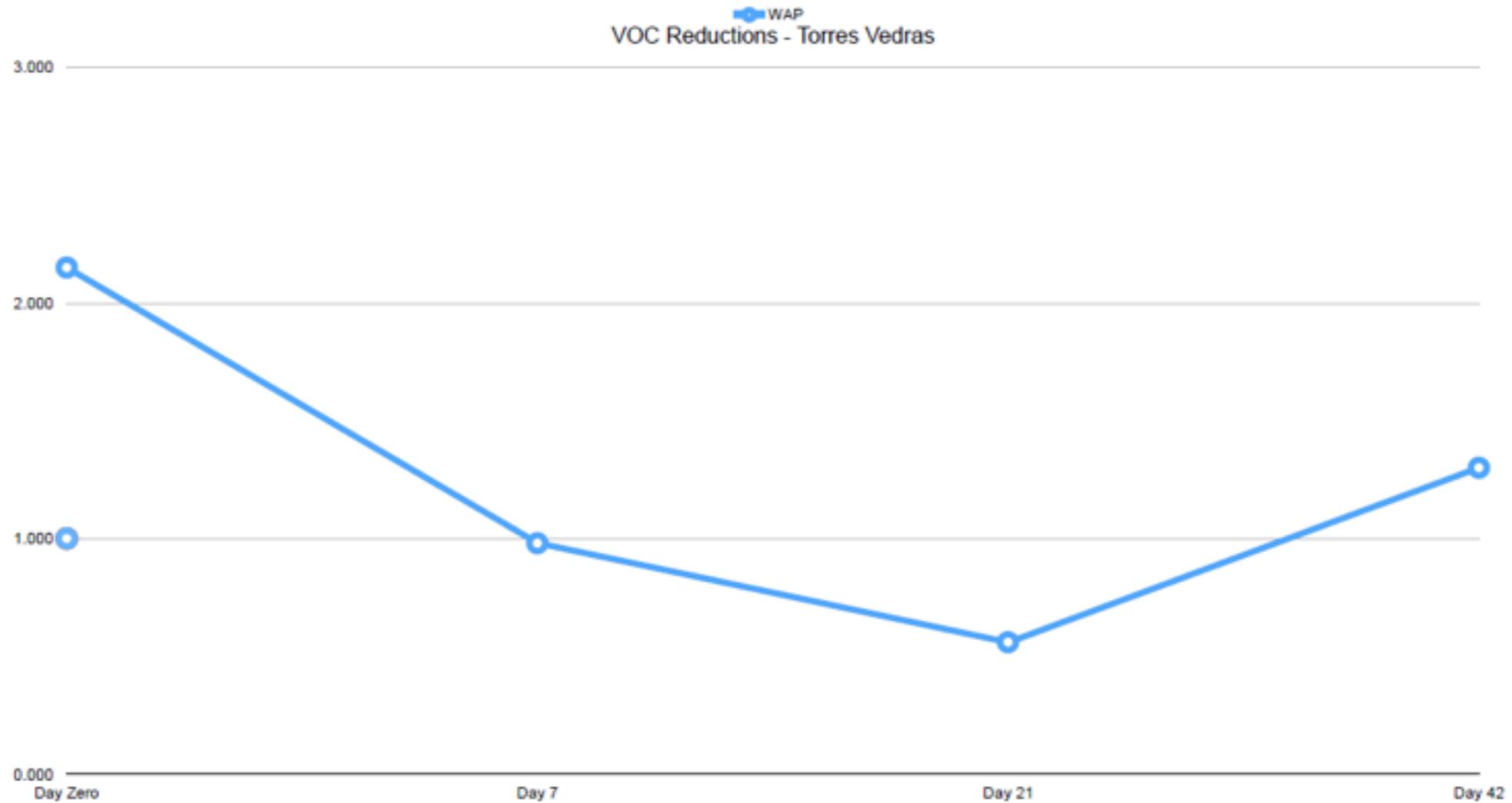


# Torres - VOC Reduction Summary





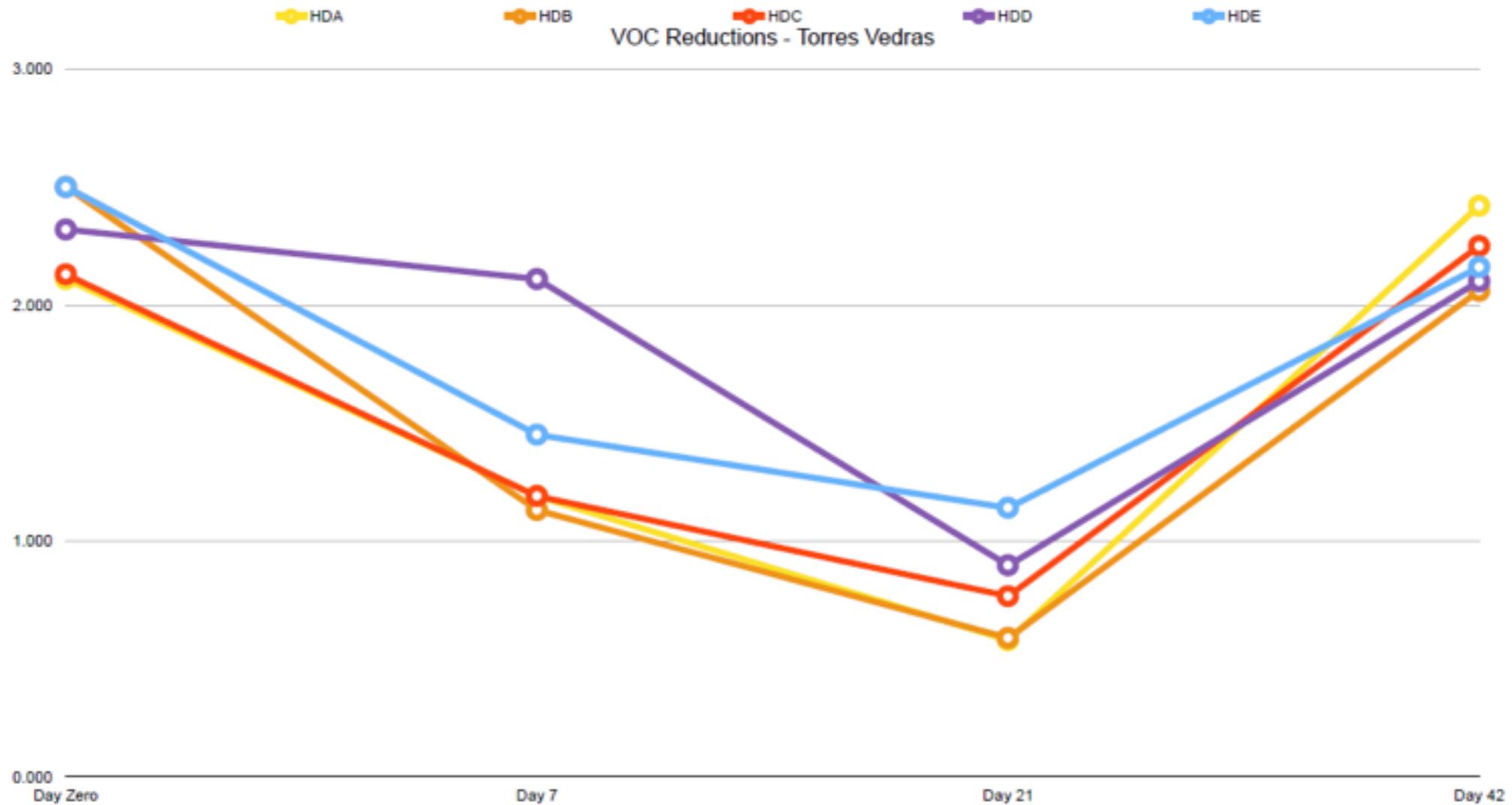
# Torres - VOC (Waiting Area)



VOC's	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
WAP	2.150	0.98	54%	NO	0.560	74%	YES	1.300	40%
AVERAGE			54%			74%			40%



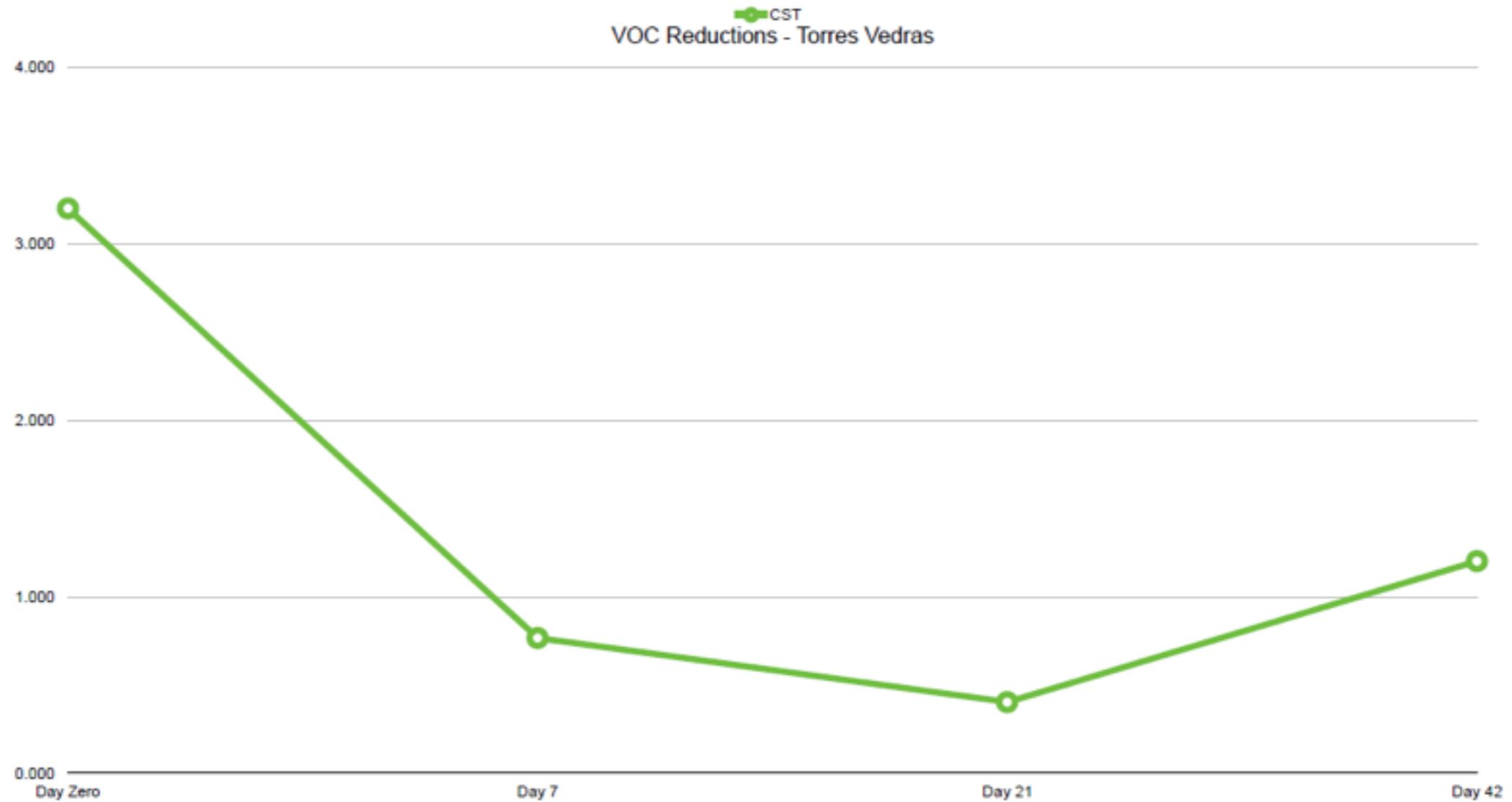
# Torres - VOC (Dialysis Room)



VOC's	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
HDA	2.110	1.19	44%	NO	0.578	73%	YES	2.420	(15%)
HDB	2.500	1.13	55%	NO	0.588	76%	YES	2.060	18%
HDC	2.130	1.19	44%	NO	0.765	64%	YES	2.250	(6%)
HDD	2.320	2.11	9%	NO	0.896	61%	YES	2.100	9%
HDE	2.500	1.45	42%	NO	1.140	54%	YES	2.160	14%
<b>AVERAGE</b>			39%			66%			4%



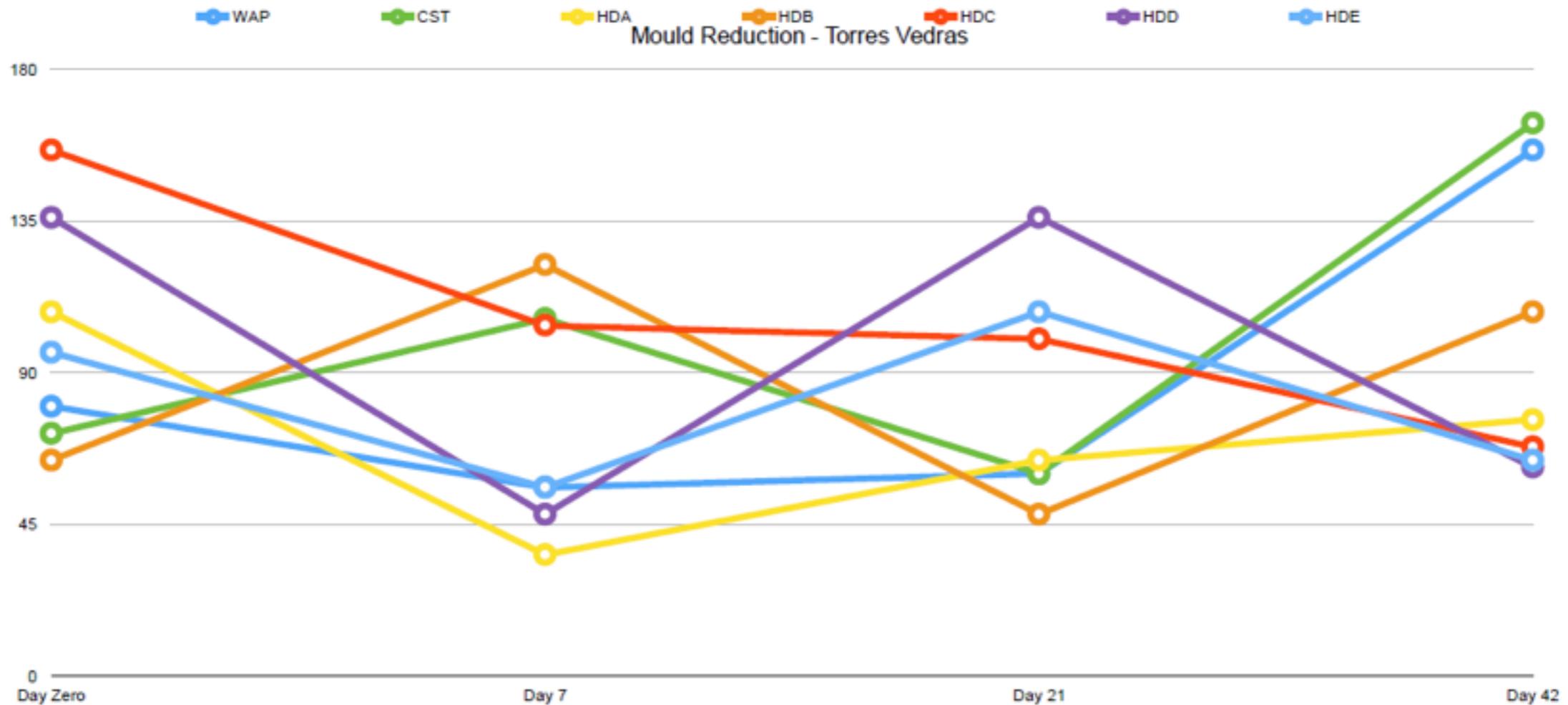
# Torres - VOC (Other Areas)



VOC's	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
CST	3.200	0.765	76%	NO	0.401	87%	YES	1.200	63%
AVERAGE			76%			87%			63%



# Torres - Mould Reduction Summary



YEASTS & MOULDS	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
WAP	80	56	30%	NO	60	25%	YES	156	(95%)
CST	72	106	(47%)	NO	60	17%	YES	164	(128%)
HDA	108	36	67%	NO	64	41%	YES	76	30%
HDB	64	122	(91%)	NO	48	25%	YES	108	(69%)
HDC	156	104	33%	NO	100	36%	YES	68	56%
HDD	136	48	65%	NO	136	0%	YES	62	54%
HDE	96	56	42%	NO	108	(13%)	YES	64	33%
AVERAGE			14%			19%			(17%)



# Mould Reduction Results Discussion

---

- Mould is being brought into the facility through the HVAC system, which currently changes the air faster than Novaerus is changing it in the room
- We feel confident that if there was a Novaerus system placed at the exhaust outlets of the HVAC systems, then we would also reduce the mould counts substantially
- As there is no clear data from this study on Mould reduction, we have not isolated the data for discussion



# Alverca Facility



# Alverca Initial Observations

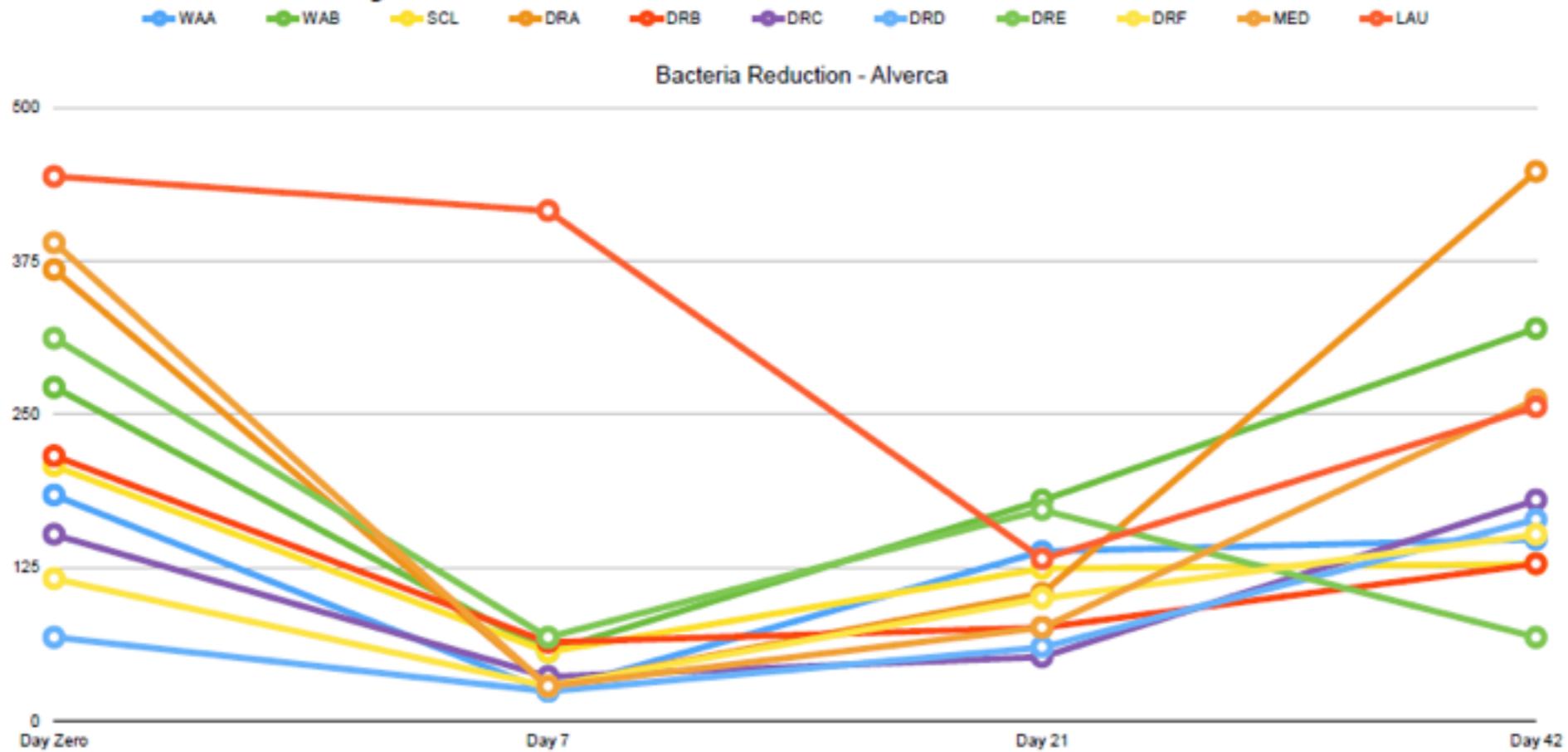
---

- There was obvious and dramatic initial reduction within the first 7 days
- This location felt that the noise level was problematic initially, and staff turned off the larger wall-mounted devices after T1
- VOC reductions in the Dialysis Room continued to remain extremely low, as they are generated locally by the dialysis machines, and were still treated by the smaller NV200 portable devices, which remained on throughout the trial
- The results in Alverca are useful as a ‘control’, as one can clearly see that after the initial dramatic decline, the levels continued to rise immediately after the devices were turned off
- Mould being brought into the building via the HVAC system was also a problem in the Alverca facility



# Alverca - Bacteria Summary

## Alverca Summary



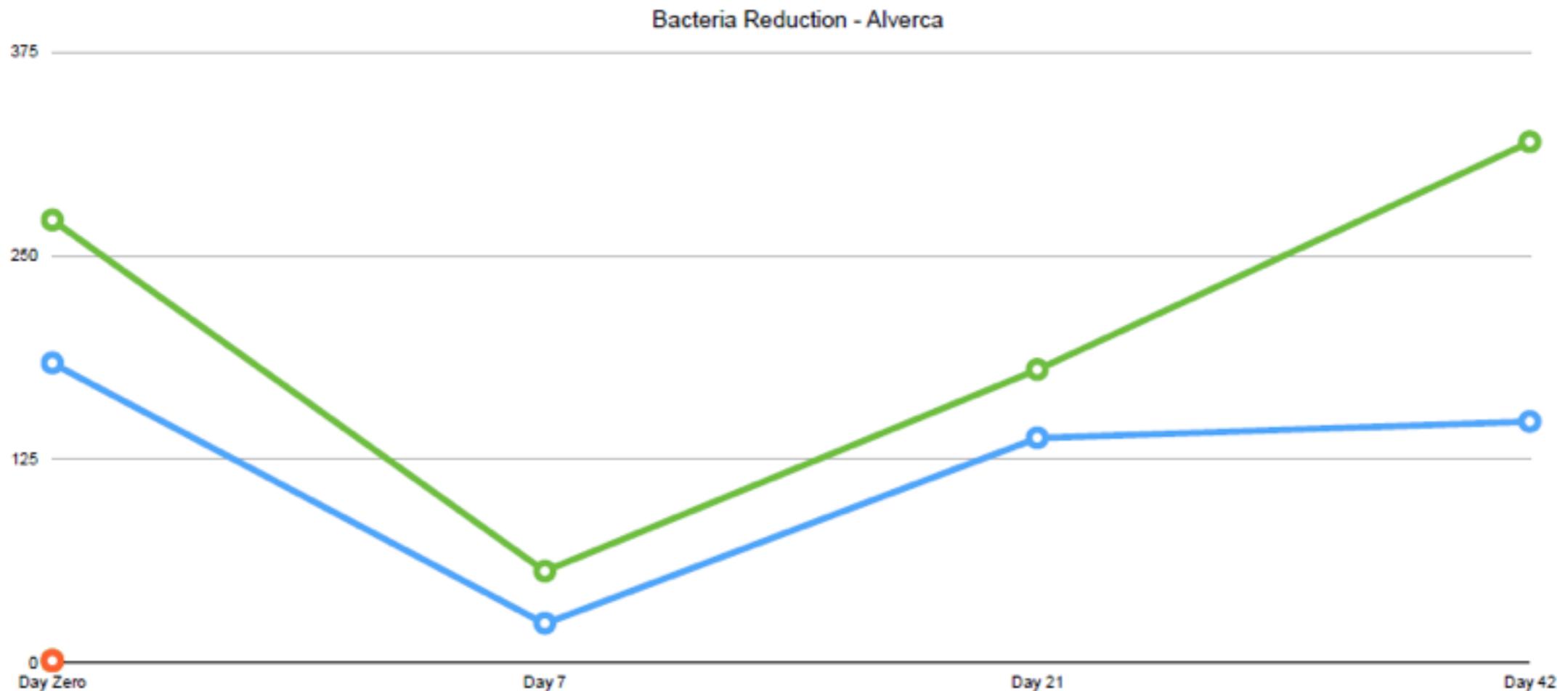
BACTERIA	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
WAA	184	24	87%	YES	138	25%	YES	148	20%
WAB	272	56	79%	YES	180	34%	YES	320	(18%)
SCL	208	56	73%	YES	124	40%	YES	128	38%
DRA	368	28	92%	YES	104	72%	YES	448	(22%)
DRB	216	64	70%	YES	76	65%	YES	128	41%
DRC	152	36	76%	YES	52	66%	YES	180	(18%)
DRD	68	24	66%	YES	60	12%	YES	164	(141%)
DRE	312	68	78%	YES	172	45%	YES	68	78%
DRF	116	28	76%	YES	100	14%	YES	152	(31%)
MED	360	28	93%	YES	76	81%	YES	262	33%
LAU	444	416	6%	YES	132	70%	YES	256	42%
AVERAGE			72%			48%			2%



# Alverca - Bacteria (Waiting Area)

## Alverca Summary

WAA WAB

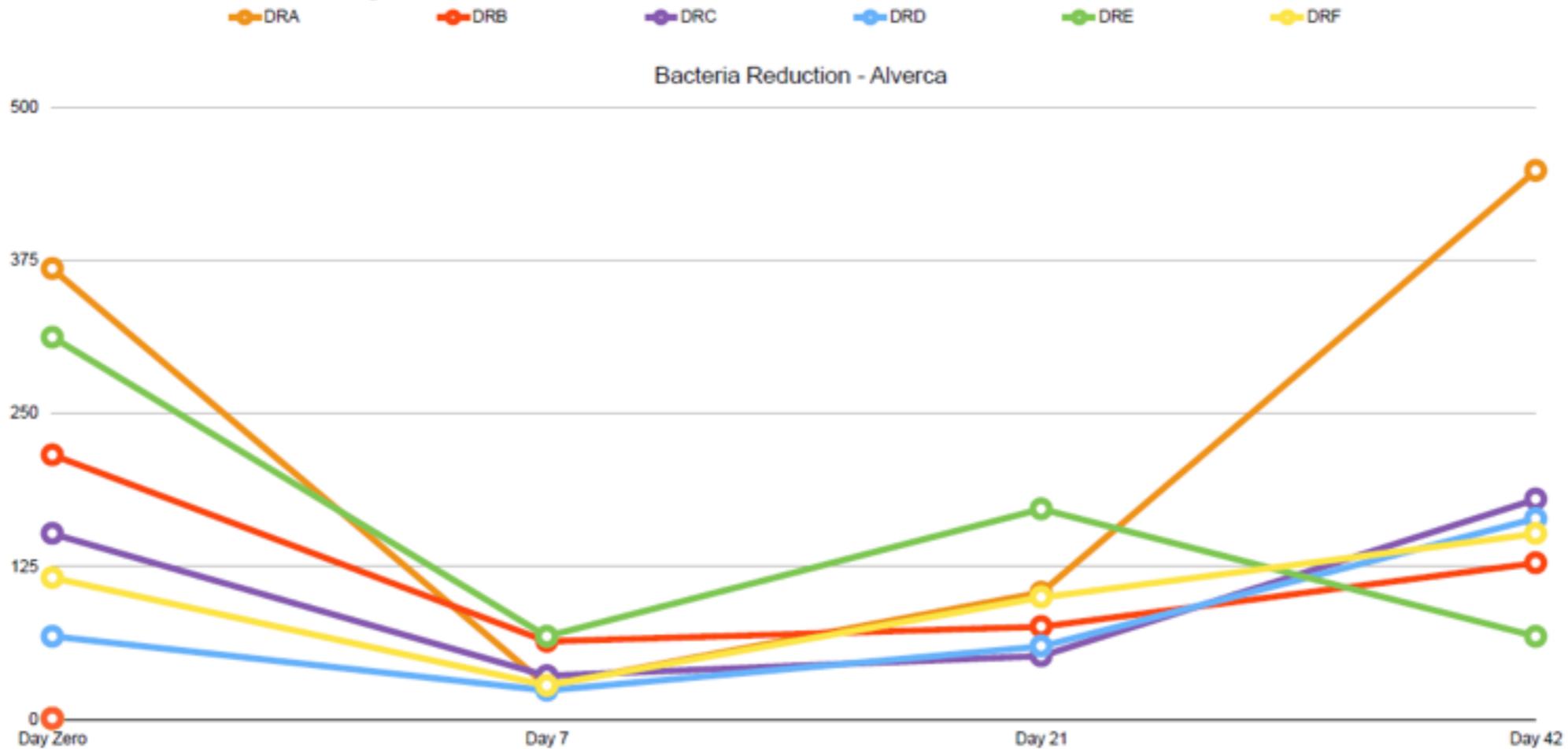


BACTERIA	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
WAA	184	24	87%	YES	138	25%	YES	148	20%
WAB	272	56	79%	YES	160	34%	YES	320	(18%)
AVERAGE			83%			29%			1%



# Alverca - Bacteria (Dialysis Room)

## Alverca Summary

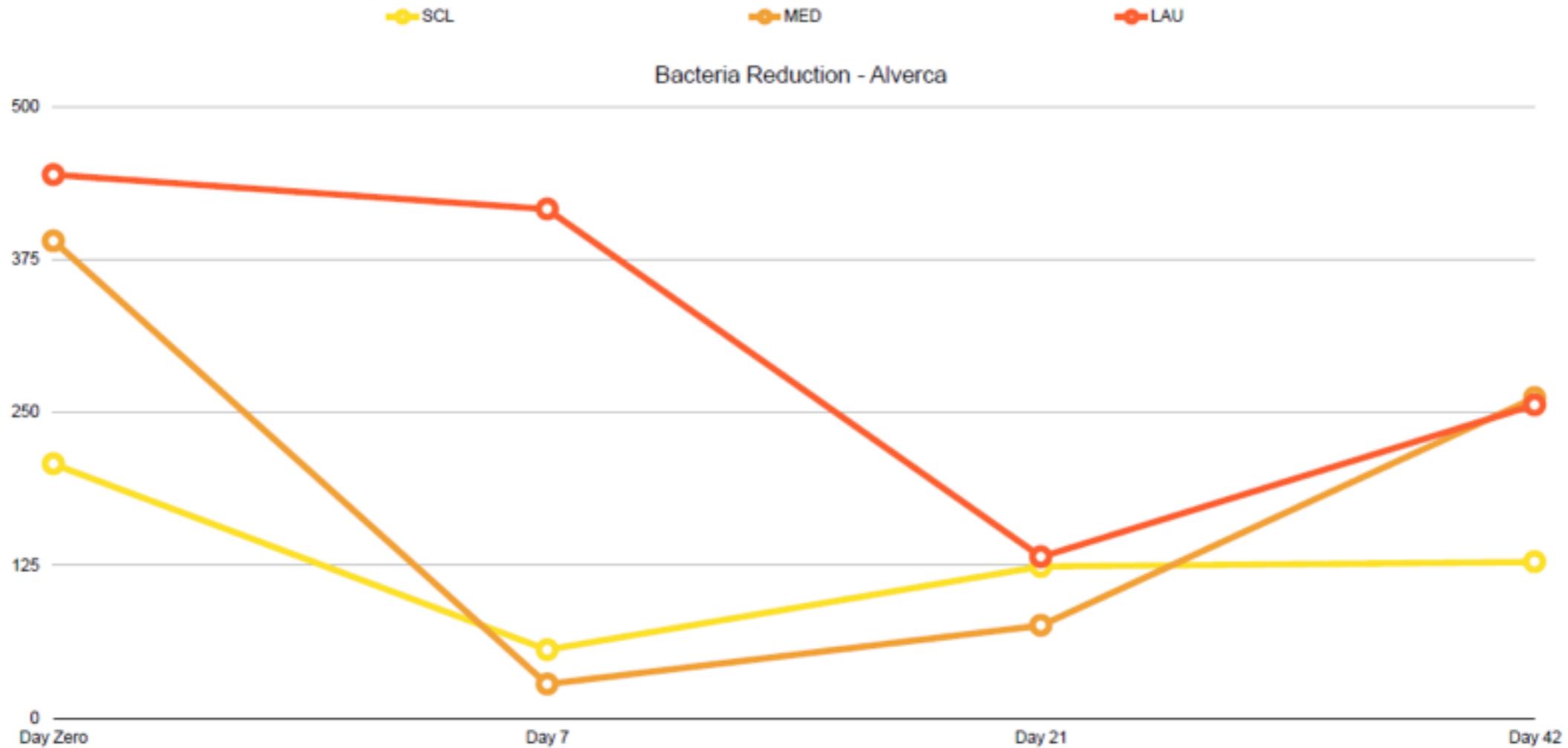


BACTERIA	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
DRA	368	28	92%	YES	104	72%	YES	448	(22%)
DRB	216	64	70%	YES	76	65%	YES	128	41%
DRC	152	36	76%	YES	52	66%	YES	180	(18%)
DRD	68	24	65%	YES	60	12%	YES	164	(141%)
DRE	312	68	78%	YES	172	45%	YES	68	78%
DRF	116	28	76%	YES	100	14%	YES	152	(31%)
AVERAGE			76%			45%			(16%)



# Alverca - Bacteria (Other Areas)

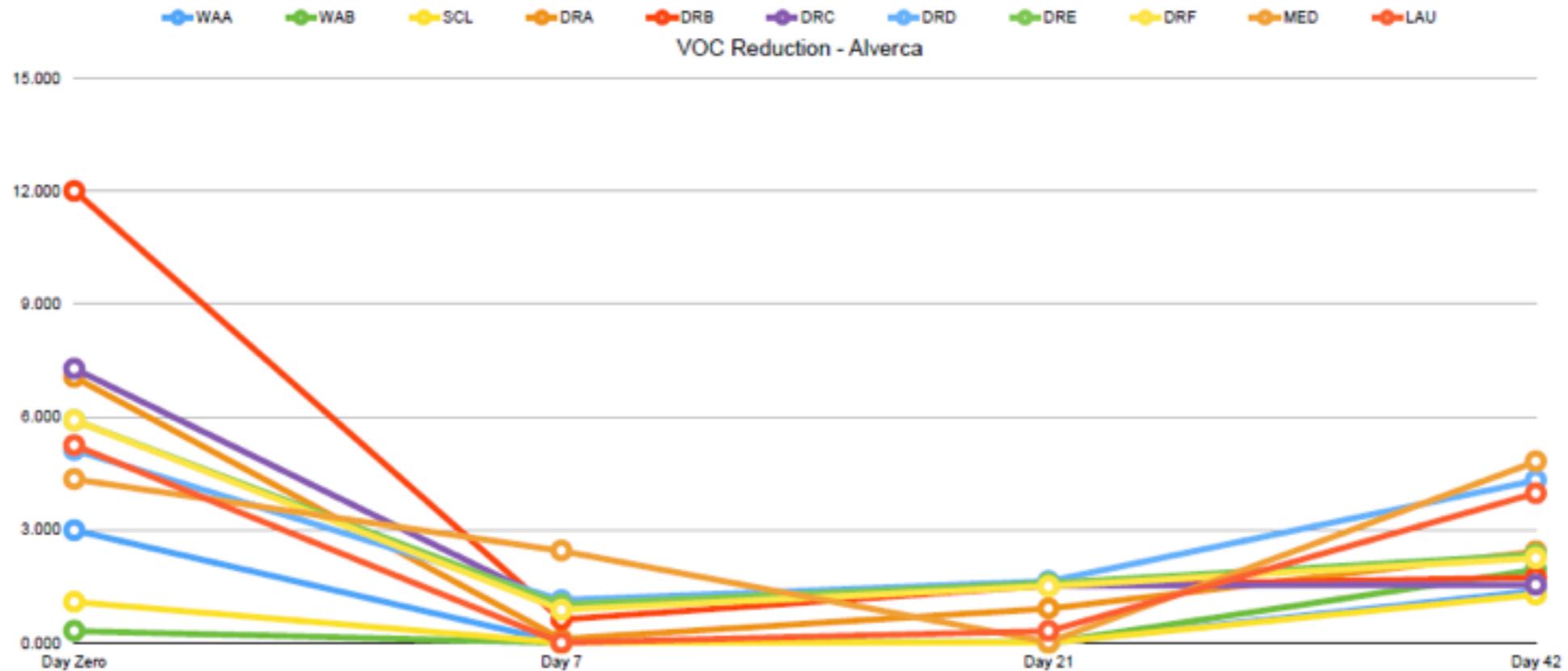
## Alverca Summary



BACTERIA	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
SCL	208	56	73%	YES	124	40%	YES	128	38%
MED	390	28	93%	YES	76	81%	YES	262	33%
LAU	444	416	6%	YES	132	70%	YES	256	42%
AVERAGE			57%			64%			38%



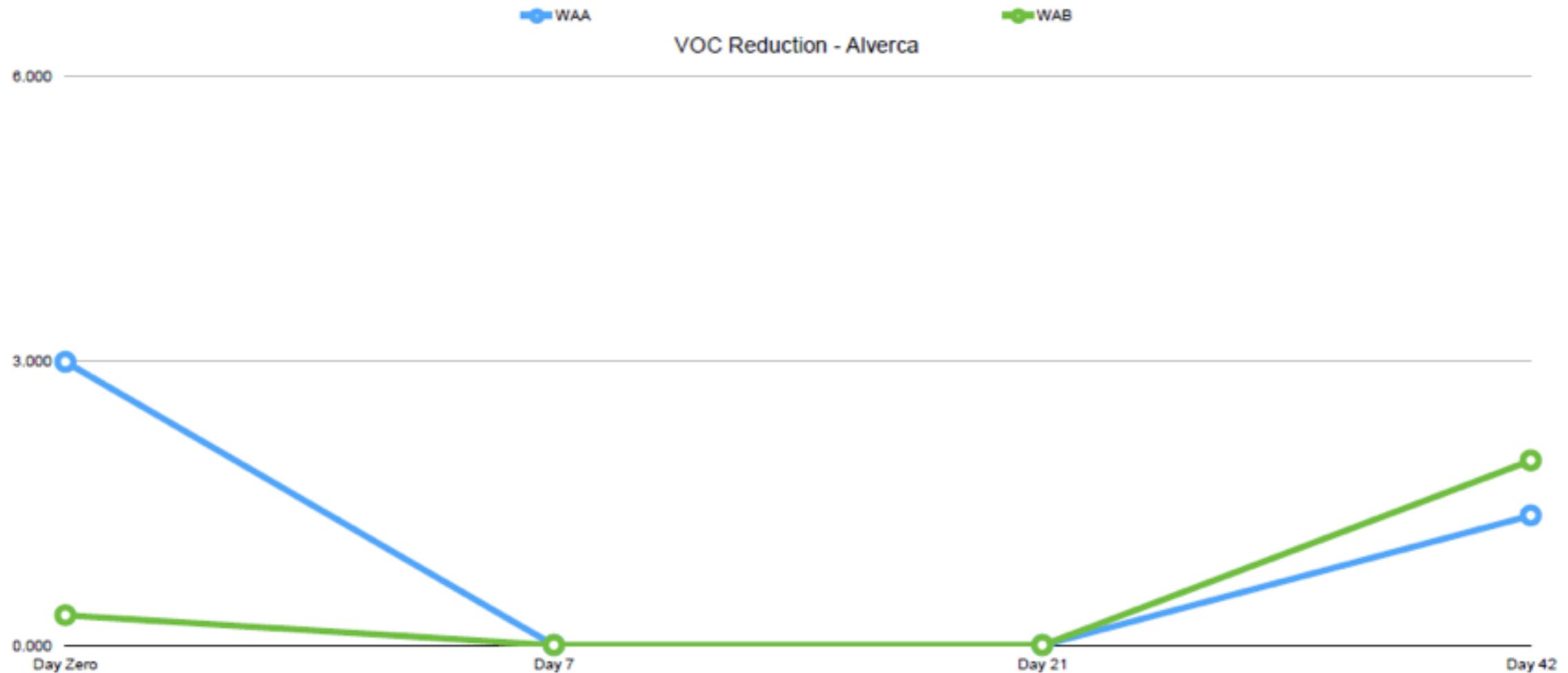
# Alverca - VOC Reduction Summary



VOC's	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
WAA	2.990	0.000	100%	YES	0.000	100%	YES	1.370	54%
WAB	0.317	0.000	100%	YES	0.000	100%	YES	1.950	(515%)
SCL	1.090	0.000	100%	YES	0.000	100%	YES	1.280	(17%)
DRA	7.060	0.105	99%	YES	0.914	87%	YES	2.430	66%
DRB	12.000	0.617	95%	YES	1.520	87%	YES	1.730	86%
DRC	7.280	0.957	87%	YES	1.530	79%	YES	1.540	79%
DRD	5.120	1.130	78%	YES	1.640	68%	YES	4.320	16%
DRE	5.910	1.020	83%	YES	1.580	73%	YES	2.350	60%
DRF	5.910	0.873	85%	YES	1.500	75%	YES	2.250	62%
MED	4.350	2.450	44%	YES	0.018	100%	YES	4.820	(11%)
LAU	5.250	0.000	100%	YES	0.316	94%	YES	3.970	24%
AVERAGE			88%			88%			(9%)



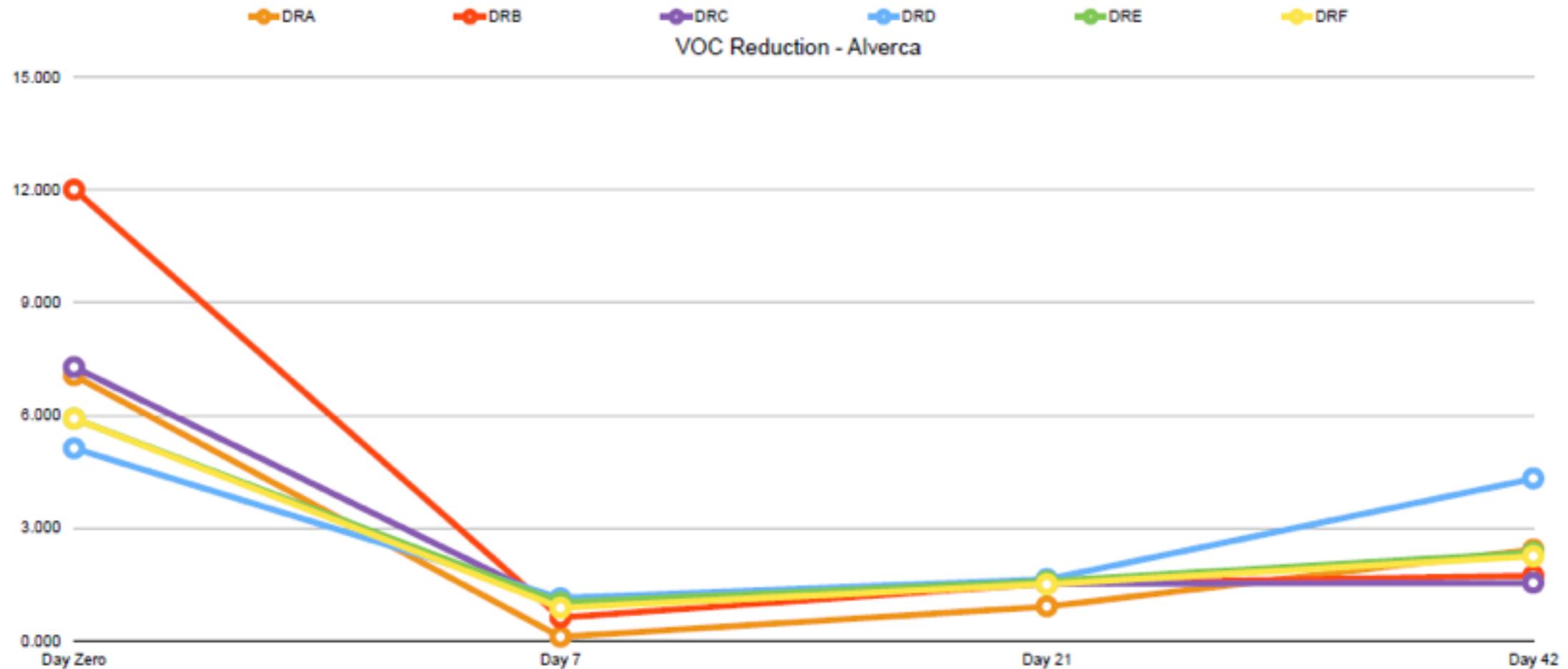
# Alverca - VOCs (Waiting Area)



VOC's	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
WAA	2.990	0.000	100%	YES	0.000	100%	YES	1.370	54%
WAB	0.317	0.000	100%	YES	0.000	100%	YES	1.950	(515%)
AVERAGE			100%			100%			(230%)



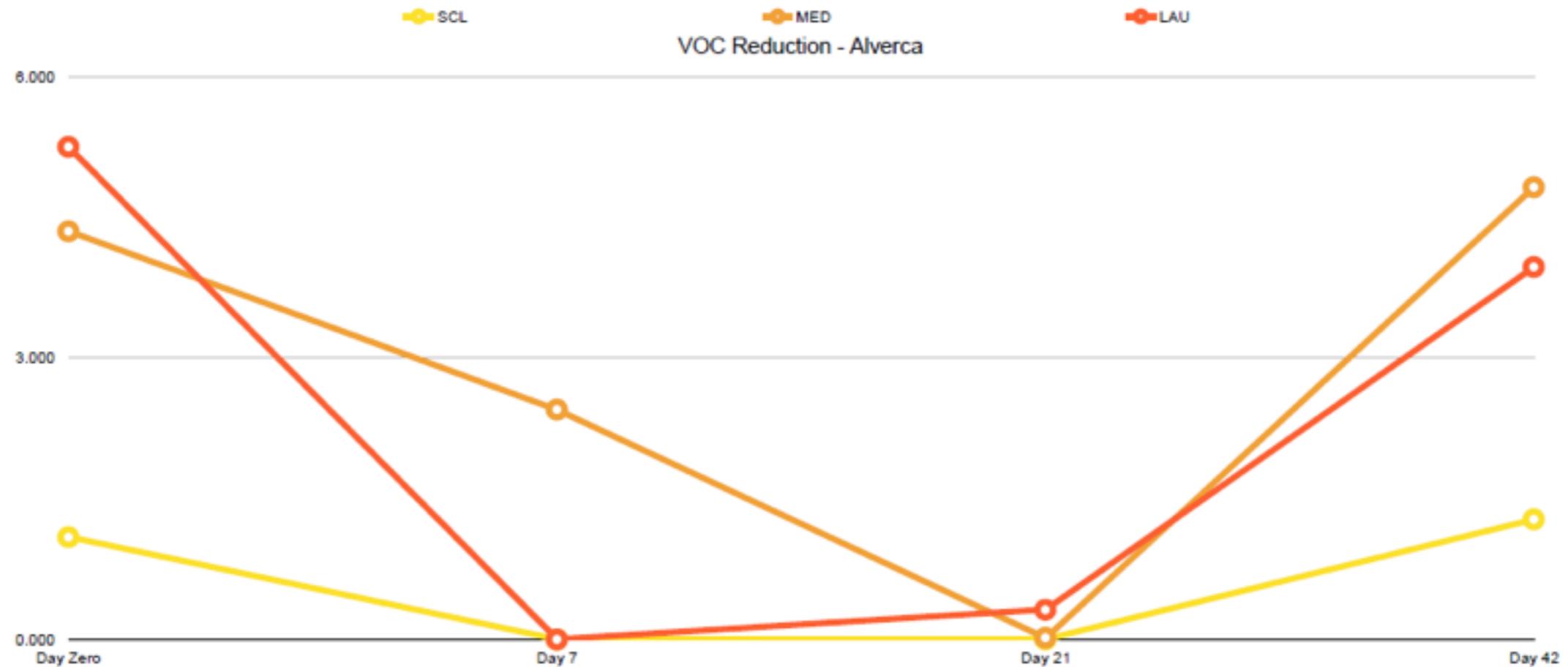
# Alverca - VOCs (Dialysis Room)



VOC's	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
DRA	7.060	0.105	99%	YES	0.914	87%	YES	2.430	66%
DRB	12.000	0.617	95%	YES	1.520	87%	YES	1.730	86%
DRC	7.280	0.957	87%	YES	1.530	79%	YES	1.540	79%
DRD	5.120	1.130	78%	YES	1.640	68%	YES	4.320	16%
DRE	5.910	1.020	83%	YES	1.580	73%	YES	2.350	60%
DRF	5.910	0.873	85%	YES	1.500	75%	YES	2.250	62%
AVERAGE			88%			78%			61%



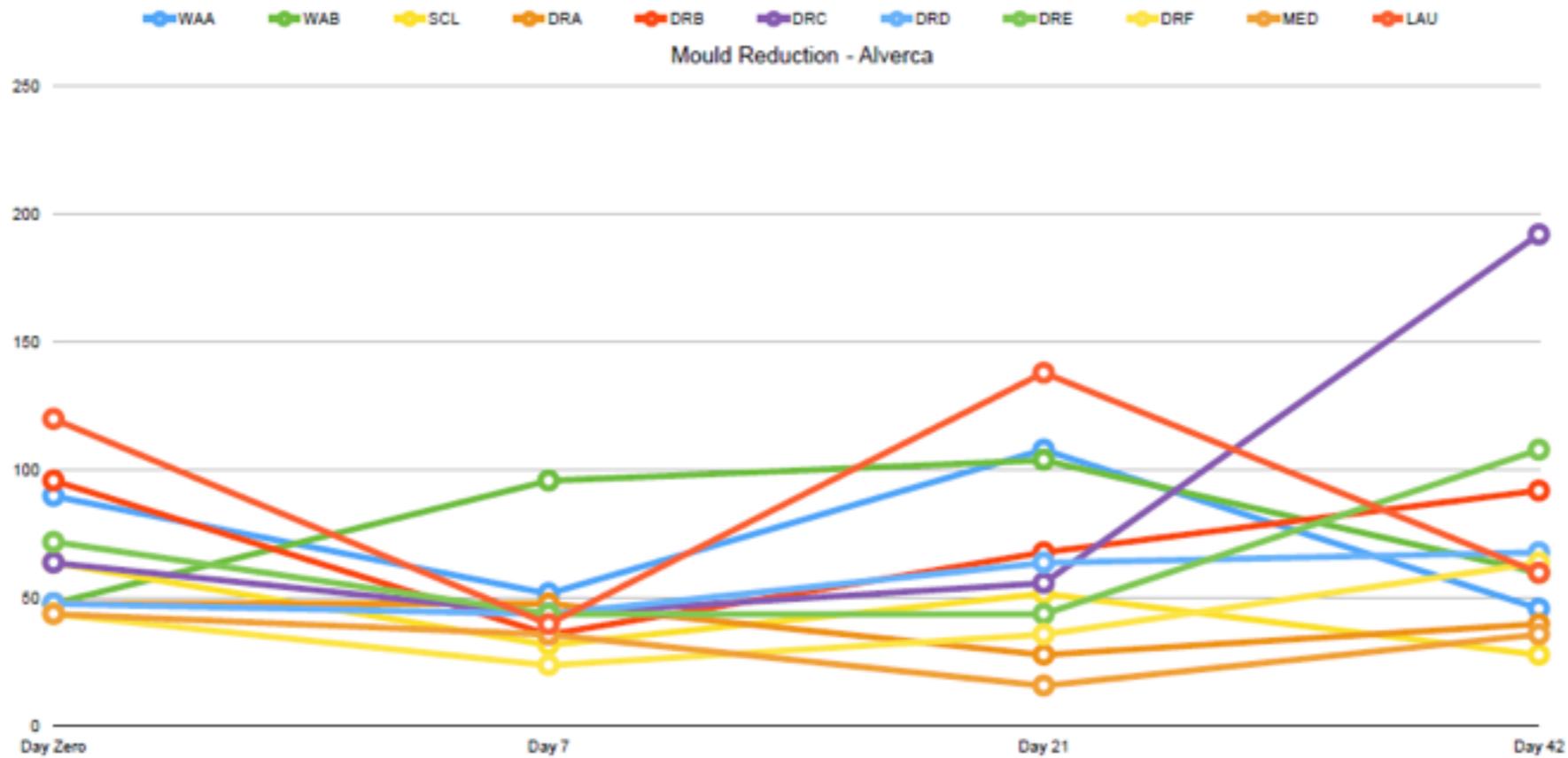
# Alverca - VOCs (Other Areas)



VOC's	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
SCL	1.090	0.000	100%	YES	0.000	100%	YES	1.280	(17%)
MED	4.350	2.450	44%	YES	0.018	100%	YES	4.820	(11%)
LAU	5.250	0.000	100%	YES	0.316	94%	YES	3.970	24%
AVERAGE			81%			98%			(1%)



# Alverca - Mould Reduction Summary



YEASTS & MOULDS	Day Zero	Day 7	INITIAL REDUCTION	UNITS REMOVED OR REDUCED	Day 21	MID TERM REDUCTION	UNITS REMOVED OR REDUCED	Day 42	TOTAL REDUCTION
WAA	90	52	42%	YES	108	(20%)	YES	46	49%
WAB	48	96	(100%)	YES	104	(117%)	YES	60	(25%)
SCL	64	32	50%	YES	52	19%	YES	28	56%
DRA	48	48	0%	YES	28	42%	YES	40	17%
DRB	96	36	63%	YES	68	29%	YES	92	4%
DRC	64	44	31%	YES	56	13%	YES	192	(200%)
DRD	48	44	8%	YES	64	(33%)	YES	68	(42%)
DRE	72	44	39%	YES	44	39%	YES	108	(50%)
DRF	44	24	45%	YES	36	18%	YES	64	(45%)
MED	44	36	18%	YES	16	64%	YES	36	18%
LAU	120	40	67%	YES	138	(15%)	YES	60	50%
AVERAGE			24%			3%			(15%)



# Mould Reduction Results Discussion

---

- Mould is being brought into the facility through the HVAC system, which currently changes the air faster than Novaerus is changing it in the room
- We feel confident that if there was a Novaerus system placed at the exhaust outlets of the HVAC systems, then we would also reduce the mould counts substantially
- As there is no clear data from this study on Mould reduction, we have not isolated the data for discussion



# Final Summary

Clear Findings From The  
Data





# Clear Results

---

- Novaerus reduced airborne bacteria in both facilities by meaningful levels throughout the trial
- Novaerus reduced airborne VOCs in both facilities by meaningful levels throughout the trial
- Mould is being brought into both facilities by the HVAC system, and should be looked at in the future