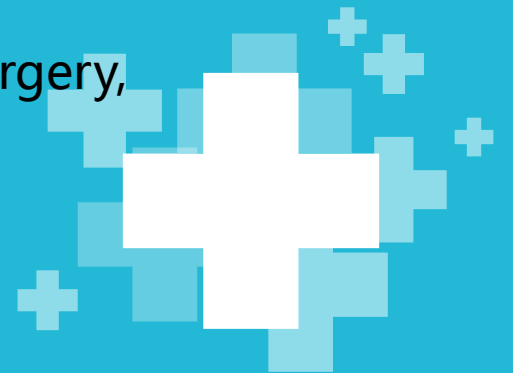




# The Experience of Color Dust Explosion in Formosan Water Park

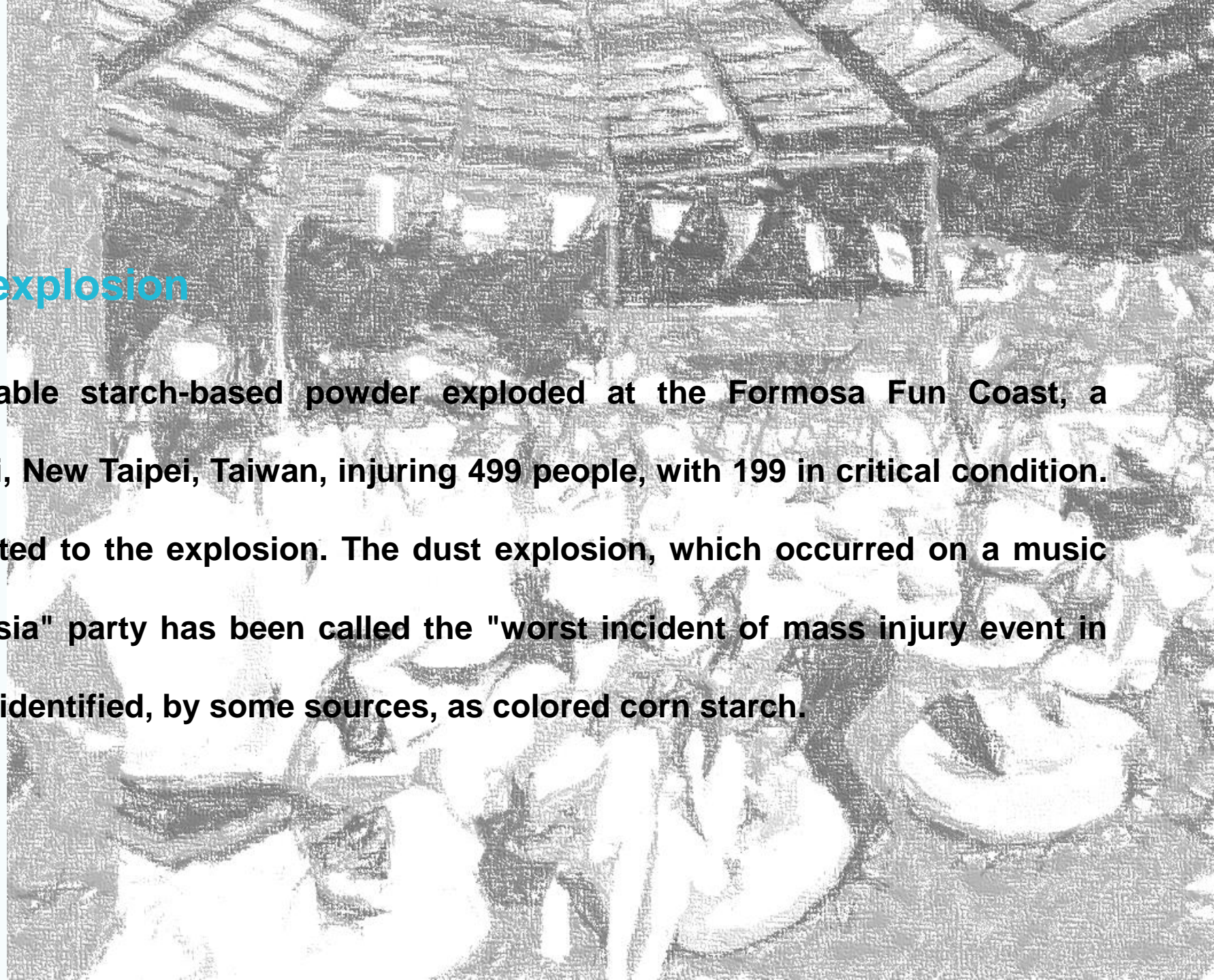
Event | Management | Assistance | Society | Outcome

Department of Plastic and Reconstructive Surgery, Department of Surgery,  
Taipei Veterans General Hospital, Taipei, Taiwan



## 2015 New Taipei City Formosan water park explosion

On 27 June 2015, a flammable starch-based powder exploded at the Formosa Fun Coast, a recreational water park in Bali, New Taipei, Taiwan, injuring 499 people, with 199 in critical condition. Sixteen fatalities were attributed to the explosion. The dust explosion, which occurred on a music stage during a "Color Play Asia" party has been called the "worst incident of mass injury event in New Taipei". The powder was identified, by some sources, as colored corn starch.





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### Taiwan Formosa Water Park explosion injures hundreds

28 June 2015

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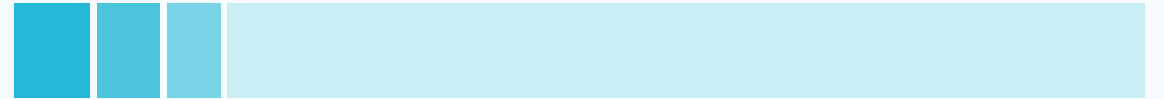

## 'All her skin was gone': Horrific aftermath of fireball at Taiwan water park

By **Jethro Mullen**, Kathy Novak and K.J. Kwon, CNN  
Updated 1454 GMT (2254 HKT) June 29, 2015

News & buzz

2 hurt in UPS explosion authorities believe was accidental

Australia's intelligence face most significant n in 40...



## Hot News!!





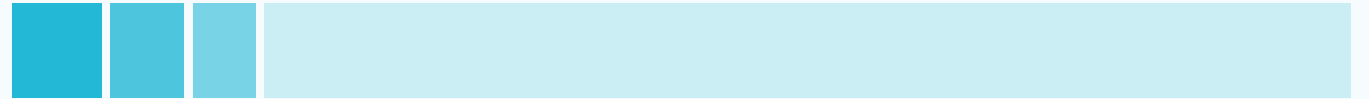


## Hospital Transit & Emergent Room

At about 20:30, a large deflagration occurred when a cloud of colored powder ignited after being discharged from the stage onto a crowd of 1,000 people during a concert. Some of the crowd breathed in the powder, causing respiratory problems. As recorded in an amateur video by an audience member, a massive fireball suddenly engulfed the stage. The powder caught fire along the ground, resulting in burns mainly to victims' limbs and torsos. According to the authorities, the fire was quickly extinguished. Some victims were carried out on swim rings because their skin was sloughing off when touched. The rescue included help from army vehicles and soldiers, along with medical services.







## Hot News!!

Chief of Department of Surgery, Dr. Ma

2015/06/28





## Admissions to Taipei Veterans Hospital

TBSA (%)	<10	10-19	20-39	40-59	60-79	80-89	≥90	Sum
Patient number	6	5	3	9	9	2	4	38
	Ward (14)			ICU(24)				
				11 patients intubated at ER				





# Meetings and treatment plannings

Combined with other departments in VGHTPE



A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA AB AC AD AE AF AG AH AI AJ AK AL AM AN AO AP AQ AR AS AT																									
Patient's Profile																									
Case No.	Age	Sex	Height	Weight	BMI	BP	HR	Temp	SpO2	Glucose	Urea	Creat	ALT	AST	ALP	Gamma	Albumin	PT	APTT	Fibrinogen	D-Dimer	INR	APACHE II	SOFA	
101	65	M	170	70	24.2	120/80	75	36.5	98	100	1.2	0.8	40	35	100	25	4.5	12	30	100	0.1	1.0	15	10	0
102	68	M	175	75	24.5	125/85	78	37.0	97	105	1.3	0.9	45	38	105	28	4.8	13	32	105	0.1	1.1	16	11	0
103	70	M	180	80	25.0	130/90	80	37.5	96	110	1.4	1.0	50	40	110	30	5.0	14	35	110	0.1	1.2	17	12	0
104	72	M	185	85	25.0	135/95	82	38.0	95	115	1.5	1.1	55	42	115	32	5.2	15	38	115	0.1	1.3	18	13	0
105	75	M	190	90	25.0	140/100	85	38.5	94	120	1.6	1.2	60	45	120	35	5.5	16	40	120	0.1	1.4	19	14	0
106	78	M	195	95	24.5	145/105	88	39.0	93	125	1.7	1.3	65	48	125	38	5.8	17	42	125	0.1	1.5	20	15	0
107	80	M	200	100	25.0	150/110	90	39.5	92	130	1.8	1.4	70	50	130	40	6.0	18	45	130	0.1	1.6	21	16	0
108	82	M	205	105	25.0	155/115	92	40.0	91	135	1.9	1.5	75	52	135	42	6.2	19	48	135	0.1	1.7	22	17	0
109	85	M	210	110	25.0	160/120	95	40.5	90	140	2.0	1.6	80	55	140	45	6.5	20	50	140	0.1	1.8	23	18	0
110	88	M	215	115	25.0	165/125	98	41.0	89	145	2.1	1.7	85	58	145	48	6.8	21	52	145	0.1	1.9	24	19	0
111	90	M	220	120	25.0	170/130	100	41.5	88	150	2.2	1.8	90	60	150	50	7.0	22	55	150	0.1	2.0	25	20	0
112	92	M	225	125	25.0	175/135	102	42.0	87	155	2.3	1.9	95	62	155	52	7.2	23	58	155	0.1	2.1	26	21	0
113	95	M	230	130	25.0	180/140	105	42.5	86	160	2.4	2.0	100	65	160	55	7.5	24	60	160	0.1	2.2	27	22	0
114	98	M	235	135	25.0	185/145	108	43.0	85	165	2.5	2.1	105	68	165	58	7.8	25	62	165	0.1	2.3	28	23	0
115	100	M	240	140	25.0	190/150	110	43.5	84	170	2.6	2.2	110	70	170	60	8.0	26	65	170	0.1	2.4	29	24	0
116	102	M	245	145	25.0	195/155	112	44.0	83	175	2.7	2.3	115	72	175	62	8.2	27	68	175	0.1	2.5	30	25	0
117	105	M	250	150	24.0	200/160	115	44.5	82	180	2.8	2.4	120	75	180	65	8.5	28	70	180	0.1	2.6	31	26	0
118	108	M	255	155	23.5	205/165	118	45.0	81	185	2.9	2.5	125	78	185	68	8.8	29	72	185	0.1	2.7	32	27	0
119	110	M	260	160	23.1	210/170	120	45.5	80	190	3.0	2.6	130	80	190	70	9.0	30	75	190	0.1	2.8	33	28	0
120	112	M	265	165	23.4	215/175	122	46.0	79	195	3.1	2.7	135	82	195	72	9.2	31	78	195	0.1	2.9	34	29	0
121	115	M	270	170	23.3	220/180	125	46.5	78	200	3.2	2.8	140	85	200	75	9.5	32	80	200	0.1	3.0	35	30	0
122	118	M	275	175	22.9	225/185	128	47.0	77	205	3.3	2.9	145	88	205	78	9.8	33	82	205	0.1	3.1	36	31	0
123	120	M	280	180	22.7	230/190	130	47.5	76	210	3.4	3.0	150	90	210	80	10.0	34	85	210	0.1	3.2	37	32	0
124	122	M	285	185	22.5	235/195	132	48.0	75	215	3.5	3.1	155	92	215	82	10.2	35	88	215	0.1	3.3	38	33	0
125	125	M	290	190	22.4	240/200	135	48.5	74	220	3.6	3.2	160	95	220	85	10.5	36	90	220	0.1	3.4	39	34	0
126	128	M	295	195	22.2	245/205	138	49.0	73	225	3.7	3.3	165	98	225	88	10.8	37	92	225	0.1	3.5	40	35	0
127	130	M	300	200	22.2	250/210	140	49.5	72	230	3.8	3.4	170	100	230	90	11.0	38	95	230	0.1	3.6	41	36	0
128	132	M	305	205	21.8	255/215	142	50.0	71	235	3.9	3.5	175	102	235	92	11.2	39	98	235	0.1	3.7	42	37	0
129	135	M	310	210	21.6	260/220	145	50.5	70	240	4.0	3.6	180	105	240	95	11.5	40	100	240	0.1	3.8	43	38	0
130	138	M	315	215	21.4	265/225	148	51.0	69	245	4.1	3.7	185	108	245	98	11.8	41	102	245	0.1	3.9	44	39	0
131	140	M	320	220	21.3	270/230	150	51.5	68	250	4.2	3.8	190	110	250	100	12.0	42	105	250	0.1	4.0	45	40	0
132	142	M	325	225	21.1	275/235	152	52.0	67	255	4.3	3.9	195	112	255	102	12.2	43	108	255	0.1	4.1	46	41	0
133	145	M	330	230	20.9	280/240	155	52.5	66	260	4.4	4.0	200	115	260	105	12.5	44	110	260	0.1	4.2	47	42	0
134	148	M	335	235	20.7	285/245	158	53.0	65	265	4.5	4.1	205	118	265	108	12.8	45	112	265	0.1	4.3	48	43	0
135	150	M	340	240	20.6	290/250	160	53.5	64	270	4.6	4.2	210	120	270	110	13.0	46	115	270	0.1	4.4	49	44	0
136	152	M	345	245	20.4	295/255	162	54.0	63	275	4.7	4.3	215	122	275	112	13.2	47	118	275	0.1	4.5	50	45	0
137	155	M	350	250	20.3	300/260	165	54.5	62	280	4.8	4.4	220	125	280	115	13.5	48	120	280	0.1	4.6	51	46	0
138	158	M	355	255	20.1	305/265	168	55.0	61	285	4.9	4.5	225	128	285	118	13.8	49	122	285	0.1	4.7	52	47	0
139	160	M	360	260	20.0	310/270	170	55.5	60	290	5.0	4.6	230	130	290	120	14.0	50	125	290	0.1	4.8	53	48	0
140	162	M	365	265	19.9	315/275	172	56.0	59	295	5.1	4.7	235	132	295	122	14.2	51	128	295	0.1	4.9	54	49	0
141	165	M	370	270	19.7	320/280	175	56.5	58	300	5.2	4.8	240	135	300	125	14.5	52	130	300	0.1	5.0	55	50	0
142	168	M	375	275	19.5	325/285	178	57.0	57	305	5.3	4.9	245	138	305	128	14.8	53	132	305	0.1	5.1	56	51	0
143	170	M	380	280	19.4	330/290	180	57.5	56	310	5.4	5.0	250	140	310	130	15.0	54	135	310	0.1	5.2	57	52	0
144	172	M	385	285	19.2	335/295	182	58.0	55	315	5.5	5.1	255	142	315	132	15.2	55	138	315	0.1	5.3	58	53	0
145	175	M	390	290	19.0	340/300	185	58.5	54	320	5.6	5.2	260	145	320	135	15.5	56	140	320	0.1	5.4	59	54	0
146	178	M	395	295	18.8	345/305	188	59.0	53	325	5.7	5.3	265	148	325	138	15.8	57	142	325	0.1	5.5	60	55	0
147	180	M	400	300	18.7	350/310	190	59.5	52	330	5.8	5.4	270	150	330	140	16.0	58	145	330	0.1	5.6	61	56	0
148	182	M	405	305	18.5	355/315	192	60.0	51	335	5.9	5.5	275	152	335	142	16.2	59	148	335	0.1	5.7	62	57	0
149	185	M	410	310	18.3	360/320	195	60.5	50	340	6.0	5.6	280	155	340	145	16.5	60	150	340	0.1	5.8	63	58	0
150	188	M	415	315	18.1	365/325	198	61.0	49	345	6.1	5.7	285	158	345	148	16.8	61	152	345	0.1	5.9	64	59	0
151	190	M	420	320	17.9	370/330	200	61.5	48	350	6.2	5.8	290	160	350	150	17.0	62	155	350	0.1	6.0	65	60	0
152	192	M	425	325	17.7	375/335	202	62.0	47	355	6.3	5.9	295	162	355	152	17.2	63	158	355	0.1	6.1	66	61	0
153	195	M	430	330	17.5	380/340	205	62.5	46	360	6.4	6.0	300	165	360	155	17.5	64	160	360	0.1	6.2	67	62	0
154	198	M	435	335	17.3	385/345	208	63.0	45	365	6.5	6.1	305	168	365	158	17.8	65	162	365	0.1	6.3	68	63	0
155	200	M	440	340	17.1	390/350	210	63.5	44	370	6.6	6.2	310	170	370	160	18.0	66	165	370	0.1	6.4	69	64	0
156	202	M	445	345																					





## Meeting and treatment planning

### Surgical intervention



	7/13	7/14	7/15	7/16	7/17	7/18	7/19
A18							
A19	彭	高/林	石/梅	王	王		
		A23		A24	A22		
16	ICUA-24 BL, RU 3rd, LU 2-3 PICU-5 BL 3rd, LU: 2nd, RU: 2nd with residual pseudotumor. BU-21MEEK (BU thigh)	BU-17/RL: rectal + graft; LU: microskin PICU-8(-194-6) BU-18BL: MEEK; BL: microskin + allotrans; LU: allotrans; BU-20 BL: MEEK ICUA-25	PICU-1(-194-7) PICU-8(-194-6) ICUA-17 (-194- 12) LU: STSG (donor: scalp)	ICUA-25 PICU-9 ICUA-5; BU: cadaveric skin 1540cm2 ICUA-8: LU STSG (scalp) 1.5% TBSA BU-22	ICUA-3 BU cadaveric skin 2004cm2 ICUA-7 BU cadaveric skin 2000 BU-17 BU-19 BU-20 (PICU-9) BL cadaveric skin 2800(3000)cm2	ICUA-6 ICUA-3 ICUA-24	PICU-10(194-8) debridement PICU-5 Debridement
	7/20	7/21	7/22	7/23	7/24	7/25	7/26
A18	廖王	高/林	高/林	高/林	彭		
A19	彭	高/林	石/梅	王	王		
		A23 Since 14:00			A22, A8		
19	1. BU-21 debridement, maybe face rectal 2. 194-7(PICU-1) BU: ankle, PELAC LU: ankle Residual TBSA 20% (BU: lower legs, Left buttock 1%; Back 2%)	1. ICUA-26(ICG) 2. BU-19 cadaver skin 2308 cm2, autograft head 15*25cm2, left thigh 15*15cm2 3. ICUA-7 4. BU-20 cadaver skin 3600 cm2	1. BU-22 BL: MEEK; BU: rectal 2. ICUA-6 BU: allograft take well; BL: partial allograft loss-> debrided 3. 194-6 (-PICU-8) BL: STSG 5%, residual TBSA 7% BU: healed <0.5%	1. BU-17 debridement 2. ICUA-6 STSG 3. PICU-9 STSG	1. ICUA-5 STSG 1.4 CS 4000 SPUNT 2. BU-18 3. BU-21 Meek BL SPUNT 4. PICU-5 5. ICUA-8 STSG AD 100 SPUNT 6. ICUA-3 STSG 1.4 + CS 2000		ICUA-7 debridement

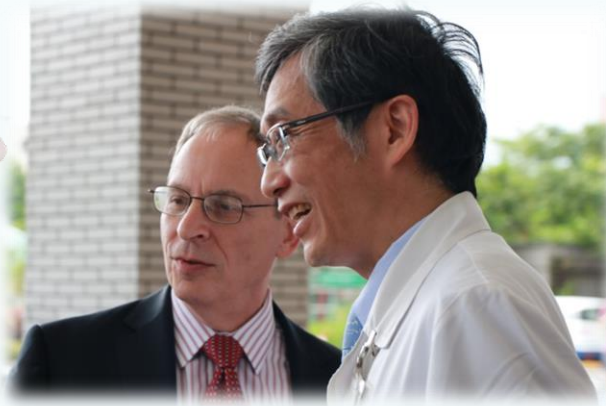






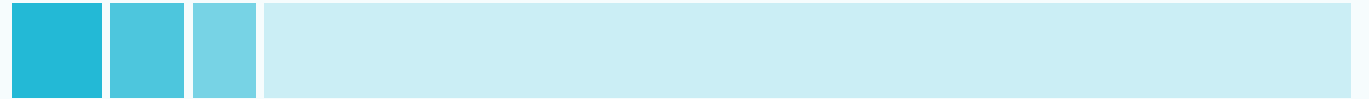
# Communications and Cooperation

John Hopkin' s hospital





ASSISTANCE



## Consolation in VGHTPE

President Ma

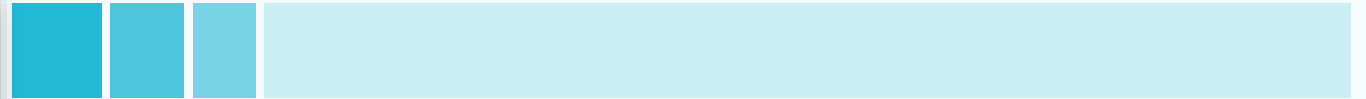
2015/06/28







ASSISTANCE



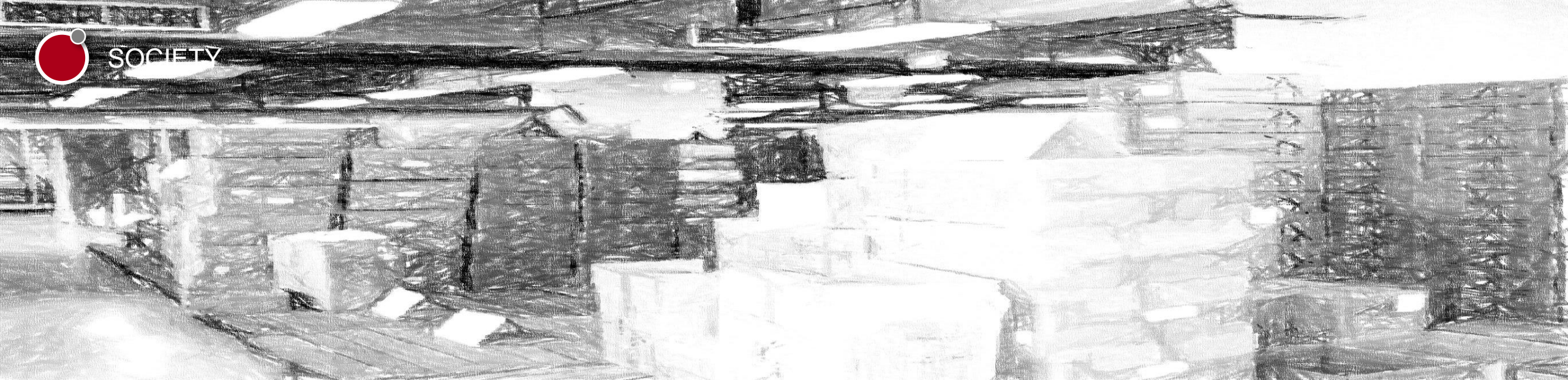
## Consolation in VGHTPE

Premier Mao

2015/07/05







## Supplies

From all over our country







SOCIETY



## Encouragement

香港朋友 致

八仙樂園事件傷者慰問卡



# 讓愛的祝福生生不息

## 臺北榮總與您一同為塵爆傷者祈福

Day 14

風大雨大，  
辛苦的醫護人員，  
出入平安呀~



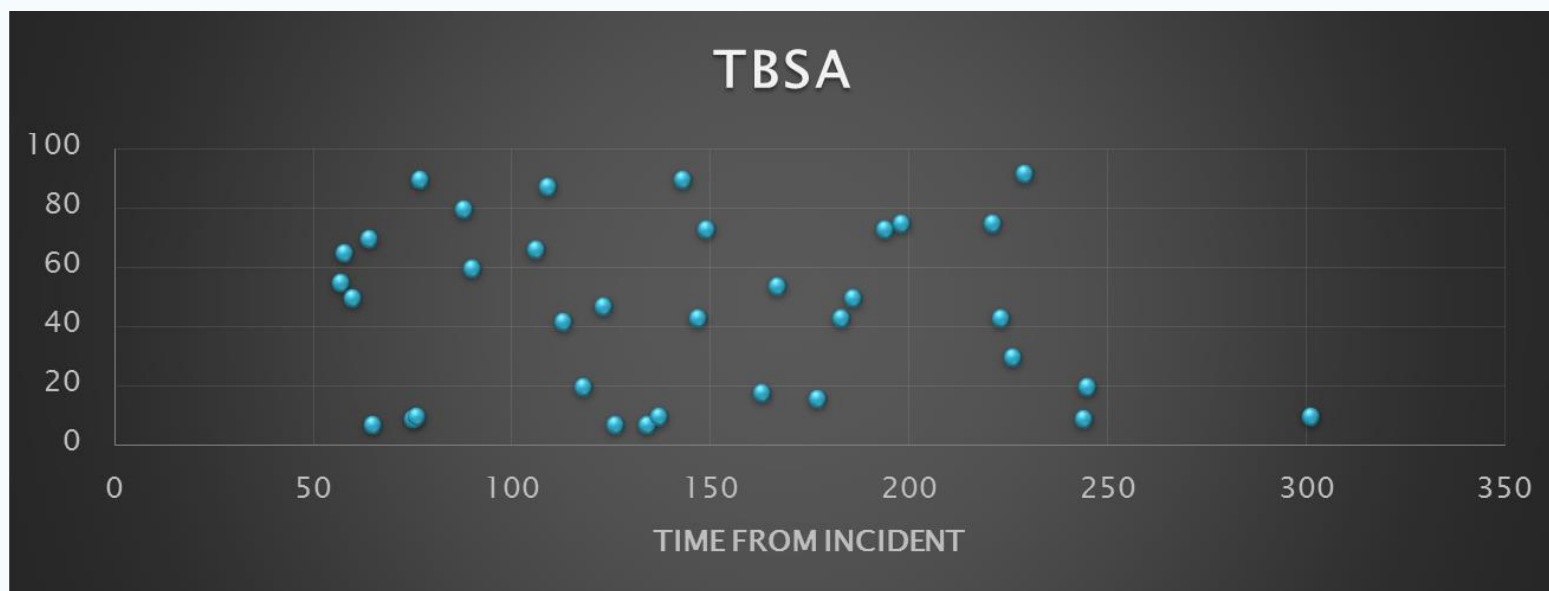
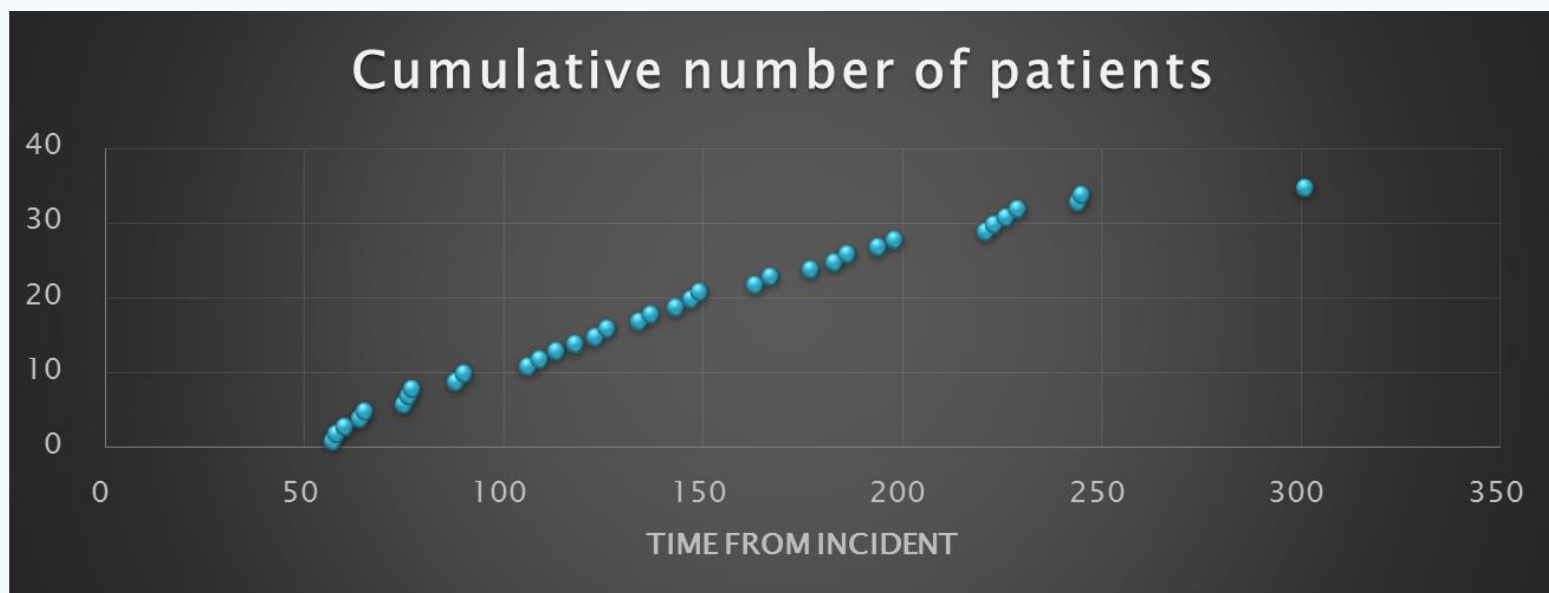
為八仙塵爆的  
哥哥姐姐們加油!  
你們真的很勇敢飛  
過每個關卡，  
在你們身邊有愛你  
的家人和朋友，  
所以請不要放棄  
任何希望唷!!

一群小朋友為你們祝福



感謝外理師救了  
了哥哥姐姐們沒救  
的話可能會死  
亡，多需要救  
人全，我多需要  
卡片，你們多  
陳小朋友  
宥平

# Outcomes





# Outcomes

## Patient characteristics

Male/female ratio	23 / 15
Mean age (range)	22.7±6.2 (13–38)
Mean TBSA (range)	45.8±29.4% (5–92%)
Inhalation injury	5
Hospital stay (day)	91.5±76.2 (9–276)
Ventilator time (day)	29.24±38.7 (3–155)

## Major complications of ICU patients (n = 24)

Acute kidney injury	3
ARDS	7 (VV ECOM x4)
Septic shock	1 (VA ECMO )
Brain Abscess, SAH	1
Bil. BK amputation	1

## Mortality

In hospital (n = 38 )	5.26% (2 / 38)
Intensive care (n = 24 )	8.33% (2 / 24)



# Outcomes



## Case

The 12 year-old patient, who was at first brought to another hospital, was the last and also the youngest patient admitted to our hospital. After 6 months of treatment he was finally discharged. Although he has to face a long-term rehabilitation and recovery in the future.





# Outcomes



## 2 years later

Some of the patients came back to our hospital 2 years after the explosion. Some of them still wearing elastic cloths for preventing scar formation and contraction. But they seem to have a whole new life from the recovery.



## Experience learned

- High Quality Patient Care of All Disciplines
- Coordination and Efficiency
- Full Support from Government and Hospital Administration

