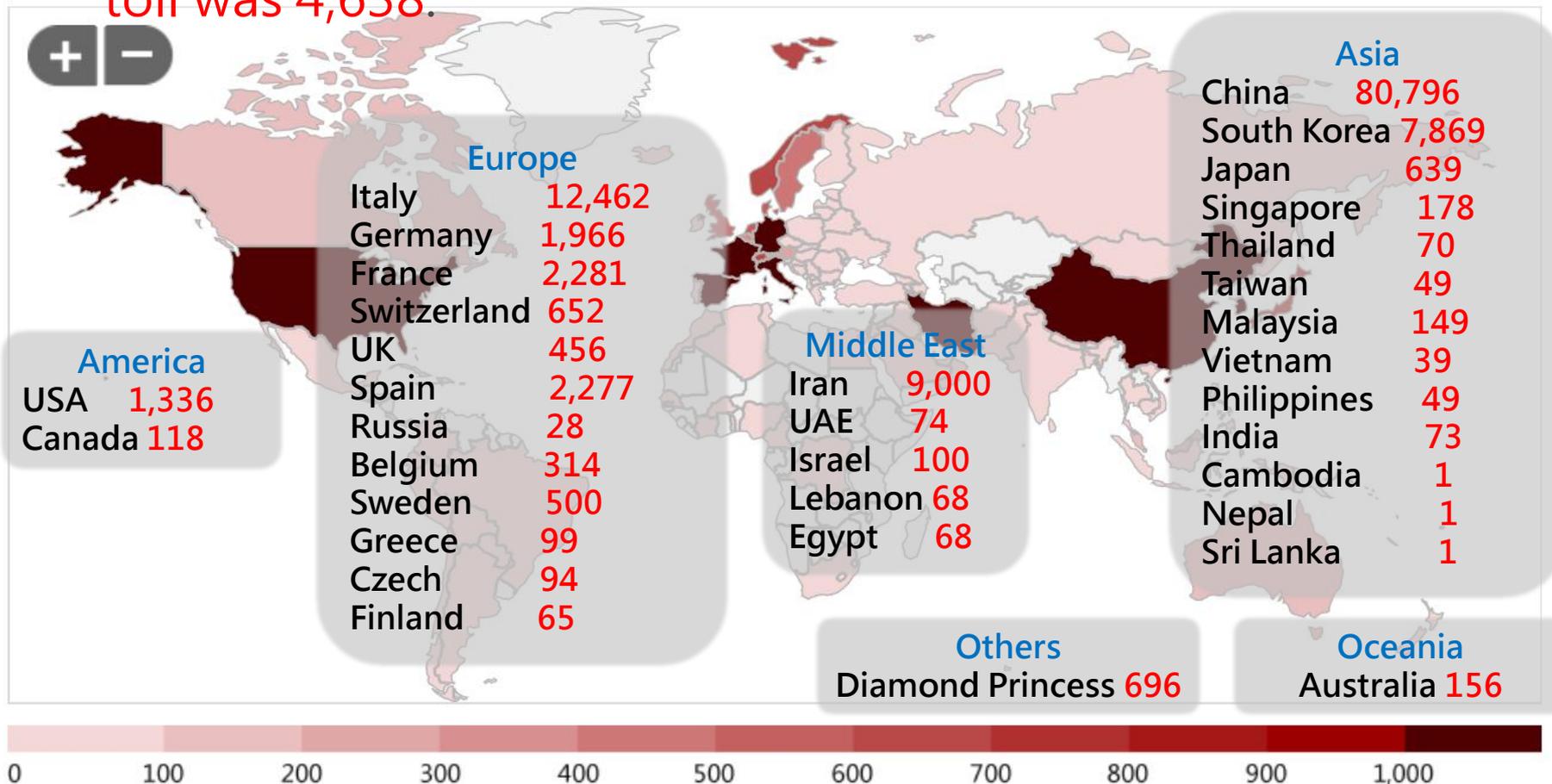


Hyper Light Guidance



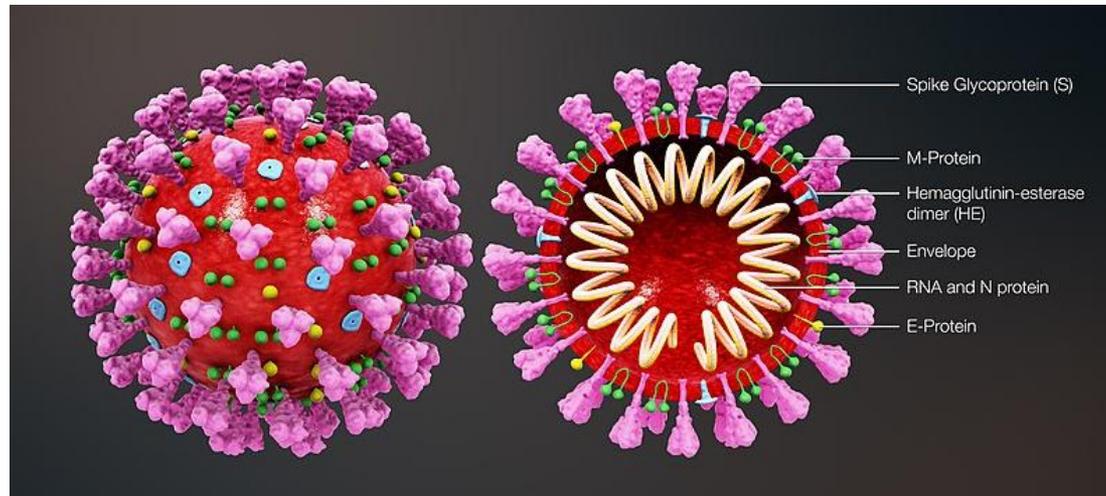
Coronavirus pneumonia outbreak (Covid-19)

- As of the morning of March 12th, the official count of confirmed cases in the world was 126,623, and the death toll was 4,638.



Covid-19 pathogen

- 2019 novel coronavirus (2019-nCoV)
 - Single-stranded **RNA virus**, with envelope [1]
 - Genetic sequences are similar to SARS-CoV(79.5%) [1]



[1] Zhou, Peng; Yang, Xing-Lou; Wang, Xian-Guang; Hu, Ben; Zhang, Lei; Zhang, Wei; Si, Hao-Rui (23 January 2020). "Discovery of a novel coronavirus associated with the recent pneumonia outbreak in humans and its potential bat origin". bioRxiv: 2020.01.22.914952.

Characteristic of 2019-nCoV

- **Human-to-human transmission**, the basic reproduction number(R_0) estimate to be 2.68 [1]
- The time from exposure to onset of symptoms is estimated at 2 to 24 days. [2][3]
- Transmission: **droplet contact, physical contact** [4] or **fecal-oral transmission** [5]



[1] Wu, Joseph T.; Leung, Kathy; Leung, Gabriel M. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. The Lancet. 2020-01-31 [2020-02-02].

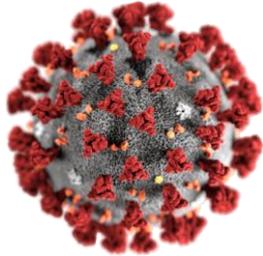
[2] Chaolin Huang; et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020: 1–10

[3] Guan, Wei-jie; et al. Clinical characteristics of 2019 novel coronavirus infection in China. medRxiv. 2020-02-09 [2020-02-10].

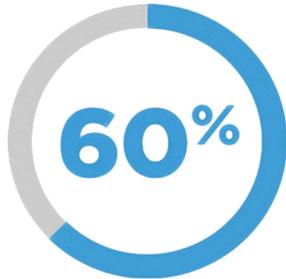
[4] 衛生福利部疾病管制署, “醫療機構因應嚴重特殊傳染性肺炎感染管制措施指引”, 2020/1/21

[5] Michelle L. Holshue, et al. First Case of 2019 Novel Coronavirus in the United States. New England Journal of Medicine. 2020-01-31 0(0)

Risk of standard cleaning process



- 2019-nCoV can persist on the surface for up to 9 days. [1]



- The average qualifying rate of standard environmental cleaning process is only 60%. [2]



- Additional disinfection process will improve the environmental hygiene and reduce the healthcare-associated infection. [3]

[1] Kampf G, Todt D, Pfaender S, Steinmann E, Persistence of coronaviruses on inanimate surfaces and its inactivation with biocidal agents, *Journal of Hospital Infection*, 2020-01-31 0(0)

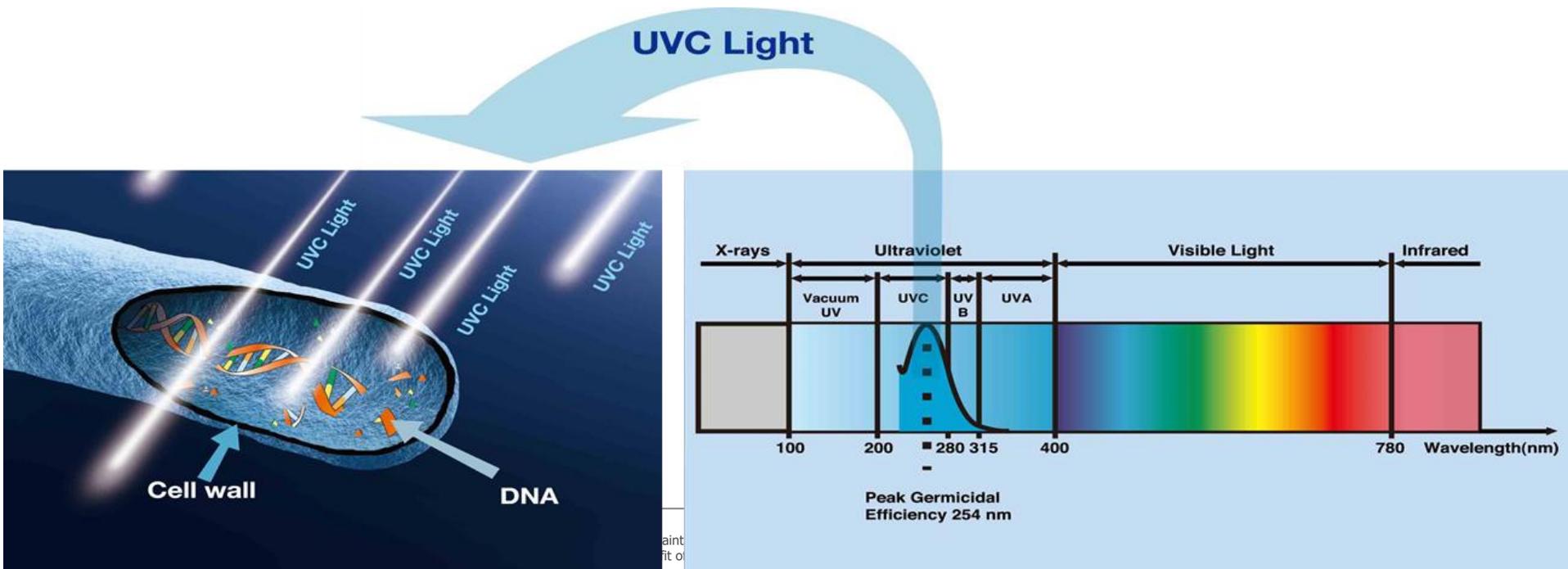
[2] Jefferson J., et al. "A novel technique for identifying opportunities to improve environmental hygiene in the operating room", *AORN J* 2011;93:358-364

[3] Deverick J Anderson . et al. Enhanced terminal room disinfection and acquisition and infection caused by multidrug-resistant organisms and *Clostridium difficile* (the *Benefits of Enhanced Terminal Room Disinfection* study): a cluster-randomised, multicentre, crossover study. *Lancet*. 2017 Feb 25;389(10071):805-814

Hyper Light Disinfection System

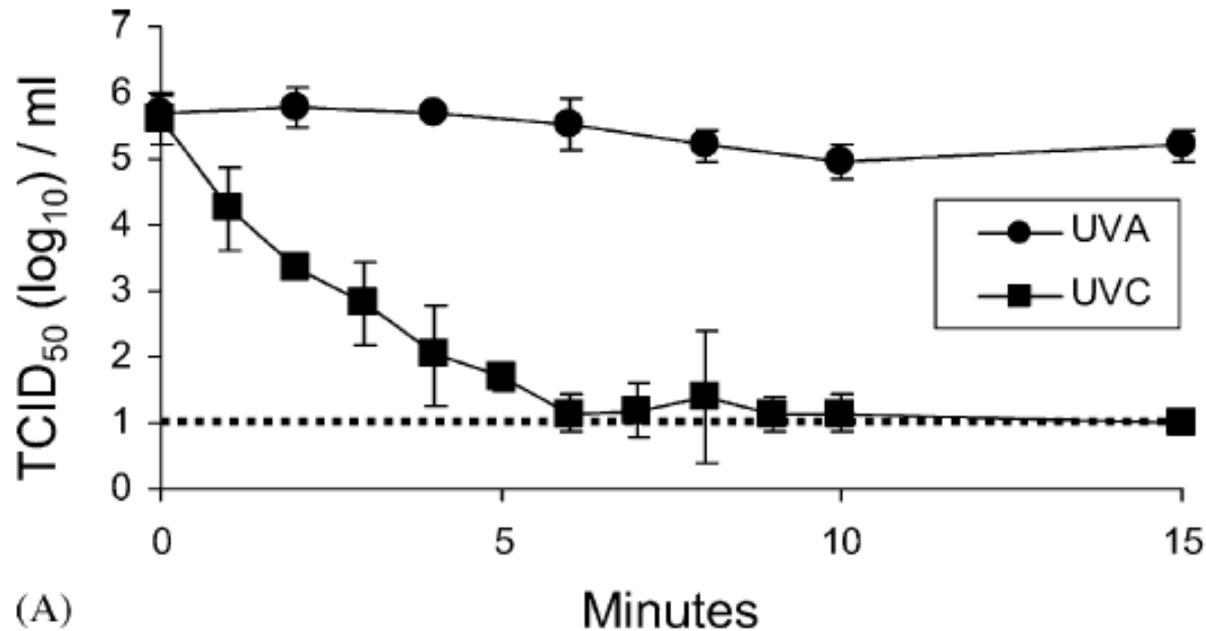


- UVC Germicidal Wavelength 254 nm
 - The most effective germicidal wavelength
 - Kill the pathogens by damaging the bonds between nucleotides and inhibiting DNA/RNA replication



UVC inactivate SARS-CoV

- UVC technology could inactivate SARS-CoV effectively. [1]

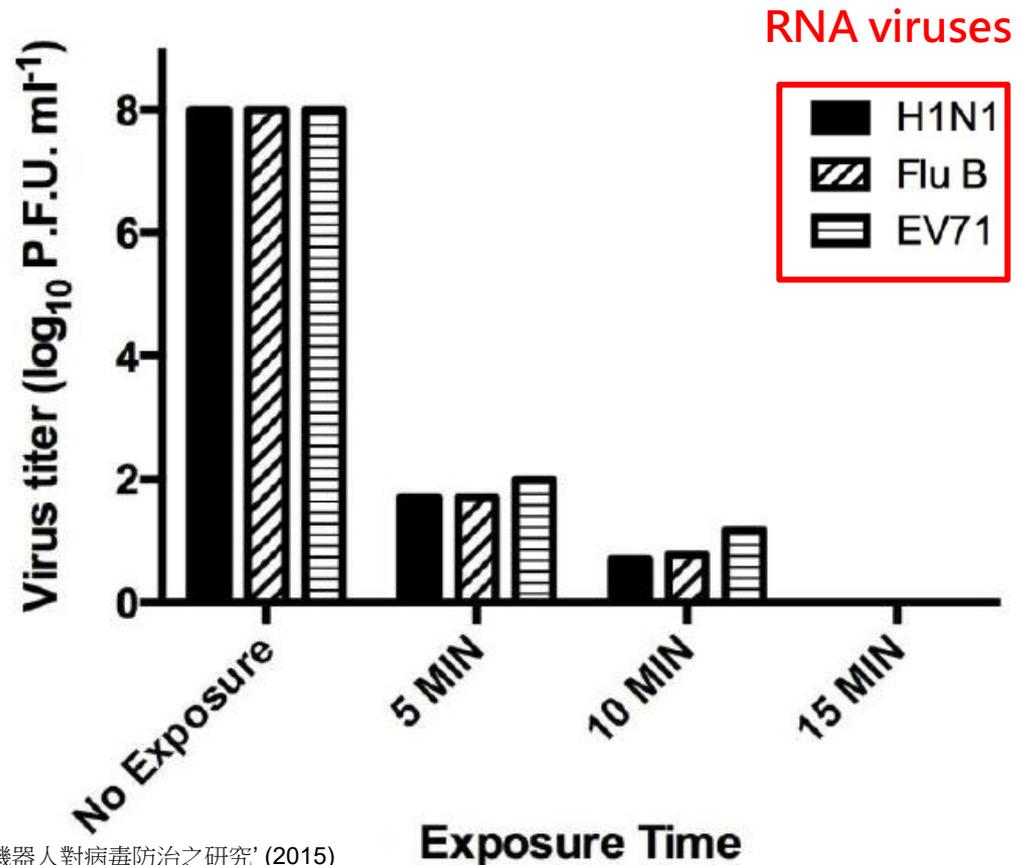


[1] M.E.R. Darnell et al. 'Inactivation of the coronavirus that induces severe acute respiratory syndrome, SARS-CoV' Journal of Virological Methods 121 (2004) 85–91

Hyper Light inactivate RNA viruses



- Hyper Light could inactivate more than 99.999% RNA viruses in 5 minutes.



[1] 長庚大學新興病毒感染研究中心, '254紫外線滅菌機器人對病毒防治之研究' (2015)

Hyper Light reduce the risk of pathogen transmission

- Hyper Light could eliminate the pathogens on the environmental high-touch surfaces effectively. [1]



Culture

表 4、紫消前後菌落量(cfu/cm²)分析結果比較

High touch surfaces	n	Before 紫消前		After 紫消後		p value
		Median	IQR	Median	IQR	
Bedrail 1.床欄	36	0.28	(0.1-1.2)	0	(0-0)	<0.001
Head board 2.床頭板	36	1.32	(0.3-4.6)	0	(0-0.1)	<0.001
Foot board 3.床尾板	36	0.64	(0.2-2.6)	0	(0-0.1)	<0.001
Call bell 4.叫人鈴	36	0.08	(0-0.3)	0	(0-0)	<0.001
Bedside table 5.床旁桌	36	1.08	(0.4-4.1)	0	(0-0.2)	<0.001
Monitor 6.監視器	36	2.28	(0.2-7.2)	0	(0-0)	<0.001
Switch 7.抽痰器開關	36	1.08	(0.2-4.7)	0	(0-0.1)	<0.001
O ₂ flow meter 8.氧氣流量表	36	0.28	(0.1-1.1)	0	(0-0)	<0.001
IV pump 9.幫浦	32	1.6	(0.2-3.7)	0	(0-0)	<0.001
IV pole 10.點滴架	36	0.24	(0.1-0.8)	0	(0-0)	<0.001

Wilcoxon Signed Ranks test.

[1] 臺中榮民總醫院, '評估紫消燈UVC 裝置應用於環境終期消毒之成效' (2018)

Hyper Light reduce the risk of pathogen transmission



- Hyper Light could **reduce the pathogens in the air.** [1]



Bacteria counts in the air

表 7、紫消前、紫消後空氣菌落量及菌種種類數目結果比較

	n	Before 紫消前		After 紫消後		p value
		Median	IQR	Median	IQR	
Bacteria counts 菌落量 (cfu/cm ²)	36	12.5	(10-17.5)	8.5	(5-11.8)	<0.001
Bacteria species 菌種數目	36	3	(3-4)	3	(2-4)	0.039

Wilcoxon Signed Ranks test.

[1] 臺中榮民總醫院, '評估紫消燈UVC 裝置應用於環境終期消毒之成效' (2018)

High Risk Environment of Covid-19



Fever clinics



Examination rooms



Emergency rooms



X ray rooms



Isolation wards/ICU



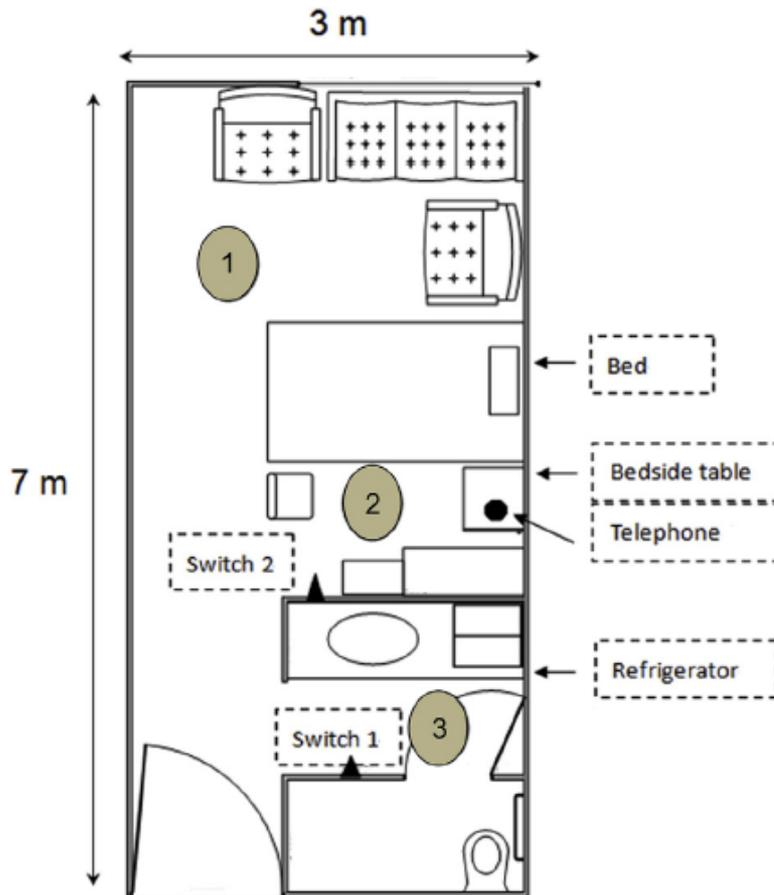
General wards



Hyper Light Guidance in healthcare facilities for coronavirus infection control



■ Operation instruction:



3 locations, 5 mins/location

Total 15 mins

(Disinfect high-touch surfaces/highly-contaminated area)

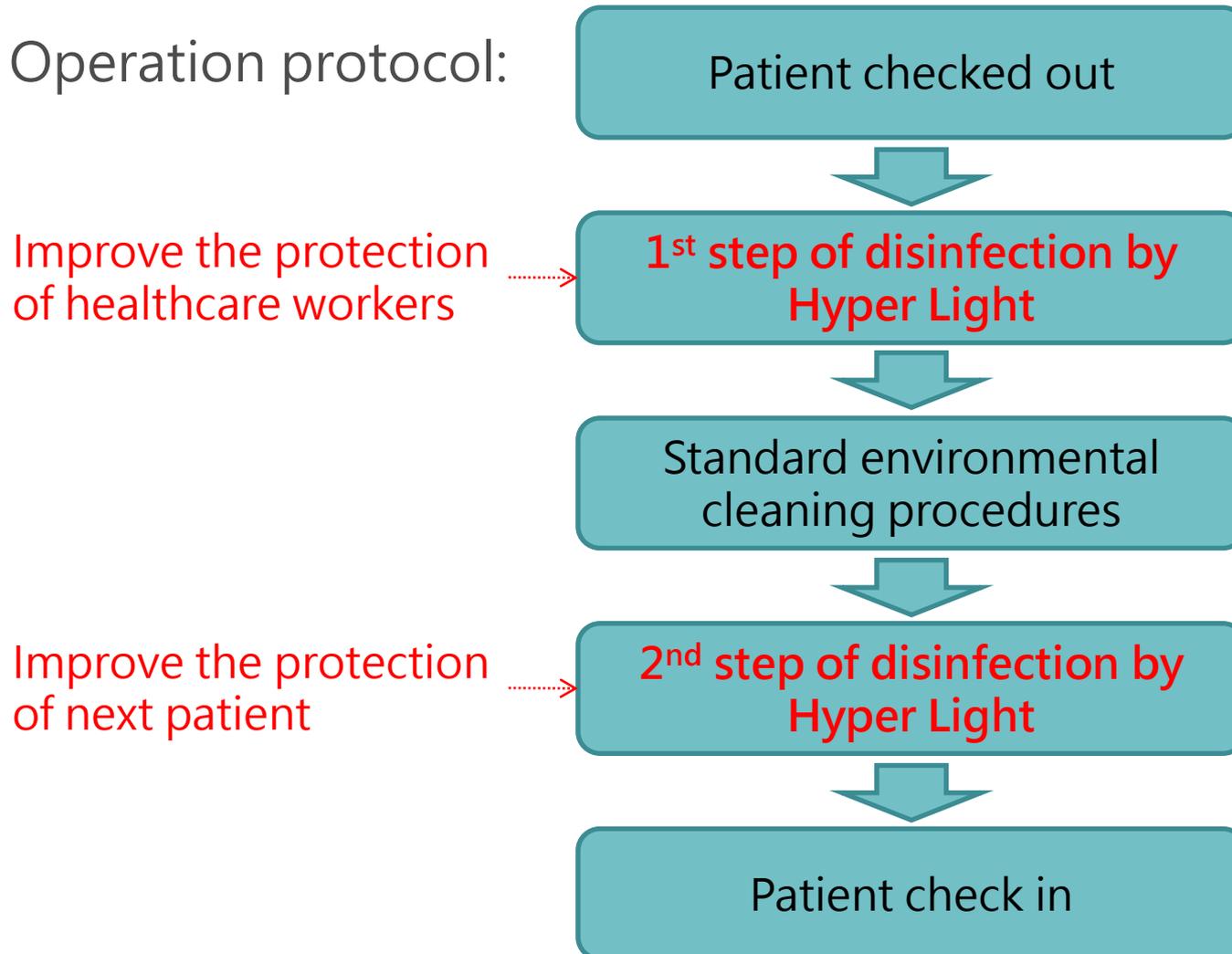
1. Left side of bed
2. Right side of bed
3. In front of bathroom

Reduce the risk of pathogen transmission

Hyper Light Guidance in healthcare facilities for coronavirus infection control

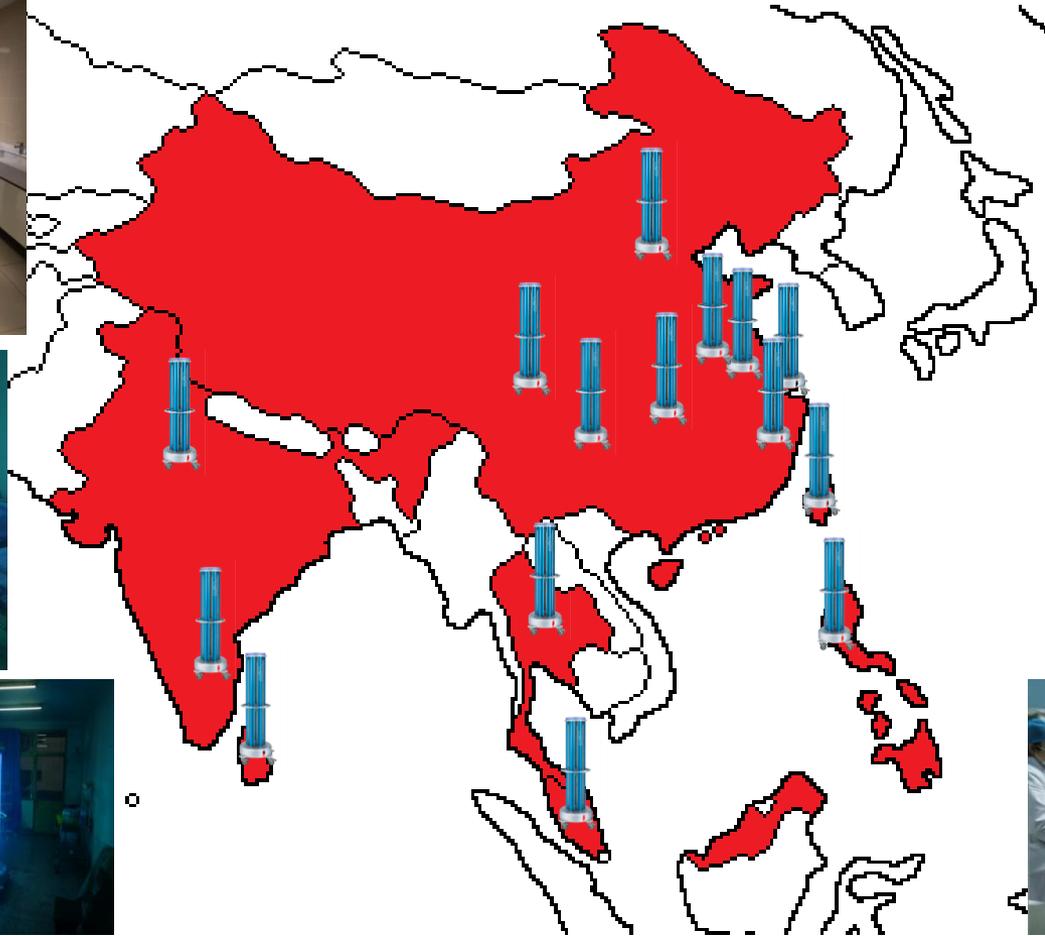
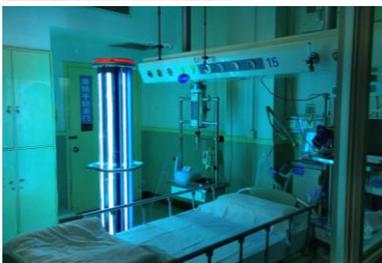


■ Operation protocol:



Against Wuhan coronavirus

- Hyper Light have been introduced to infected areas.



Thank you for your attention!



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