



FOCUS ON THE HEALTH OF FRONTLINE STAFF

APPLICATION NOTE RFT-029 (US)

During a pandemic or health emergency, the safety and health of frontline healthcare workers is paramount in responding, containing, and protecting the community.

The next pandemic is a matter of when, not if. Are we prepared?

Within 11 weeks of the first SARS (2003) case in Hong Kong it had spread to 27 countries. World Health Organization (WHO) issued an alert in Hong Kong SAR, Vietnam and Guangdong China. Due to its highly infectious nature, the disease resulted in over 8,000 cases and 774 deaths in 30 countries including Taiwan, Singapore, Vietnam, Hong Kong and China. Both Severe Acute Respiratory Syndrome (SARS) and Middle Eastern Respiratory Syndrome (MERS) (2015) outbreaks experienced respirator supply shortages and triggered a clear mandate for hospitals worldwide to prioritize improvement of respiratory equipment and Personal Protective Equipment (PPE) procedures for healthcare.

However, a 2016 UN report¹ found that the world remains ill-prepared to address the threats from pandemics and urges action before the next one. Developed countries are more prepared, having implemented stringent infection controls for respiratory protection against aerosol transmissible diseases and having better equipped healthcare workers. But even, they face issues such as inadequately trained personnel and limited respirator stockpiles. Developing countries are much less prepared—healthcare procedures, equipment, infrastructures and systems not adequate to serve rapidly growing and urbanizing populations.

The next pandemic may be a global health crisis – The UN report estimates that a virulent airborne influenza virus strain can spread to all major global capitals in 60 days, killing more than 33 million people in 250 days. **Asia may face the worst impacts from the next pandemic.**

1. **Asia faces the most acute healthcare worker shortages²**—Per the World Health Organization: Doctor (and nurse) to patient ratios are much lower than international standards. *By 2030, SE Asia is projected to be in need of 4.7M more healthcare workers to achieve effective coverage, while the Western Pacific zone (China, S. Korea, Japan) are projected to need approximately 1.4M more healthcare workers.*

¹http://www.un.org/News/dh/infocus/HLP/2016-02-05_Final_Report_Global_Response_to_Health_Crises.pdf

²<https://apps.who.int/iris/bitstream/handle/10665/250368/9789241511131-eng.pdf;jsessionid=977B20E6CFA3027AC97441DE1F9956DE?sequence=1>



Table 1. Estimates of health worker needs-based shortages (in millions) in countries below the Sustainable Development Goals (SDG) index threshold by region, 2013 and 2030

Region	2013				2030				
	Physicians	Nurses/ Midwives	Other cadres	Total	Physicians	Nurses/ Midwives	Other cadres	Total	% Change
Africa	0.9	1.8	1.5	4.2	1.1	2.8	2.2	6.1	45%
Americas	0.0	0.5	0.2	0.8	0.1	0.5	0.1	0.6	-17%
Eastern Mediterranean	0.2	0.9	0.6	1.7	0.2	1.2	0.3	1.7	-1%
Europe	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	-33%
South-East Asia	1.3	3.2	2.5	6.9	1.0	1.9	1.9	4.7	-32%
Western Pacific	0.1	2.6	1.1	3.7	0.0	1.2	0.1	1.4	-64%
Grand Total	2.6	9.0	5.9	17.4	2.3	7.6	4.6	14.5	-17%

*Since all values are rounded to the nearest 100,000, totals may not precisely add up.

Source: Global strategy on human resources for health: Workforce 2030, World Health Organization.

2. **Asia will face most severe economic consequences**—Asian Development Bank³ states that a pandemic similar to H₁N₁/SARS/avian influenza will reduce global trade of goods/services by 14% and cut Asia's growth rate to zero.

Table 2. Two Quarters of Strong Demand Contraction Only in Asia

Economy	Estimated Reduction in Annual Gross Domestic Product (GDP) Growth, 2006 (percentage point)		Estimated Reduction in Annual Gross Domestic Product (GDP) Levels, 2006 (US\$ billion)	
	Demand Shock ^a	Supply Shock ^b	Demand Shock	Supply Shock
East Asia				
PRC	1.3	0.4	21.4	6.6
Hong Kong, China	9.2	0.2	18.3	0.4
Republic of Korea	1.5	0.3	9.1	1.8
South Asia				
India	1.5	0.3	9.3	1.9
Southeast Asia and Mekong				
Indonesia	0.5	0.2	1.0	0.4
Malaysia	7.1	0.2	7.9	0.2
Philippines	1.0	0.3	0.9	0.3
Singapore	10.4	0.4	11.1	0.4
Thailand	6.3	0.3	9.8	0.5
Total^c	2.3	0.3	99.2	14.2

^a Reduction in consumption, trade in services, and investment.

^b Reduction in the labor due to incapacity and mortality.

^c East and South Asia, excluding Japan.

Sources: Staff estimates, ADB (2005), and Oxford Economic Forecasting (financed by 6194-REG).

3. **Asia will be impacted the earliest** (likely be first point of impact)—most new influenza virus strains are likely to emerge first in China and SE Asia.
4. Even non-pandemic communicable diseases (TB, malaria) pose higher disease control/prevention challenges due to high cross-border travel in Asia.

To address its unique challenges, the countries of Asia should implement strong infection control measures and respiratory protections for frontline healthcare workers.

³<https://www.adb.org/sites/default/files/publication/28082/pb042.pdf>

According to WHO and industry experts, control measures and infection prevention are critical to reduce risk of virus spread from infected patients to visitors, patients, or healthcare workers⁴. *This is most crucial in Asia to ensure its limited number of skilled healthcare frontline staff stay protected during an emergency.*

Patients (and biological samples from those patients) should be managed as being a potential source of aerosol transmissible disease.

During SARS and MERS, virus transmission from patients to health-care providers and between patients occurred in health-care facilities in several countries.⁴ Of the 238 probable SARS cases in Singapore, 41% were reported among healthcare workers.⁵

Table 3. Probable SARS cases by nature of contact and gender

Nature of Contact	Male	Female	Total	
			No.	%
Index Case	1	7	8	3
Healthcare Worker	13	84	97	41
Family	23	31	54	23
Friend/Social	20	28	48	20
Inpatient	20	11	31	13
Total	77	161	238	100

Source: Communicable Diseases Surveillance in Singapore 2003, Ministry of Health.

1. Hence, infection control teams are encouraged to examine their PPE procedures and evaluate if the respiratory protection devices and programs are fully capable of protecting healthcare workers and manage public health crises.
2. Valuable frontline healthcare staff should be trained and educated in infection control, prevention and respiratory protection, and should constantly refresh these skills.

Respiratory Protection for Healthcare Workers

Providing even the highest quality N95 respirators to healthcare workers and enforcing their use is only the first step. The efficiency of a respirator's filter material alone does not reduce dangers posed by airborne hazards. **The other necessary step is to reduce exposure by ensuring that respirators fit.** If a respirator does not seal properly to a person's face, the airborne hazards can leak underneath the face piece seal and into healthcare worker's breathing zone. Respiratory protective equipment must form a seal to the user's face to provide protection. Small leaks allow harmful materials into the mask that the user will breathe. **The only way to know if respiratory protective equipment fits is to conduct a fit test.** Fit Testing is an activity that evaluates how well the respirator face piece seals to the user's face.

⁴[https://www.who.int/news-room/fact-sheets/detail/middle-east-respiratory-syndrome-coronavirus-\(mers-cov\)](https://www.who.int/news-room/fact-sheets/detail/middle-east-respiratory-syndrome-coronavirus-(mers-cov))

⁵https://www.moh.gov.sg/docs/librariesprovider5/resources-statistics/reports/special_feature_sars.pdf

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The TSI PortaCount® Respirator Fit Tester is the world's leading quantitative fit tester and features intelligent touchscreen solutions, providing assistance across your entire respiratory protection program from training through compliance. Choose the industry's most trusted fit tester to increase your staff's safety, while new software and features improve your program's efficiency and productivity.

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MODEL 8048



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TSI Incorporated – Visit our website www.tsi.com for more information.

USA Tel: +1 800 680 1220
UK Tel: +44 149 4 459200
France Tel: +33 1 41 19 21 99
Germany Tel: +49 241 523030

India Tel: +91 80 67877200
China Tel: +86 10 8219 7688
Singapore Tel: +65 6595 6388