Post-pandemic Life: Vigilance Against Future Risks

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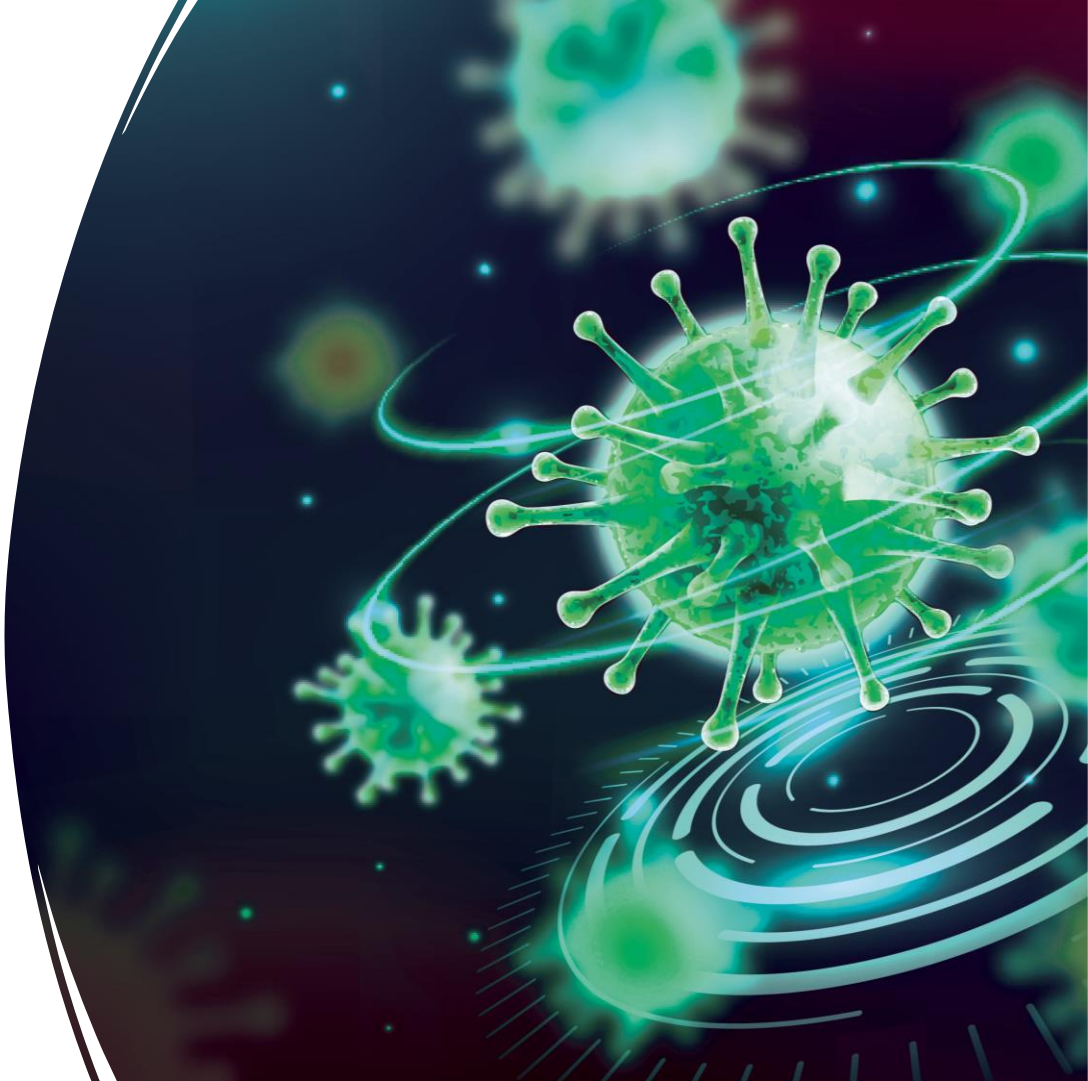

Post-Pandemic

- Social Norm back to normal
- Mask-enforcement lifted
- Direct contact increases
- Increased cross-border travel

Global Health Issues. What's next?

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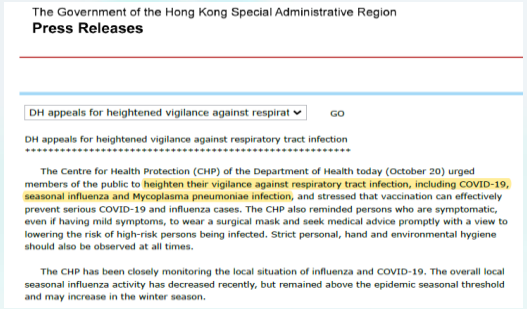
- Antimicrobial resistance **(AMR)**
- Weakened Immune System
- Mutation
- Adenovirus, Flu A
- **Hot off the press**:
  Mini outbreak of Child Pneumonia cases in northern China
- Pandemic is **not really over**

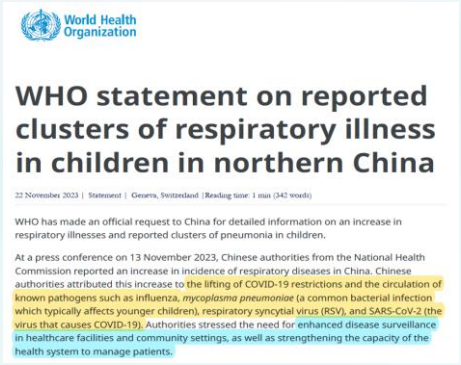

The Government of the Hong Kong Special Administrative Region
Press Releases

DH appeals for heightened vigilance against respirat ▾ GO

DH appeals for heightened vigilance against respiratory tract infection

The Centre for Health Protection (CHP) of the Department of Health today (October 20) urged members of the public to heighten their vigilance against respiratory tract infection, including COVID-19, seasonal influenza and Mycoplasma pneumoniae infection, and stressed that vaccination can effectively prevent serious COVID-19 and influenza cases. The CHP also reminded persons who are symptomatic, even if having mild symptoms, to wear a surgical mask and seek medical advice promptly with a view to lowering the risk of high-risk persons being infected. Strict personal, hand and environmental hygiene should also be observed at all times.

The CHP has been closely monitoring the local situation of influenza and COVID-19. The overall local seasonal influenza activity has decreased recently, but remained above the epidemic seasonal threshold and may increase in the winter season.


World Health Organization

WHO statement on reported clusters of respiratory illness in children in northern China

22 November 2023 | Statement | Geneva, Switzerland | Reading time: 1 min (342 words)

WHO has made an official request to China for detailed information on an increase in respiratory illnesses and reported clusters of pneumonia in children.

At a press conference on 13 November 2023, Chinese authorities from the National Health Commission reported an increase in incidence of respiratory diseases in China. Chinese authorities attributed this increase to the lifting of COVID-19 restrictions and the circulation of known pathogens such as influenza, *mycoplasma pneumoniae* (a common bacterial infection which typically affects younger children), respiratory syncytial virus (RSV), and SARS-CoV-2 (the virus that causes COVID-19). Authorities stressed the need for enhanced disease surveillance in healthcare facilities and community settings, as well as strengthening the capacity of the health system to manage patients.

Medical Alone Is Not Enough

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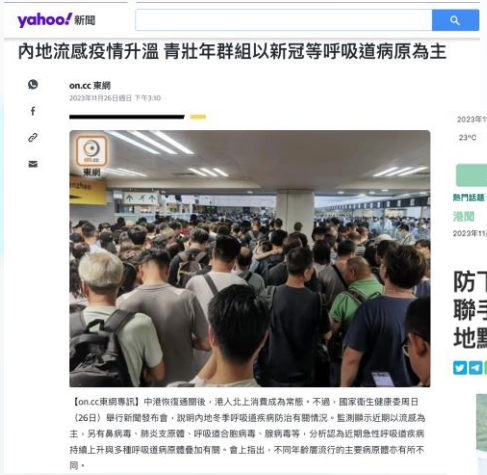
- Importance of non-clinical application
- Prevention + Detection
- Cross-species transmission – poultry farming + Environmental (e.g. swine)



Reference: Mingpao.com.防下次疫情 袁國勇促續監察篩查 各地聯手尋「潛力病源」 街市入境等高危地點把關. https://shorturl.at/beuD6. Accessed on 24 Nov 2023

Importance of Target Identification

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- Immune Disorders

- Children

- Co-infection

Relieve anxiety

- COVID **NOT** the major pathogens, shifting time to time

The Decentralisation Trend

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- Data Sharing
- Decentralisation
- Shift from pandemic to endemic


CENTRALISATION AND DECENTRALISATION IN A CRISIS:
HOW CREDIT AND BLAME SHAPE GOVERNANCE

By Scott L. Greer, Michelle Falkenbach, Holly Jarman, Olga Löblová, Sarah Rozenblum, Noah Williams and Matthias Wismar

https://iris.who.int/bitstream/handle/10665/344946/Eurohealth-27-1-36-40-eng.pdf?sequence=1


WORLD ECONOMIC FORUM

COVID-19

COVID-19 will likely shift from pandemic to endemic — but what does that mean?

https://www.weforum.org/agenda/2021/09/covid-pandemic-epidemic-disease-coronavirus/


Empowering clinical research in a decentralized world

Walter De Brouwer, Chirag J. Patel, Arjun K. Manrai, Isaac R. Rodriguez-Chavez & Nirav R. Shah

npj Digital Medicine 4, Article number: 102 (2021) | Cite this article

10k Accesses | 20 Citations | 41 Altmetric | Metrics

The COVID-19 pandemic has been a catalyst for the implementation of decentralized clinical trials (DCTs) enabled by digital health technologies (DHTs) in the field while curtailing in-person interactions and putting significant demands on health care resources. DHTs offer improvements in real-time data acquisition remotely while maintaining privacy and security. Here, we describe the implications of technologies, including edge computing, zero-trust environments, and federated computing in DCTs enabled by DHTs. Taken together, these technologies—in the setting of policy and regulation that enable their use while protecting the users—extend the scope and accelerate the pace of clinical research.

https://www.nature.com/articles/s41746-021-00473-w


Post COVID-19 condition: WHO supports standardization of clinical data collection and reporting

12 August 2021 | Departmental news | Reading time: Less than a minute (97 words)

The World Health Organization is working with researchers to address the urgent need to streamline data collection and reporting on Post COVID-19 condition, also known as 'long COVID'.

A significant portion of people diagnosed with COVID-19 experience lingering symptoms including fatigue, breathlessness and neurological complications. The project, Post-COVID Condition Core Outcomes, will survey these patients to establish what core patient outcomes need to be measured to understand the condition. Later, the project will focus on how to measure these outcomes.

See the full announcement: Researchers start new investigation into Long | EurekAlert!

About the project: https://www.pc-cos.org/

https://www.who.int/news/item/12-08-2021-post-covid-19-condition-who-supports-standardization-of-clinical-data-collection-and-reporting


國家衛生健康委新聞發言人米鋒表示，當局持續開展呼吸道疾病監測和形勢研判，推進流感疫苗接種，定期調度各地醫療資源供給和診療工作情況，有針對性地加強工作指導，組織經驗交流和技術培訓。會上提醒民眾堅持戴口罩、多通風、勤洗手的衛生習慣，倡導「一老一小」等重點人群積極接種相關疫苗，並建議病童首選到基層醫療衛生機構或綜合醫院兒科就診。

https://hk.news.yahoo.com/%E5%85%A7%E5%9C%B0%E6%B5%81%E6%84%9F%E7%96%AB%E6%83%85%E5%8D%87%E6%BA%AB-%E5%91%BC%E5%90%B8%E9%81%93%E7%97%85%E5%8E%9F%E9%AB%94%E7%96%8A%E5%8A%A0%E5%80%8B%E6%A1%88%E6%80%A5%E5%A2%9E-071013012.html

Vigilance Looks Like... (A Simplistic View)

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Database Deadlock

Cyber Security

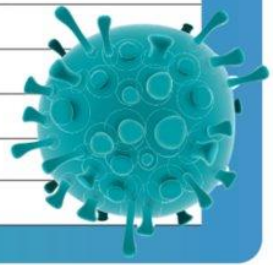
Avalon Automated Multiplex System AAMST

EMERGING VIRAL
Diagnostics

Customizable reagent cartridge for simultaneous detection of **Viruses**, **Bacteria** & **Fungi**

40+ PATHOGENS OF RESPIRATORY DISEASES

11 Bacteria	28 Viruses			3 Fungi
Mycobacterium tuberculosis	Influenza A (Matrix)	Parainfluenza 1	Adenovirus	*Cryptococcus neoformans/gattii*
Mycoplasma pneumoniae	Influenza A (pdm09 H1)	Parainfluenza 2	Bocavirus	*Pneumocystis jirovecii*
Legionella pneumophila	Influenza A (H2)	Parainfluenza 3	Human Metapneumovirus	
Bordetella pertussis	Influenza A (H3)	Parainfluenza 4	Respiratory syncytial virus	
Chlamydophila psittaci	Influenza A (H5)	Coronavirus 229E	Human Enterovirus/ Rhinovirus	
Burkholderia pseudomallei	Influenza A (H6)	Coronavirus NL63	Parechovirus	
Coxiella burnetii	Influenza A (H7)	Coronavirus HKU1		
Chlamydophila pneumoniae	Influenza A (H9)	Coronavirus OC43		
Staphylococcus aureus	Influenza A (H10)	MERS-CoV		
Streptococcus pneumoniae	Influenza B	SARS-CoV-2		
Streptococcus pyogenes	Influenza C			



Customizable Panels Available

All-in-One Diagnostic System

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1 Input Sample

Input Sample into Sample Apparatus (SA) & plug in to the Sample Slot of the Cartridge

2 Insert Cartridge

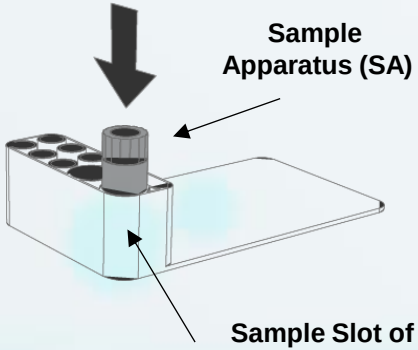
Insert the the Cartridge to the Diagnostic Device

3 Press Start

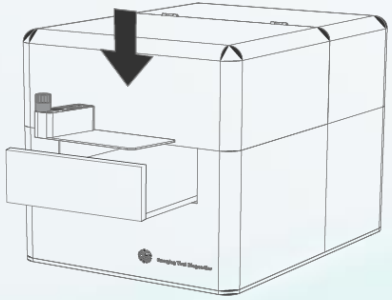
Press “Start” to kickstart the operation

4 Result

Report generation (on screen and in printable versions)



Microfluidic Cartridge



All-in-One POC (Point-Of-Care) Diagnostic Device

Control PC & Software

Report Issuance

IEEE Publication

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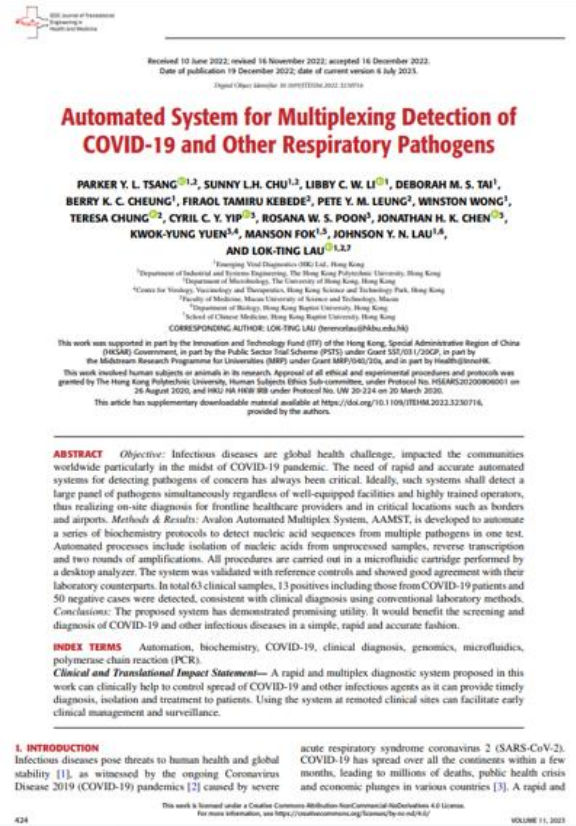

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Automated System for Multiplexing Detection of COVID-19 and Other Respiratory Pathogens

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This work involved human subjects or animals in its research. Approval of all ethical and experimental procedures and protocols was granted by The Hong Kong Polytechnic University, Human Subjects Ethics Sub-committee, under Protocol No. HSEARS20200806001 on 26 August 2020, and HKU HA HKW IRB under Protocol No. UW 20-224 on 20 March 2020.

This article has supplementary downloadable material available at https://doi.org/10.1109/ITEHM.2022.3230716, provided by the authors.

ABSTRACT *Objective:* Infectious diseases are global health challenge, impacted the communities worldwide particularly in the midst of COVID-19 pandemic. The need of rapid and accurate automated systems for detecting pathogens of concern has always been critical. Ideally, such systems shall detect a large panel of pathogens simultaneously regardless of well-equipped facilities and highly trained operators, thus realizing on-site diagnosis for frontline healthcare providers and in critical locations such as borders and airports. *Methods & Results:* Avalon Automated Multiplex System, AAMST, is developed to automate a series of biochemistry protocols to detect nucleic acid sequences from multiple pathogens in one test. Automated processes include isolation of nucleic acids from unprocessed samples, reverse transcription and two rounds of amplifications. All procedures are carried out in a microfluidic cartridge performed by a desktop analyzer. The system was validated with reference controls and showed good agreement with their laboratory counterparts. In total 63 clinical samples, 13 positives including those from COVID-19 patients and 50 negative cases were detected, consistent with clinical diagnosis using conventional laboratory methods. *Conclusions:* The proposed system has demonstrated promising utility. It would benefit the screening and diagnosis of COVID-19 and other infectious diseases in a simple, rapid and accurate fashion.

INDEX TERMS Automation, biochemistry, COVID-19, clinical diagnosis, genomics, microfluidics, polymerase chain reaction (PCR).

Clinical and Translational Impact Statement— A rapid and multiplex diagnostic system proposed in this work can clinically help to control spread of COVID-19 and other infectious agents as it can provide timely diagnosis, isolation and treatment to patients. Using the system at remoted clinical sites can facilitate early clinical management and surveillance.

I. INTRODUCTION

Infectious diseases pose threats to human health and global stability [1], as witnessed by the ongoing Coronavirus Disease 2019 (COVID-19) pandemics [2] caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). COVID-19 has spread over all the continents within a few months, leading to millions of deaths, public health crisis and economic plunges in various countries [3]. A rapid and

Detection results from clinical samples including those infected by SARS-CoV-2 and several other important respiratory pathogens have also **fully agreed with gold standard testing methods.**

The current feasibility study demonstrated the clinical usefulness of AAMST and it **can potentially be deployed in many applications** that require multiplexed nucleic acid detection in both research and clinical settings.

Parker Y.L.Tsang et al. Automated system for multiplexing detection of COVID 19 and other respiratory pathogens.

Safe to use in laboratory; safety standard

Accreditations

- ISO 13485:2016 certified for Device and Cartridge production (Medical Devices - Quality Management Systems)

bsi.

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 13485:2016

This is to certify that: Emerging Viral Diagnostics (HK) Limited.
Flat/RM 08-10, 17/F
Prosperity Center
25 Chong Yip Street
Kwun Tong
Hong Kong

Holds Certificate No: MD 763027

and operates a Quality Management System which complies with the requirements of ISO 13485:2016 for the following scope:

Design, development, manufacture and distribution of automated multiplex analysers and molecular in vitro diagnostic cartridges for the detection of multiple pathogens.

For and on behalf of BSI:

Graeme Tunbridge, Senior Vice President Medical Devices

Original Registration Date: 2022-06-09
Latest Revision Date: 2022-02-28
Effective Date: 2022-06-09
Expiry Date: 2025-06-08

Page: 1 of 2

...making excellence a habit.

Certificate No: MD 763027

Location	Registered Activities
Emerging Viral Diagnostics (HK) Limited. Flat/RM 08-10, 17/F Prosperity Center 25 Chong Yip Street Kwun Tong Hong Kong	Design, development, manufacture and distribution of automated multiplex analysers for use with molecular in vitro diagnostic cartridges for the detection of multiple pathogens.
Emerging Viral Diagnostics (HK) Ltd. Unit 203 2/F MAMS Centre 1 Dai Wang Street Tai Po, INDS, Estate Tai Po, N.T. Hong Kong	Design, development, manufacture, and distribution of molecular in vitro diagnostic cartridges for the detection of multiple pathogens.

Original Registration Date: 2022-06-09
Latest Revision Date: 2022-02-28
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Page: 2 of 2

A software guy in a stormy time

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- **Lead the design & development of AAMST software**
- **Software Design**
  - Panel Centric
  - Fast adaptation
- **Clinical Laboratory Workflow Oriented**
  - No-Nonsense approach
  - Minimising Human Guess Works
- **Data Structure**
  - Collection
  - Management

Surveillance

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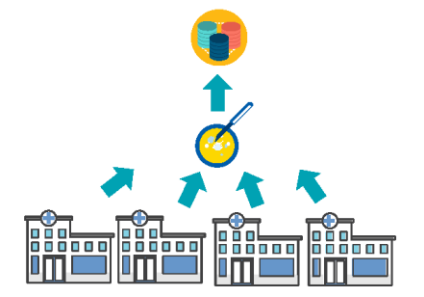
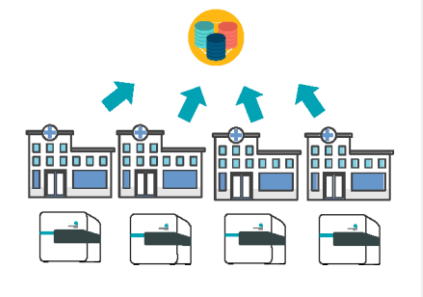
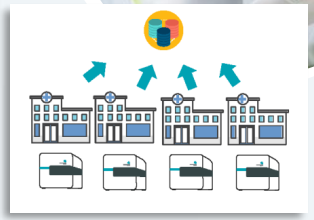
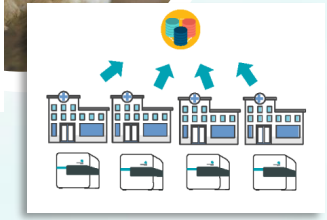
	Traditional	New Norm Enabler
		
Data Collection	Centralised	Decentralised
Information Generation	Centralised	Centralised
Target throughput	Low	High
Rounds of Single Target Test for Identification	Potentially Multiple	Single
Time	Time consuming	Rapid Identification

Potential Collaborations with Clinical & Non-Clinical Industry Partners in good progress

Food Safety

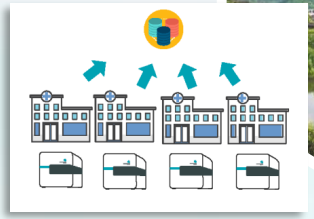


Poultry/ Faming

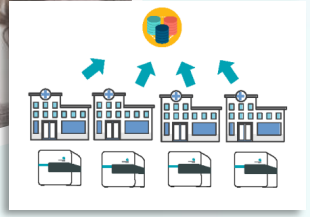


VIRAL gnostics

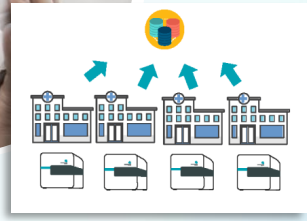
Environmental



Cancer



Respiratory



Key Takeaways

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- Vigilance
- Teamwork
- Supports
- Thanks
- Design group
- Collaboration on new ideas

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Thank you