

IIHMR UNIVERSITY

SUMMER TRAINING PROJECT

REPORT

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A REVIEW OF SUPPLY SHORTAGE STRATEGIES IN HOSPITALS IN INDIA DURING COVID-19 PANDEMIC



INTRODUCTION

You have to keep on changing your strategies in order to sustain, as people, circumstances, situations and conditions are continually changing.

Fighting with this pandemic is our first priority, but we need to overcome this instability in health care supplies, that will definitely come out, as supplies are exhausted and manufacturers grapple to meet intense demand.

This article will give insights to understand the effective supply chain strategy to culminate the world threat COVID-19 in India.



OBJECTIVE

The primary objective :

To explore the supply shortage strategies followed by hospitals to combat the COVID 19 pandemic in India.

The secondary objectives are:

- ✓ To understand the existing demand of PPE, vaccines, oxygen, drugs and diagnostics arise due to COVID 19 pandemic.
- ✓ To explore the strategies used for the management of supply shortages and demands of PPE, vaccines, oxygen, drugs and diagnostics.
- ✓ To recommend the supply shortage strategies if the condition prevails.



METHODOLOGY

Descriptive study design

Data collection _

News Articles, Reports, Websites

Government guidelines, Research papers

TYPE OF ARTICLE	NAME AND DATE OF THE ARTICLE	KEY FACTS AND LINK
News article (Financial Express)	COVFID-19: Personal Protection Equipment essential for ICUs, OPDs! PPE usage in hospitals explained; details April 11, 2020	Personal protective equipment or a PPE is a part of complete protection gear used by any doctor or a worker during an outbreak of any disease which is transmitted. https://www.financialexpress.com/lifestyle/health/covid-19-personal-protection-equipment-essential-for-icus-opds-ppe-usage-in-hospitals-explained-details/1925606/
News article (Times of India)	From zero, India now produces around 2 lakh PPE kits per day May 5, 2020	As of now, the Central Government has distributed about 21.32 lakh PPE kits to the central and state run hospitals, at least 15.96 lakh PPE kits are in the Centre-State buffer stock. https://timesofindia.indiatimes.com/india/from-zero-india-now-produces-around-2-lakh-ppe-kits-per-day/articleshow/75556879.cms
News report (The Indian express)	Ban on PPE export lifted, limit set at 5 million a month June 30, 2020	The Centre Monday partially lifted its ban on exports of personal protective equipment (PPEs), allowing medical textile manufacturers here to ship up to five million units of such equipment to other nations seeking global suppliers during the ongoing COVID-19 pandemic . https://indianexpress.com/article/india/govt-allows-export-of-covid-19-ppe-medical-coveralls-monthly-quota-fixed-at-50-lakh-units-6481526/
News report (The Economic Times)	Government tightens PPE testing, certification norms April 20, 2020	Unique Certification Code (UCC) will apply to PPE garments and fabric which pass the laboratory tests. https://m.economictimes.com/industry/healthcare/biotech/healthcare/government-tightens-ppe-testing-certification-norms/articleshow/75298657.cms#:~:text=New%20Delhi%3A%20The%20government%20on,body%20coveralls%20manufactured%20in%20India.&text=Unique%20Certification%20Code%20(UCC)%20will,which%20pass%20the%20laboratory%20tests.
News report today)	(India Have enough PPEs, HCQ stock in India: Health ministry April 9, 2020	The health ministry official claimed that even as the government has arranged for a sufficient supply of PPEs to all health workers, it has also issued guidelines to use them rationally. “For example, an N95 mask can be used by a doctor for 8 hours. But, if a doctor will use one mask per patient and then dispose it off, or uses four-five masks a day then that’s misuse,” https://www.indiatoday.in/india/story/have-enough-ppes-hcq-stock-in-india-health-ministry-1665136-2020-04-09
News report express)	(DU PPE production in India June 20, 2020	India has an inventory of about 16 lakh PPE kits of all kinds, and there are 2.22 crore kits against firm orders by the industry. https://duexpress.in/ppe-production-in-india/
News report (Hindustan Times)	‘Buy PPE only from approved producers’: Govt advisory May 26, 2020	The government is working to ensure all manufacturers register with the online market place portal called ‘Government e-Marketplace (GeM)’ so that information on quality manufacturers is easily accessible for people . https://www.hindustantimes.com/india-news/buy-ppe-only-from-approved-producers-govt-advisory/story-sdQvfi7FRP1YPdQdH1VJgJ.html
News Report	COVID-19: How India Became A PPE Kit Manufacturing Hub June 8, 2020	India is now the second-largest manufacturing hub for PPE kits in the world. https://www.boomlive.in/videos/fact-file/covid-19-how-india-became-a-ppe-kit-manufacturing-hub-8408
News Report (NDTV)	From Zero, India Now Manufactures 4.5 Lakh PPE Suits A Day To Fight Coronavirus May 19, 2020	India started manufacturing PPE kits within two months of the coronavirus outbreak. Earlier, all PPE kits were being imported. https://www.ndtv.com/india-news/from-zero-india-now-manufactures-4-5-lakh-ppe-suits-a-day-to-fight-coronavirus-2231742



RESULT & DISCUSSION



TYPES OF PPE AVAILABLE TO THE HOSPITALS

- Face shields
- Gloves
- Goggles
- Masks
- Gown
- Shoe cover
- Head cover

EXISTING PPE AVAILABLE TO HOSPITALS

- In January, there were only 2.75 lakh PPE kits available in the country which was actually the imported ones.
- May 2, 2020, recorded as a highest single day production of 2.06 lakh PPE in India.
- On average, domestic production is about 1.5 lakh per day

DEMAND OF PPE WITH INCREASED COVID 19 CASES

Initially, the first month of the lockdown was tough. But now orders are happening, systems are in place, transport issues have been sorted out, materials and manufacturers are in place.

Also, the Health ministry has generated guidelines on the rational use of PPEs.

Evidently, the demand of PPE has increased with increased COVID19 cases in the country.

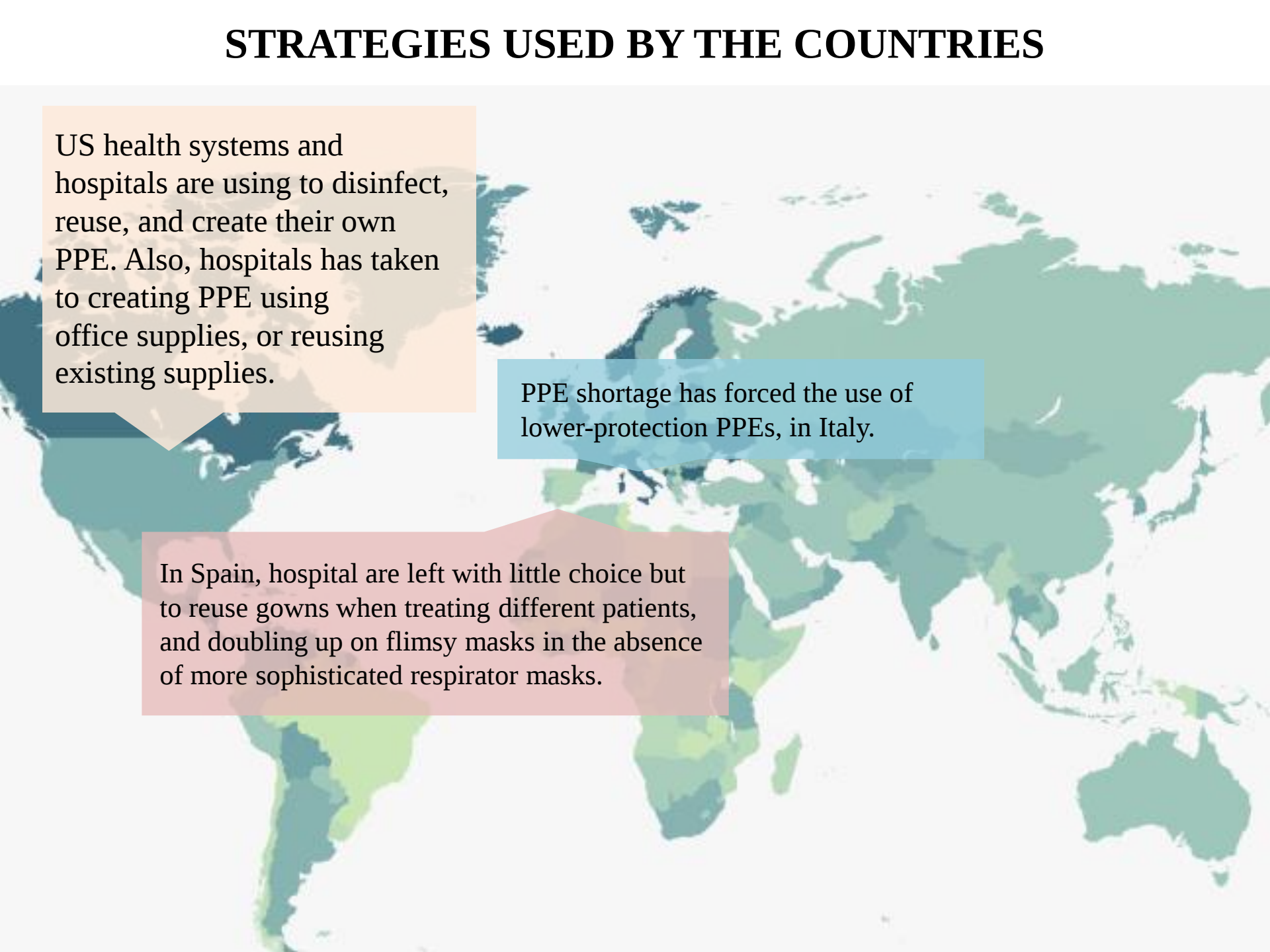
Before this pandemic, for instance,



China produced approximately half the world's face masks. As the infection spread across China, their exports came to a halt and now on an average, domestic production of PPE in India is about 1.5 lakh per day, which is the top most solution to deal with the shortage. ^{xi}

- Beyond increasing the supply, a crucial role for the government is to coordinate efforts to ensure that the areas hardest hit at any given time are receiving needed equipment.
- The increase in demand for tests results in test shortages. Staff needs protective gear both to perform tests and to treat patients.
- So, not surprisingly, increase in patient flows creates shortages of masks and other protective equipment.

STRATEGIES USED BY THE COUNTRIES



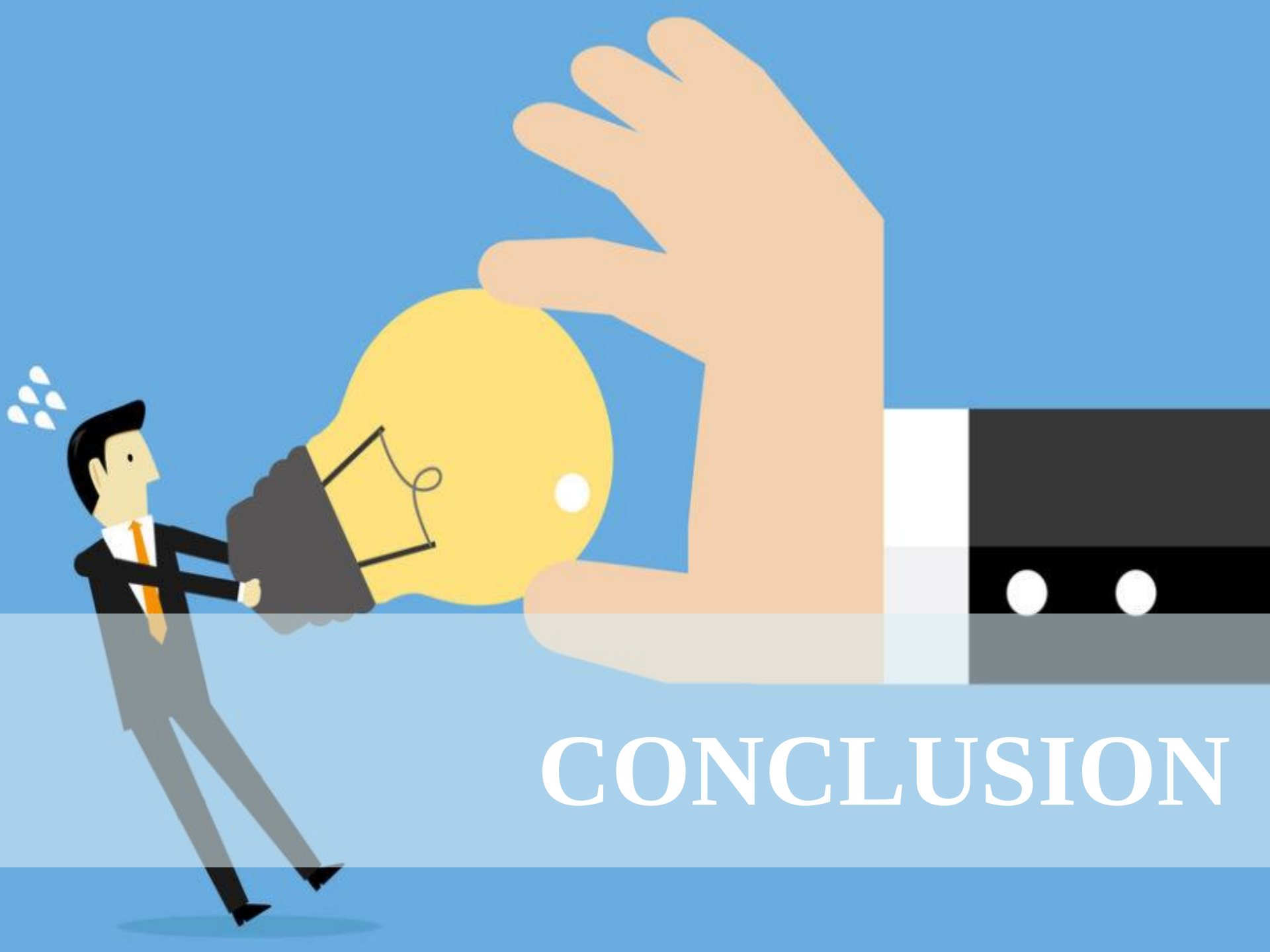
US health systems and hospitals are using to disinfect, reuse, and create their own PPE. Also, hospitals have taken to creating PPE using office supplies, or reusing existing supplies.

PPE shortage has forced the use of lower-protection PPEs, in Italy.

In Spain, hospitals are left with little choice but to reuse gowns when treating different patients, and doubling up on flimsy masks in the absence of more sophisticated respirator masks.

STRATEGIES USED IN INDIA

- Doctors were using raincoats and helmets in place of N95 masks when nothing was the step to deal with shortage
- Using plastic garbage bags for gowns and plastic water bottle cut outs for eye protection.
- Reuse-by sterilization, reduce non-essential services, reduce patient contact are some of the measures taken in India.
- Now India has started with the manufacturing of PPE within the country.
- DRDO that works with coating technology and Nano Technology has developed a specific type of fabric to make bio suits that protect one from the virus.
- Major hospitals supplied with some components of PPE from local hospitals and non-health care businesses as per the need.



CONCLUSION

This concluded that:

In this review it is been stated that the Rational use and successful reuse of respirators can help in the shortage of PPE during a pandemic. Hospitals reported that widespread shortages of PPE put staff and patients at risk.

Hospitals also expressed uncertainty about availability of PPE from State sources and noted sharp increases in prices for PPE from some vendors.

But then and there, now we have many indigenous manufacturers in India leads to increased PPE production capacity.

A method of using UV disinfection system to sanitize face shields using plastic storage boxes, a reflective coating, and UV-c bulbs is the best method for conservation of PPE.

The mobile phone app, should be made, which tracks donations, manages the shipping, and ensures the shipping is paid for by the receiving hospital

Donations of masks, face shields, gloves, gowns, and more are matched with hospitals based on need and demand, and they can include a single box of PPE or an entire truckload as per the need, this can conserve many PPEs.

RECOMMENDATIONS:

- ✓ The technology can be integrated into face masks for self-sterilization, including the N95 respirator mask
- ✓ Reprocessing respirators helps conserve respirator supplies.
- ✓ Stock usage: this can be monitored by using PPE mobile phone app, which includes the database to save all information on PPE stock and distribution running in the country.
- ✓ In the Republic of Ireland, an eco-friendly, namely vaporized hydrogen peroxide (VH_2O_2) is using, such as for filtering face piece respirators and UV irradiation and High-level liquid disinfection (Actichlor+) is also been pursued in Ireland.
- ✓ An engineering and design company in Italy, recently has developed a 3D printed adapter that turns a mass-market snorkeling mask into a noninvasive ventilator for COVID-19 patients.

- ✓ The sourcing, manufacturing and distribution of PPE should be designated as separate department to ensure the efficient sourcing of PPE to different levels of healthcare needs.
- ✓ Government should legislate to ring-fence the production of PPE equipment in the country so that we would have sufficient amount for the local production and which cannot be the reason for lack of PPE in future.
- ✓ Decreasing the PPE standards that are implemented for low-risk exposure protection and increase the utilization of available PPE prioritized for higher risk exposure protection.
- ✓ Extended use of PPE which refers to the practice of wearing the same PPE, it may be implemented when multiple patients are infected with the same respiratory pathogen and patients are placed together in dedicated waiting rooms or hospital wards.



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e-HEALTH

OPPORTUNITIES AND CHALLENGES



INTRODUCTION

This course introduced eHealth strategies and frameworks for developing and analyzing them. Also the methods for eHealth service development.

During the course there were different concepts that are used in the field and learn how it developed historically. This basic knowledge helps to understand the opportunities and challenges of the field.

Different stakeholders from various countries are introduced and get to know their views on the opportunities and challenges of eHealth.

Transformation of technology in the medical sector has appear through different platforms i.e. e-Health, m-Health, and Telemedicine.

e-Health technology can be used to disseminate health-related information or services among the health care providers, patients, and clinics.

e-Health is an umbrella term that combines healthcare and technology to support people in a more efficient way, and it can also reduce health-related costs.

CONTENTS OF COURSE

WEEK 1

Introduction

What is eHealth?

What renders eHealth specific?

WEEK 2

Introduction

How is healthcare organized?

Who are the healthcare professionals?

Different types of eHealth for healthcare professionals?

WEEK 3

Introduction

Who is the patient?

Different types of eHealth for patients and citizens

Patient data and ethics

WEEK 4

Introduction

Design approaches

Tools for design

WEEK 5

Introduction

Technical demands on eHealth systems

Health informatics standards and terminologies

eHealth Innovations

WEEK 6

Introduction

Common denominators of eHealth strategies

Setting up and implementing eHealth strategies

OBJECTIVES

- To define basic eHealth concepts and describe the development of the field
- What the success factors and barriers are for eHealth implementation
- To analyze eHealth strategies and adapt them in relation to your specific context
- The unique factors about the health sector
- The factors that are important to avoid failures when implementing eHealth
- The usable tools for care professionals
- Factors that the patients best organize and use their own health data to improve their condition

What is eHealth?

e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies.

eHealth for healthcare Professionals

A very important building block in any health system is the workforce, or the healthcare professionals. A **stakeholder** is a person or group who will be affected by the eHealth system, directly or indirectly.

The users are a very important stakeholder group, and the users of eHealth can of course be healthcare professionals or patients, but also e.g. family members, social or community care workers or researchers.

USERS

- The electronic health record or medical record is one of the main eHealth tools used by physicians.
- Nurses who handle a lot of the direct patient contact
- physiotherapists and occupational therapists, who are involved in different rehabilitation activities, dietitians, who guide patients towards a healthy diet adapted to the patient's individual needs
- Pharmacists are also a very important actor in the handling on prescriptions and medications, and e-prescribing is an important part of eHealth.

eHealth for patients and citizens

The personal health record, also called PHR, which is under the control of the subject of care, and that the information it contains is at least partly entered by the subject itself, which may be the consumer or patient.

PHR can be considered in at least four different forms_

1. as a self-contained electronic health record or EHR-maintained and controlled by the patient or consumer.
2. as a self-contained EHR maintained and controlled by a third party-such as, for example, a web service provider
3. as a component of an integrated EHR maintained by a health provider and controlled at least partially, that is, at least the PHR component as a minimum, by the patient or consumer
4. as a component of an integrated EHR that is maintained and controlled by the patient or consumer.

Designing eHealth

1. socio-technical design

The idea was to shape both the technical and the social conditions of work, in such a way that efficiency and humanity wouldn't contradict each other. Has four basic rules_

- i. technical systems have social consequences, which means that we can't really design and implement a technical system that doesn't affect the organization in the social context.
- ii. social systems have technical consequences, which means that when we are designing technology we also have to consider how the organization and the social context will impact on the design, and how the technology will be used.
- iii. need to consider both parts of this complex.
- iv. To understand how people and technologies interact.

2. participatory design

3. user-centered design

Health informatics standards and terminologies

The purpose of these standards is to allow different systems that apply them to exchange information and also understand the meaning of the information exchanged automatically. This exchange of meaningful information between health IT systems is called semantic interoperability.

HL7 V2.

- it is a messaging standard.
- It defines structures for all kinds of thinkable messages to be exchanged between different health care information systems.

openEHR,

- often pronounced open air.
- to standardize the whole structure of electronic health records
- Clinical knowledge is captured by clinical experts such as physicians in so-called archetypes.

DICOM

- DICOM stands for Digital Imaging and Communications in Medicine, and it is a standard that accommodates the typical data needs of images, including data related to the image as such, like that is to store the image itself.
- But also a lot of data about the context around an image such as the unit that produced the image, the imaging technique used and the time the image was ordered, taken, or interpreted.

Other standards are HL7 Version 3, CIMI, short for Clinical Information Modeling

ehealth strategies

eHealth is on the political agenda worldwide and many countries in the world have created national eHealth strategies. The overall goals of most strategies are related to the six domains of health care quality, which are safety, effectiveness, patient-centeredness, timeliness, efficiency and equitability.

KEY LEARNING

- ✓ To define basic eHealth concepts and describe the development of the field
- ✓ What the success factors and barriers are for eHealth implementation
- ✓ To analyze eHealth strategies and adapt them in relation to your specific context
- ✓ The unique factors about the health sector
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- ✓ Factors that the patients best organize and use their own health data to improve their condition

Implementation of eHealth during COVID19 pandemic:

eHealth and telemedicine has the potential to solve many issues in this situation, simple e-health tools may give severely ill COVID-19 patients the possibility of having peer-to-peer communication and easily obtaining relevant health information, probably leading to maintained quality of life and better mental health. There are many functionality of e-Health Solutions for COVID-19 which can be:

- Communication
- Hygiene and personal protective equipment
- Remote patient monitoring
- Maintaining critical care
- Supply storage monitoring
- Training
- Virtual consultation

Stay Alert with eHealth | Stay Safe | Control the virus | Save lives



THANK YOU