

SUMMER TRAINING REPORT

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**PART I :
WORK FROM HOME**

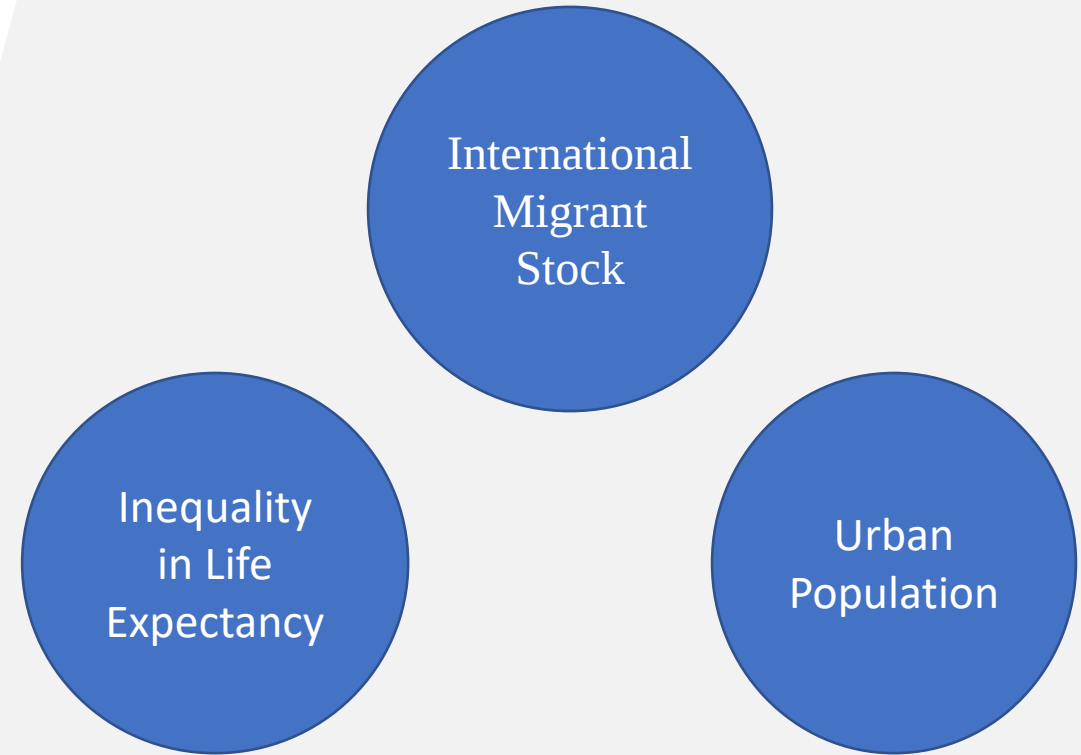
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**RESEARCH PAPER
ON
INFLUENCE OF DEMOGRAPHIC,
INEQUALITY & MOBILITY FACTORS
ON NUMBER OF REPORTED
COVID 19 CASES**



INTRODUCTION

- Coronavirus Disease 2019 or COVID 19 is caused by new strain of coronaviruses known as SARS COV 2 which is likely to have originated in bats
- The first outbreak of the disease was identified in Wuhan, China in December 2019
- World Health Organization declared COVID 19 as a pandemic on 11th March 2020
- 1,65,58,289 confirmed cases of COVID 19 were reported across 216 countries, areas or territories as on 29th July 2020
- This was an exploratory study analysis of determinants of COVID 19



THE 3 DETERMINANTS FOR THIS RESEARCH

DEFINITIONS

TABLE I: DEFINITIONS OF THE VARIABLES FOR THIS RESEARCH		
S.No.	VARIABLE	DEFINITION
1.	Confirmed COVID 19 cases per capita	Total number of confirmed cases of COVID 19 in different countries against the total population of that country
2.	International Migrant Stock per capita	Total number of migrants residing in a country in which they were not born against the total population of that country. It includes refugees
3.	Inequality in Life Expectancy	Percentage of variation in the average number of years lived by people from different genders and socio-economic background (rich to poor) of a country or The difference in the risk of mortality shared among all the people of the country which includes people from higher, medium and lower socio-economic background
4.	Urban Population	Percentage of total population of people residing in urban areas (comprising of relatively higher population density and built environment) as per Office for National Statistics

LITERATURE REVIEW

DATA BASIS

- Lancet
- PubMed
- NCBI
- World Bank
- WHO
- Researchgate
- MedRxiv

INCLUSION CRITERIA

- Articles on determinants of COVID 19
- Researches with secondary data and quantitative method of analysis conducted for world, country and city level

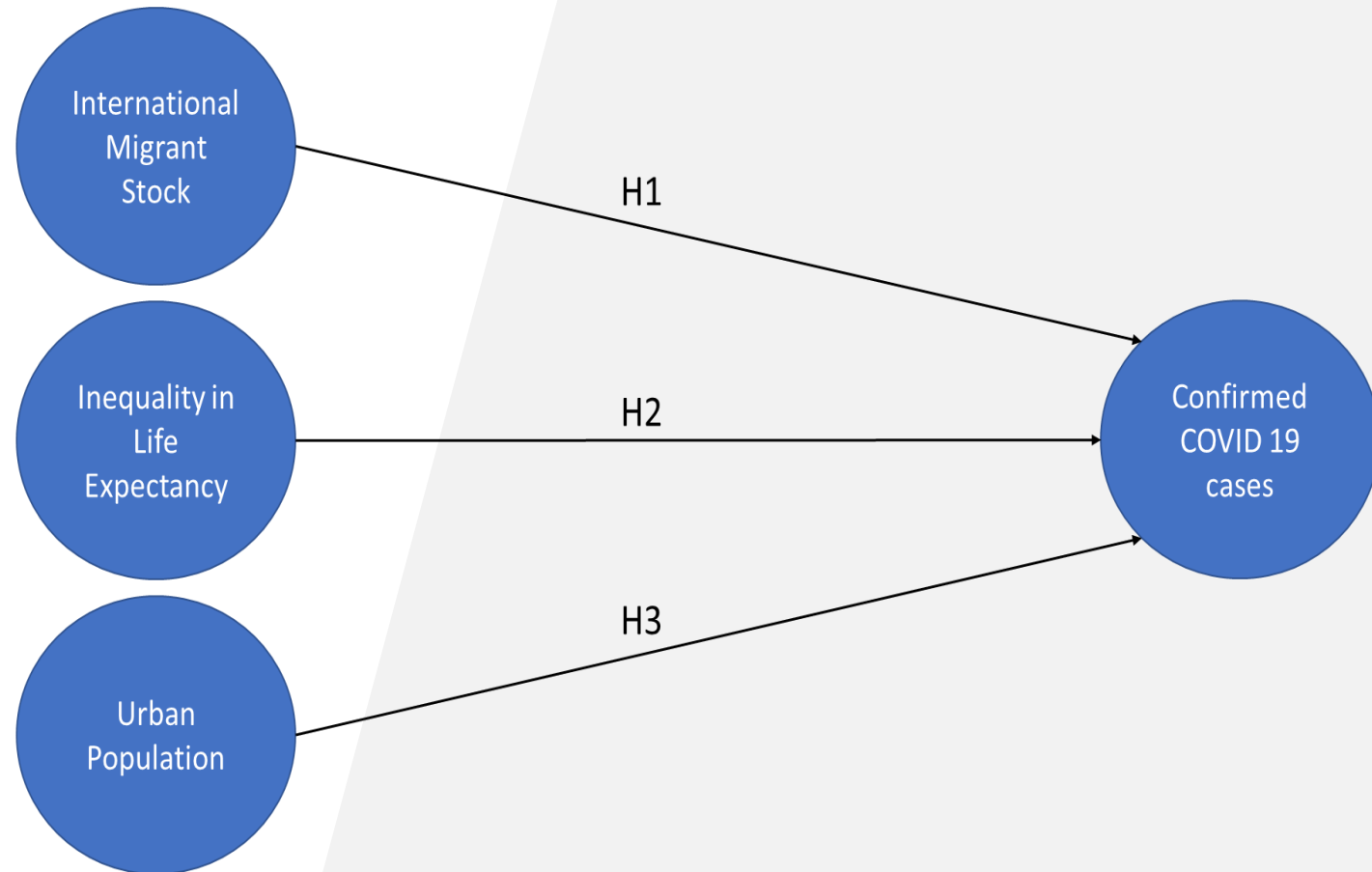
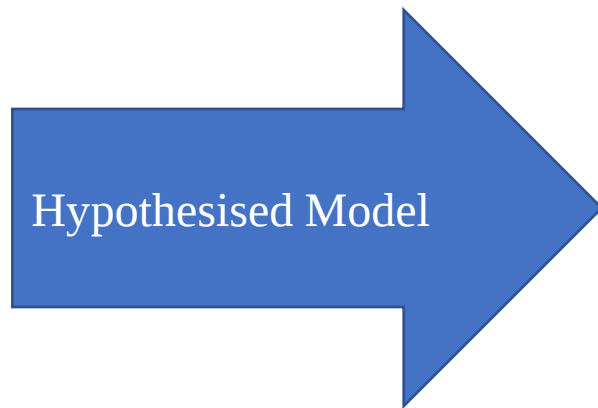
EXCLUSION CRITERIA

- Articles evaluating determinants of COVID 19 post May 2020

RESEARCH GAP

- Limited relevant information on relation of inequality in life expectancy with pandemics or COVID 19
- Limited statistical evidence on relationship of remaining variables with COVID 19

METHODOLOGY



- H1: There is a significant relationship between International Migrant Stock and confirmed COVID 19 cases
H2: There is a significant relationship between Inequality in Life Expectancy and confirmed COVID 19 cases
H3: There is a significant relationship between Urban Population and confirmed COVID 19 cases

ANALYSIS METHOD

- Quantitative Method

ESTIMATION TECHNIQUE

- Multiple Linear Regression method as it
- Identifies the strength of effect
 - Evaluates the changed value of dependent variable when the value of independent variable is changed

DATA TRANSFORMATION

- Compiled on *Microsoft Excel*
- International Migrant stock 2019 and reported number of COVID 19 cases converted into their per capita data
- Data converted into a logarithmic scale (LOG10)

STATISTICAL ANALYSIS

- *IBM SPSS Statistics 22* software
- Multiple linear regression assumptions were tested

DATA SOURCE

TABLE II: DATA SOURCE OF DEPENDENT AND INDEPENDENT VARIABLES			
S.NO	VARIABLE	YEAR	SOURCE
1.	International Migrant Stock	2019	Database of Department of Economic and Social Affairs, United Nations Population Division (2019)
2.	Inequality in life expectancy (in %)	2018	Human Development Reports (United Nations Development Programme, hdr.undp.org)
3.	Urban Population (% of total population)	2018	United Nations Population Division, World Urbanization Prospects: 2018 Revision through data.worldbank.org
4.	Number of confirmed COVID 19 cases	2020	WHO (World Health Organization) situation report-112 published on 11 th May 2020
5.	Population	2019	United Nations Population Division, Department of Economics and Social Affairs, World Population Prospects 2019

RESULTS

TABLE III: MODEL SUMMARY^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	.813 ^a	.662	.655	.552036862740188	.662	102.979	3	158	.000	1.833

a. Predictors: (Constant), Log Urban %, LOG International Migrant Stock 2019 per capita, LOG Inequality in Life Expectancy 2018

b. Dependent Variable: Log COVID 19 per capita

TABLE IV: CORRELATIONS

		Log COVID 19 per capita	Log International Migrant Stock 2019 per capita	Log Inequality in Life Expectancy 2018	Log Urban %
Pearson Correlation	Log COVID 19 per capita	1.000	.585	-.746	.664
	Log International Migrant Stock 2019 per capita	.585	1.000	-.534	.458
	Log Inequality in Life Expectancy 2018	-.746	-.534	1.000	-.588
	Log Urban %	.664	.458	-.588	1.000

RESULTS (contd...)

TABLE VI: COEFFICIENTS ^a										
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-7.031	.480		-14.662	.000	-7.978	-6.084		
	Log International Migrant Stock 2019 per capita	.291	.081	.200	3.575	.000	.130	.451	.683	1.464
	Log Inequality in Life Expectancy 2018	-1.261	.168	-.462	-7.504	.000	-1.593	-.929	.566	1.767
	Log Urban Population (% of total population) 2018	1.399	.272	.301	5.152	.000	.863	1.936	.626	1.598
a. Dependent Variable: LOG COVID 19 per capita										

RESULTS of TESTS of ASSUMPTIONS

Durbin Watson value

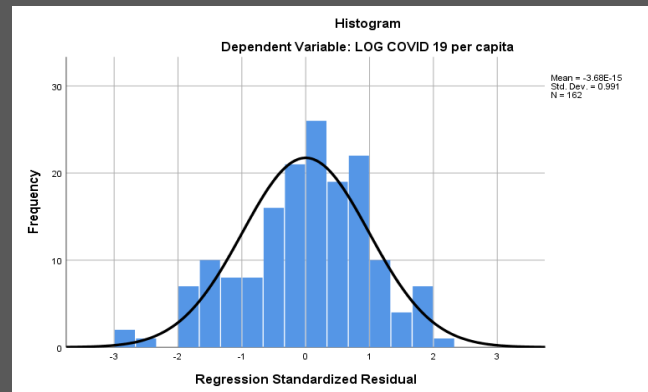
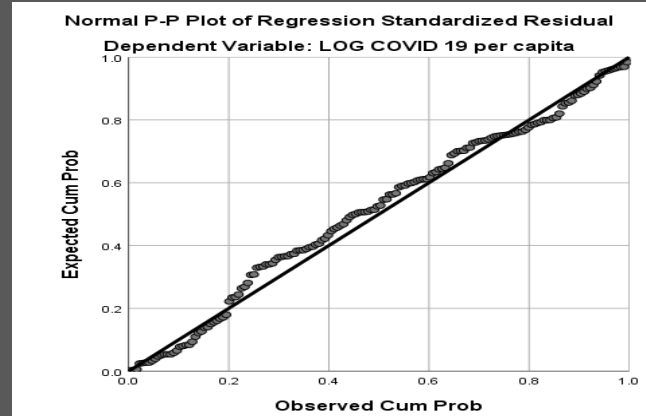
= 1.833

NO AUTOCORRELATION

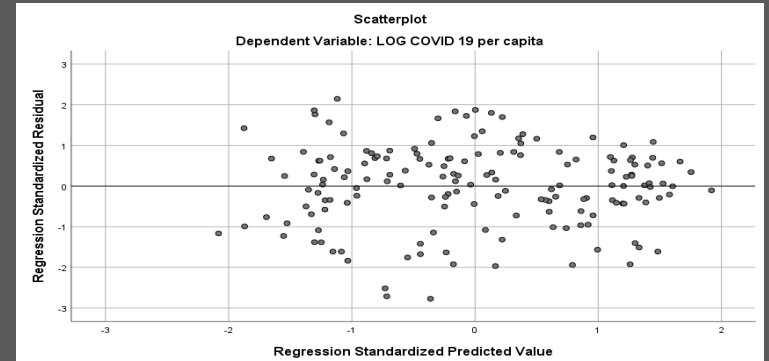
VIF values and tolerance values for:

- International Migrant Stock = 1.464 and 0.683
- Inequality in Life Expectancy = 1.764 and 0.566
- Urban Population = 1.598 and 0.626

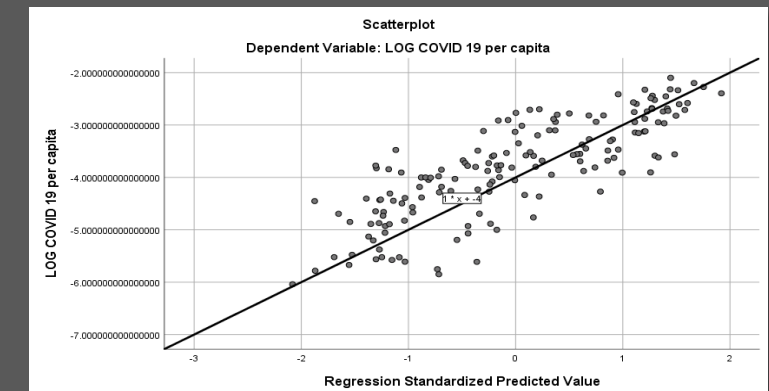
NO MULTICOLLINEARITY



MULTIVARIATE NORMALITY



HOMOSCEDASTICITY

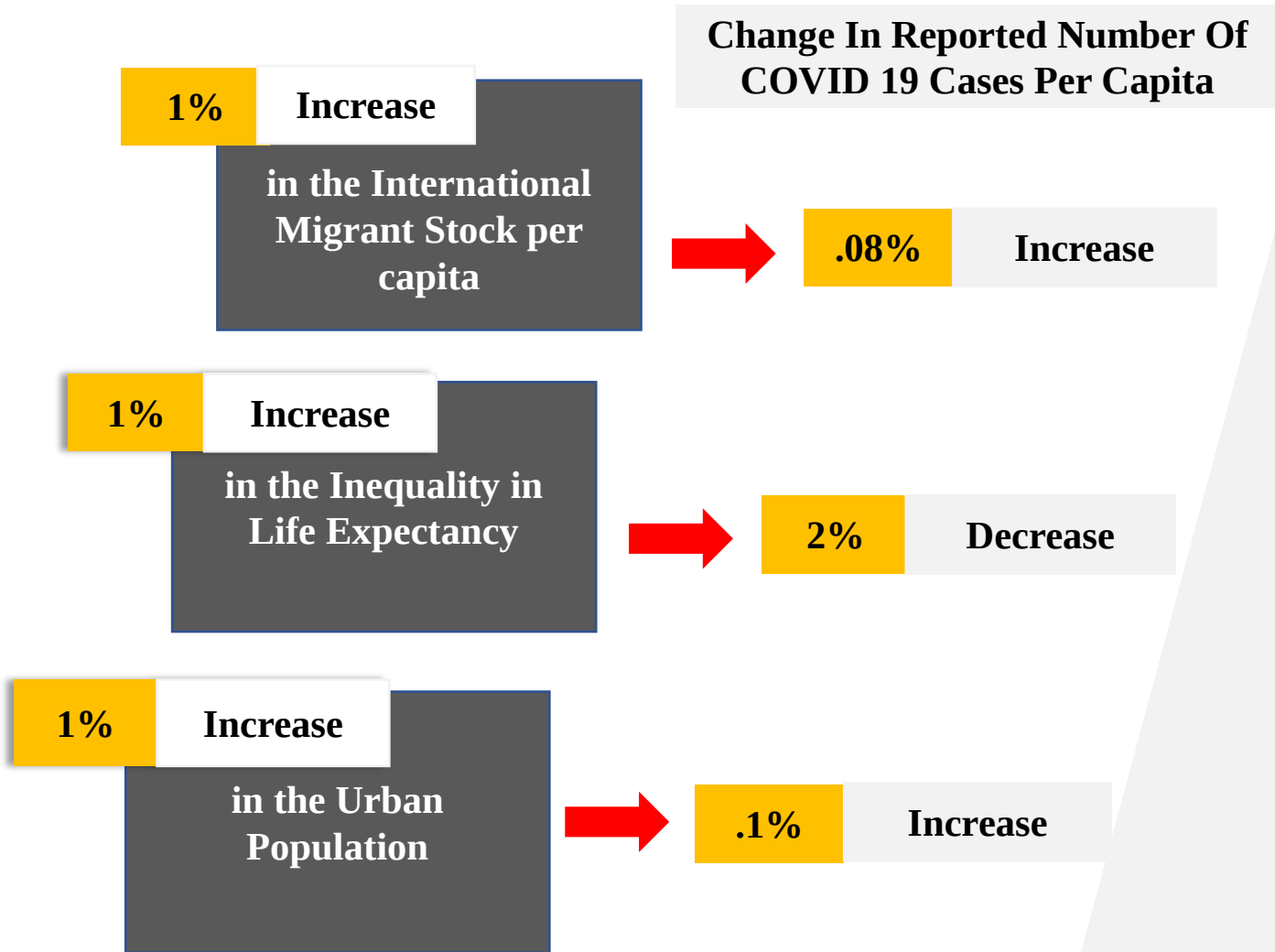


LINEARITY BETWEEN DEPENDENT AND INDEPENDENT VARIABLE

DISCUSSION

S.No.	INDEPENDENT VARIABLE	FINDINGS of this RESEARCH ANALYSIS	RATIONALE for the FINDINGS
1.	International Migrant Stock	- Moderately strong positive relationship and significant determinant - Null hypothesis rejected	- Countries with higher International Migrant Stock per capita have greater number of people residing and arriving due to professional or personal reasons, hence more social interaction and contacting a greater number of people - More variations in origins of people, their genetic composition and immunity levels which may influence the spread of COVID 19 cases
2.	Inequality in Life Expectancy	- Strong inverse and significant relationship with number of reported COVID 19 cases - Null hypothesis rejected	- Inequality in access to healthcare services lead people from lower background remain undiagnosed, hence not reported - Countries having lower inequality in life expectancy show healthier behaviours of people of lower background, thereby living longer due to more convenient access to the healthcare services
3.	Urban Population	- Strong positive and significant correlation - Null hypothesis rejected	Higher percentage of Urban population means more urbanization, more population density, more trade exchange, more social interaction, more waste generation, more physical contact with people travelling to and from other nations, hence more probability of infections to erupt and transmit at a faster pace

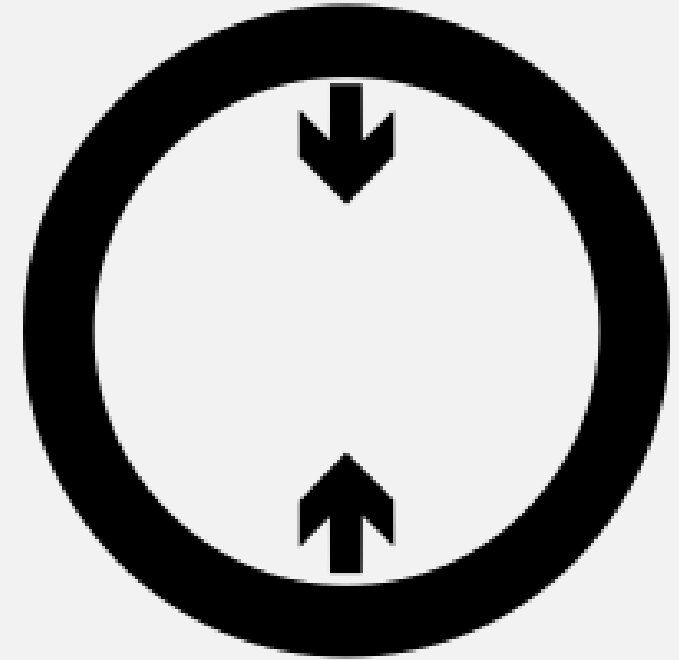
INTERPRETATION OF THE RESULTS



Formula used: $((1 - 2.72^{\log((100+1)/100)}) * \text{Beta coefficient}) * 100$

LIMITATIONS

- **3 independent variables** considering other financial, socio economic, demographic, mobility, health factors, etc constant
- **162 countries** for which data for all the variables was available
- Data used for independent variables were from the year 2019, 2018 while reported number of COVID 19 cases have been considered till 11th May 2020
- Did not consider and review literature on analysis of determinants of COVID 19 post lockdown
- Multiple Linear Regression was used which has it's own limitations
 - ☐ Variables were assumed to have linear relationship
 - ☐ Only the mean values of dependent and independent variable is used for evaluation of their relationship
 - ☐ The variables are independent

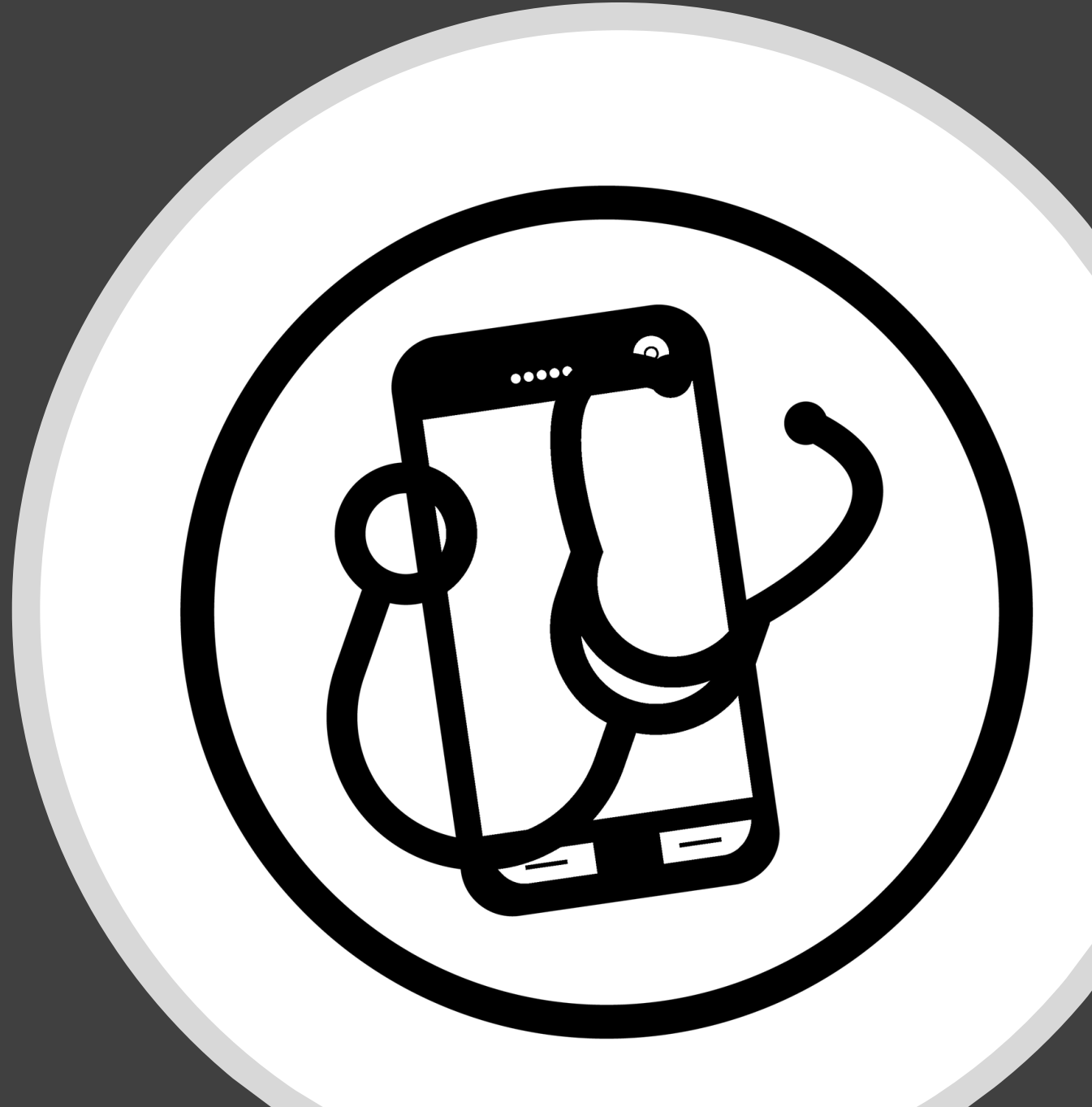


RECOMMENDATIONS

- **Frame health policies** so that the poor and vulnerable can easily access and afford healthcare services and get diagnosed in time
- The policy must make **provision for hygienic living and sanitation conditions** for them
- **Upliftment of urban slums and prevention of formation** of slums could be an important measure to reduce the side effects of fast urbanization
- **Improved vaccinations, surveillance system for diseases**, meticulous channel of communication, monitoring and reporting of new cases, could help reduce the epidemics or pandemics
- **Perform quantitative analysis** of relationship of Inequality in life expectancy, International Migrant Stock, Urban Population **at national level** if latest state-wise data for all variables is available

**PART II :
REPORT ON ONLINE COURSE**

**eHEALTH
MORE THAN JUST AN ELECTRONIC
RECORD**



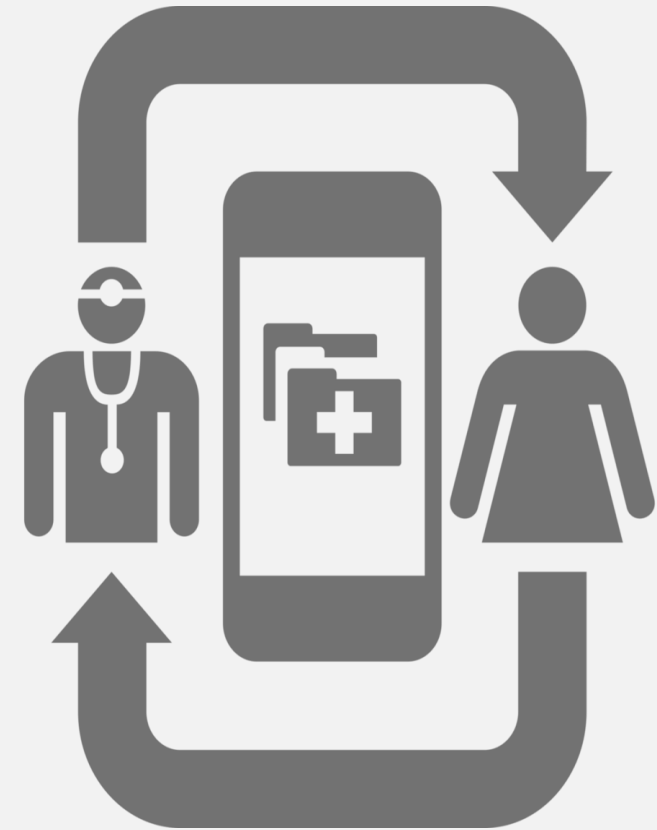
COURSE DESCRIPTION

- Self-paced online course offered by the University of Sydney on Coursera
- Taught by Tim Shaw (Professor in eHealth, University of Sydney)
- Aimed to help identify the impact of eHealth on the healthcare practice
- Targeted for clinicians, students, healthcare administrators, managers and researchers
- Spread over 15 hours duration
- Divided into 5 modules each requiring about 2-3 hours of commitment which could be easily covered over a period of 5 weeks



OBJECTIVES OF THE COURSE

- Comparison of definitions of eHealth from the perspective of health professional and health consumer
- Recognize an eHealth model which illustrates how key eHealth domains intersect with each other
- Develop an insight into the fundamental principles of eHealth
- Interpret present and future challenges in eHealth for both health professionals and health consumers
- Provoke critical thinking around the pros and cons of use of e-technology in healthcare
- Incorporating eHealth into practice at professional as well as personal level for efficient healthcare delivery



MODULE 1: WHAT is eHEALTH?

- **Module Description**

Covered the introduction to the concept of eHealth, model, challenges and future. It includes 5 videos, 4 readings and 2 practice quizzes.

- **Having eHealth would mean**

- ☐ easier access to information about the patients
- ☐ effective way to deliver healthcare to a variety of people
- ☐ keeping track of one's personal health as well as interacting with the physicians for better healthcare monitoring

- **Limitation**

- ☐ eHealth way behind in basics of technology such as seamless sharing of information



MODULE 2: HEALTH in OUR HANDS

- **Module Description**

- ☐ Various ways the technology is helping the customers to participate in health
- ☐ 9 videos, 3 readings and 1 practice quiz
- ☐ Examples of wearable health devices to help one track and record different parameters of health such as vitals
- ☐ The importance of personal health data for clinical use
- ☐ Information about the mobile health apps available, social media for health, Health information online, co designing of eHealth solutions and evaluating the health apps.

- **Learning**

- ☐ Role of Mobile Health in monitoring self-health and seeking professional advice
- ☐ Social media like facebook, twitter as new frontiers for healthcare
- ☐ Shift from healthcare to health and wellness



MODULE 3: DATA and ‘QUANTIFIED SELF’

- **Module Description**

- ☐ Kind of health data that is gathered and how that could transform healthcare in future.
- ☐ 10 videos, 3 readings and 1 practice quiz
- ☐ Digital health records and their anatomy
- ☐ Case study to help explain how electronic records could help support healthcare in remote areas
- ☐ Suggested the possibility of privacy and security breach while using eHealth apps.

- **Learning**

- ☐ Benefits of digitizing paper records
- ☐ Challenges in implementation of eHealth records- linking the data into a comprehensive and usable form for both patient and clinician
- ☐ Challenges and opportunities with large data sets such as genome



MODULE 4: INTERACTING WITH HEALTH PROFESSIONALS USING NEW TECHNOLOGIES

- **Module Description**

- ☐ Advantages of eHealth in improving care
- ☐ Use of telehealth and new models of healthcare
- ☐ 8 videos, 3 readings and 2 practice quizzes
- ☐ Personalizing healthcare using apps
- ☐ How eHealth could enable professional development
- ☐ How could we enable interdisciplinary eHealth.

- **Learning**

- ☐ Challenges in telehealth
- ☐ Role of technology in facilitating communication



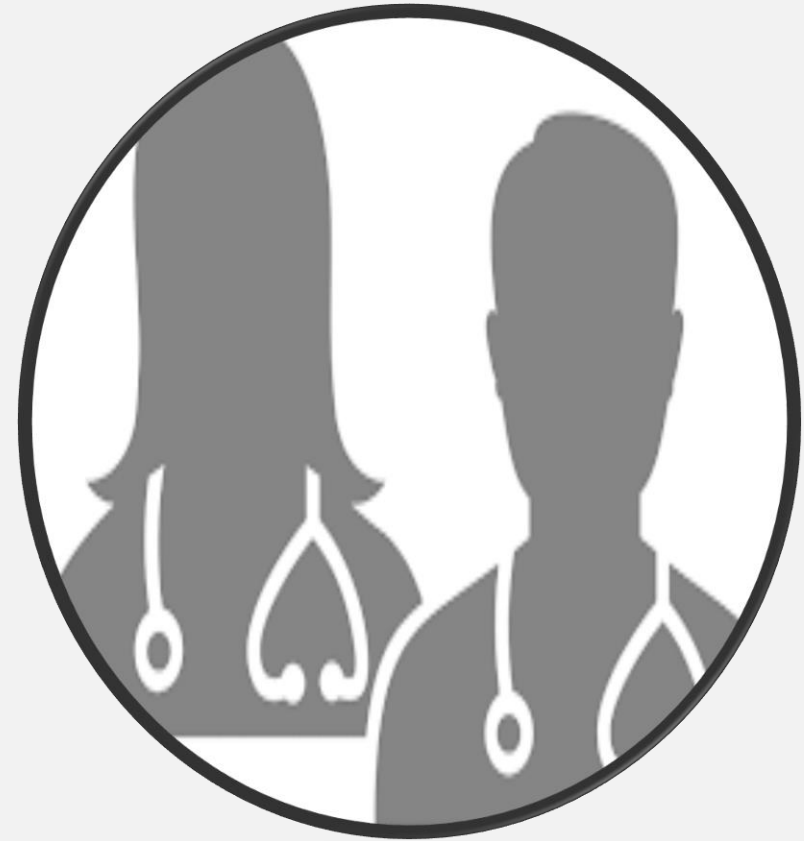
MODULE 5: eHEALTH IN PROFESSIONAL PRACTICE

- **Module Description**

- ☐ Application of eHealth principles and technologies in one's professional practice
- ☐ 7 videos and 2 readings
- ☐ Way to use 'MyPhysio' app
- ☐ 4 different case studies to explain 'Physios Online', 'My Home Dialysis' program, supporting wellness after cancer treatment and 'Synergy' online hub for mental health and well-being

- **Learning**

- ☐ Electronic records supporting remote care



LEARNING METHODOLOGY

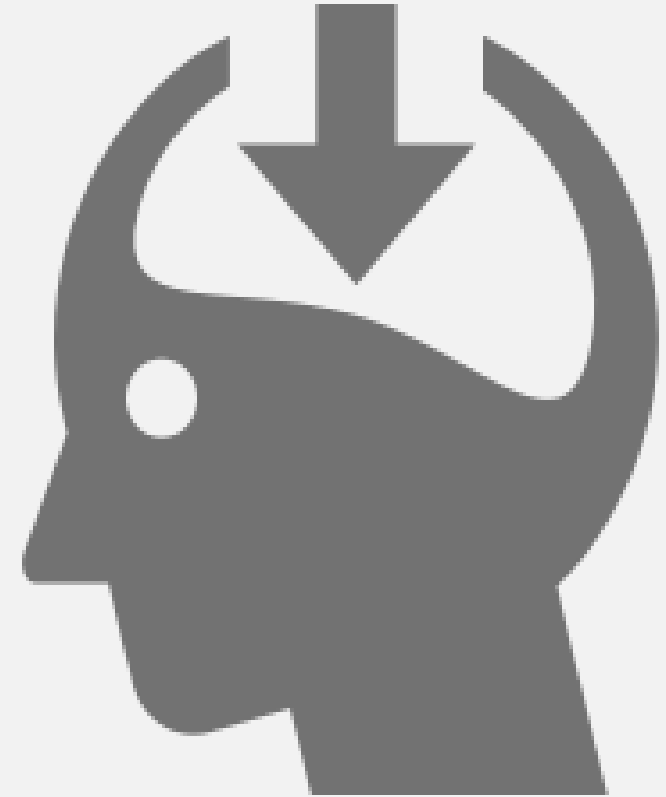
The medium of delivery of the course module was through:

- Videos
- Case Studies
- Assignments
- Readings
- Practice Quiz
- Discussion forums



KEY LEARNINGS FROM THE COURSE

- The basics of eHealth and its future
- The kind of healthcare data that is being compiled and how that will transform the healthcare in future
- New technologies that are helping consumers participate in their own healthcare
- The way eHealth can improve efficiency and coordination between different disciplines of healthcare
- Challenges to the application of eHealth in practice



THANK YOU

