

WHO – Technical Presentation

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WHO health budget for cancer has been increasing 10% yearly but cancer patients are also increasing yearly 5% these results are unfavourable for humanity, requiring to invest in effective vaccine strategy and improve health condition to reduce this impact in both short and long term.

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Increasing population across the world and less specialised doctors for treatment.

Cancer treatment budget holds 25% of the WHO total health budget.

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Identify cancer types that correlate the life expectancy

Analyse the given data using statistics to improve life expectancy

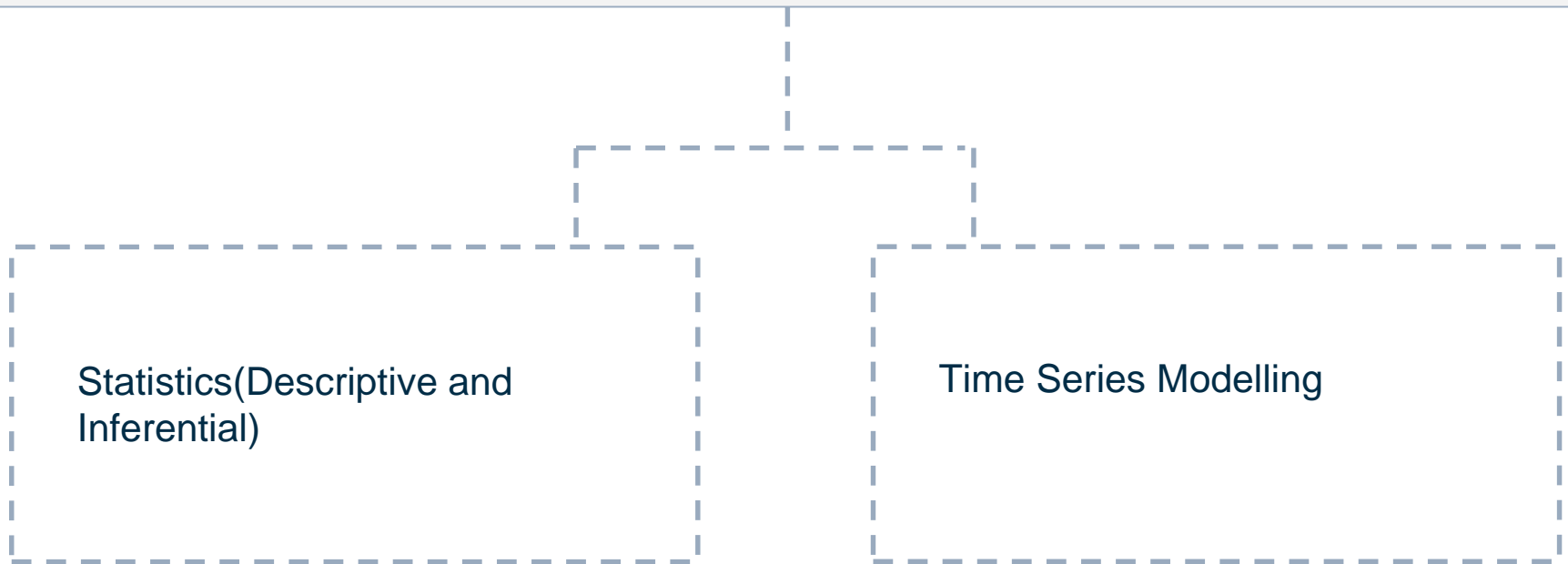
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Formation of linear equation for life expectancy can be used for other cancer types?

When we identify the life expectancy variables we can scale this to other types.

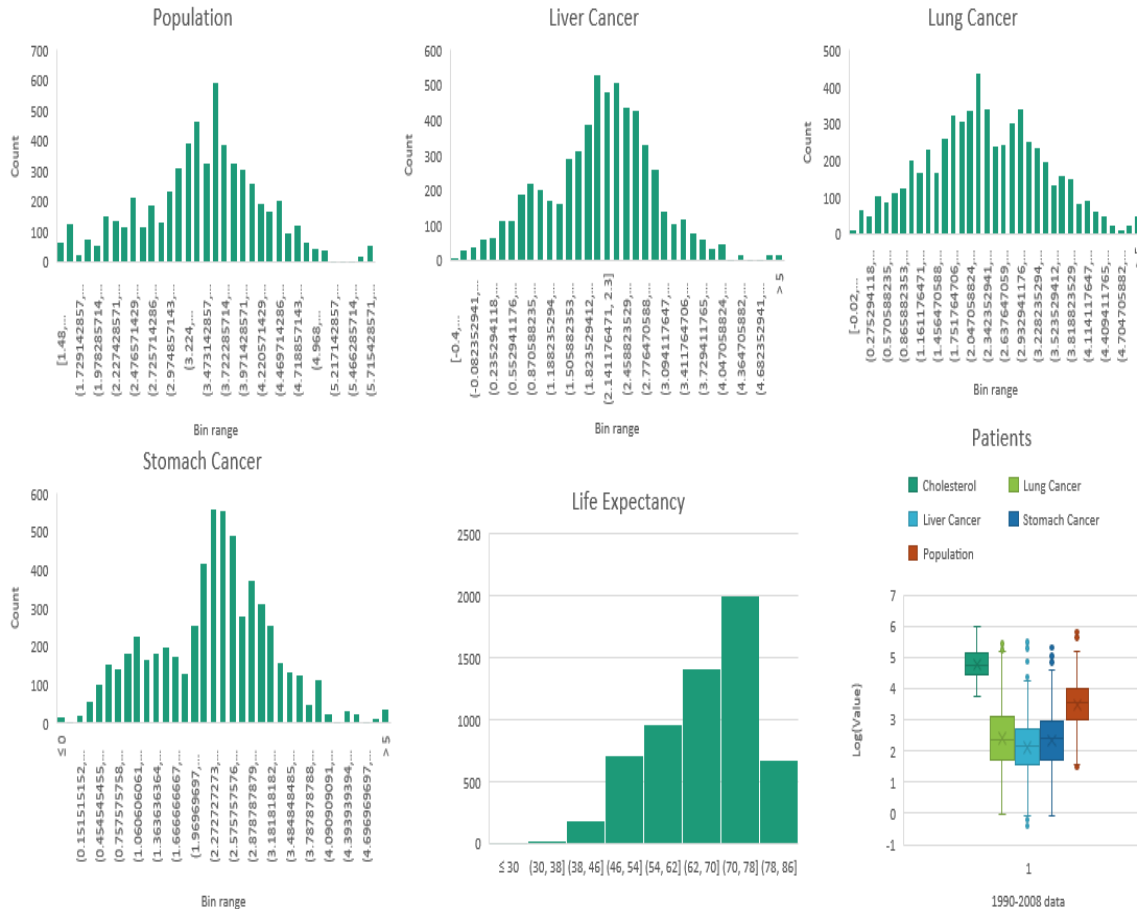
Hypothesis formation(SMART problem)

What opportunities exist for WHO health experts to reduce cancer patients 25% by the end of 2012 to spend 25% of their annual budget for increasing organ surgery or starting radiotherapy trials?



While plotting data variables distribution life expectancy ,liver and lung cancer showed intriguing results.

Gap minder health data distribution

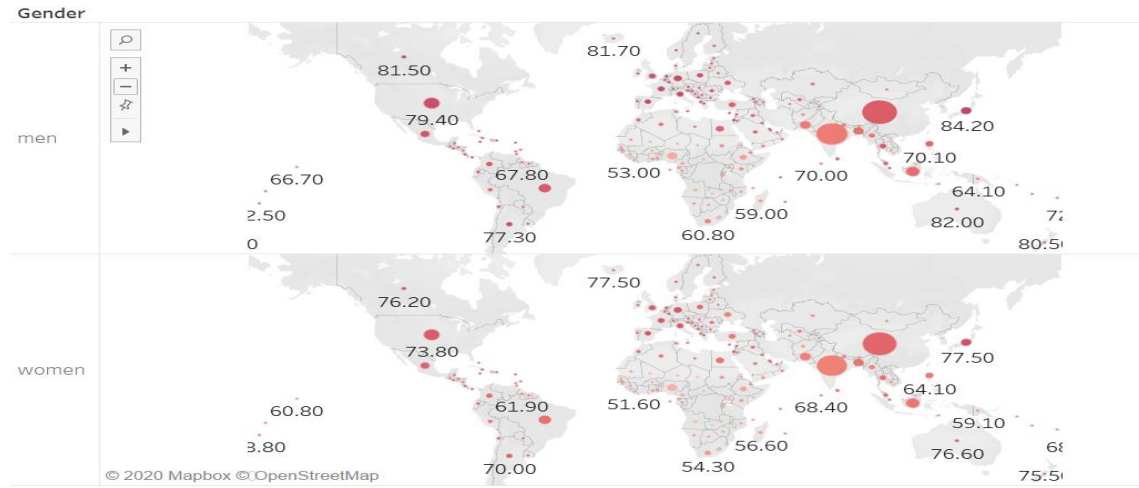


Key Insights

- Abnormal skew distribution of lung cancer.
- High life expectancy followed by tremendous decrease.
- Outlier(Value:0) in Liver cancer states countries with no liver cancer.
- Distorted right skew distribution of stomach cancer.

Demographic data exploration for cancer types using population, life expectancy and gender.

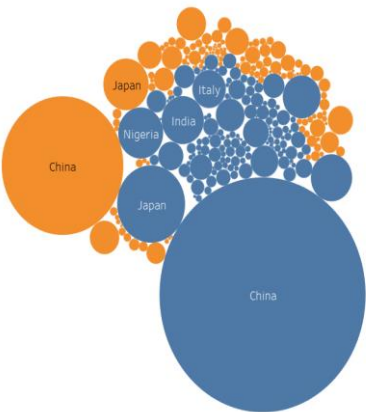
Life Expectancy vs Population



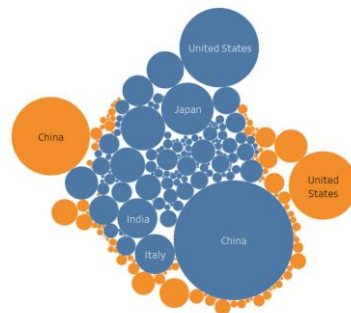
Key Insights

- China and Europe has high life expectancy and India median(2nd high population).
- Men tends to have an average 3-5 life expectancy difference with women.
- High life expectancy countries are having higher cancer patients.
- A through analysis for advanced statistics cause.

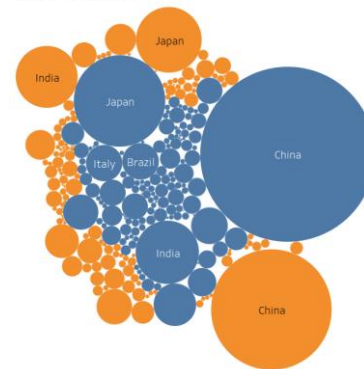
Liver Cancer



Lung Cancer



Stomach Cancer



Gender

men

women

Developed cancer leading to develop other types of cancers affecting population.

Variable	Life Expectancy	Gender	BMI	Blood Pressure	Cholesterol	Lung Cancer	Liver Cancer	Stomach Cancer	Population	Population Growth
Life Expectancy	1									
Gender	-0.233010018	1								
BMI	0.620628552	0.142460335	1							
Blood Pressure	0.024503794	-0.393459168	-0.000393982	1						
Cholesterol	0.738229857	0.125150699	0.635764588	0.084623053	1					
Lung Cancer	0.382015527	-0.214439054	-0.014874263	0.015277412	0.305100393	1				
Liver Cancer	0.013961665	-0.120146109	-0.250221278	-0.037934742	-0.053942683	0.860561375	1			
Stomach Cancer	0.200355763	-0.086417682	-0.138984943	-0.034926739	0.156083214	0.943287747	0.921096511	1		
Population	-0.02362795	0.000452366	-0.263090189	-0.148146504	-0.055265167	0.838380456	0.93271384	0.916170773	1	
Population Growth	-0.324194589	-0.014469599	-0.230860401	-0.157661943	-0.340001216	-0.28940803	-0.098551507	-0.237643877	-0.01888823	1

Key Insights

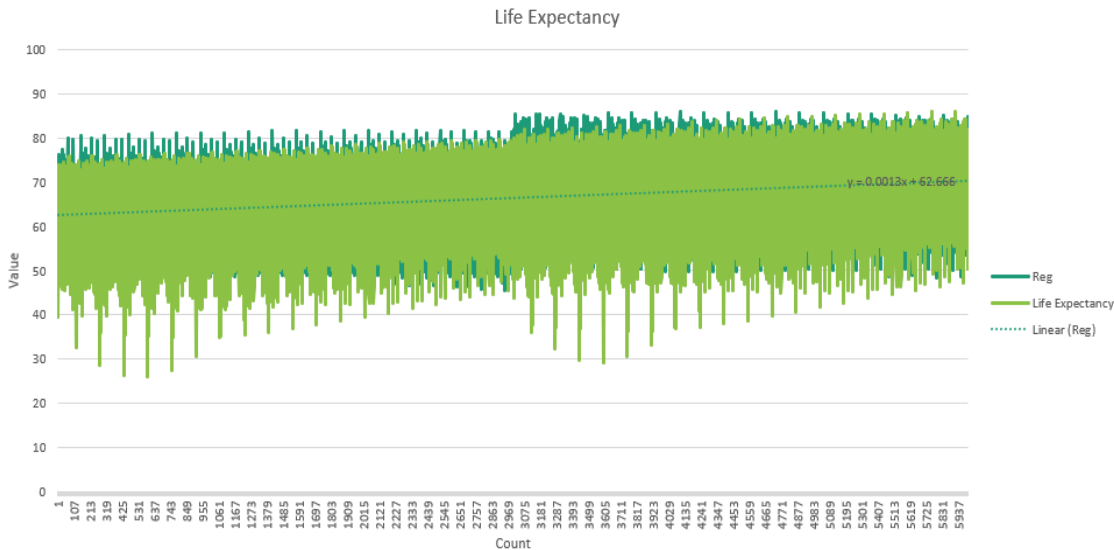
- Cholesterol has moderate effect on life expectancy but not on BMI.
- Cancer types are having high correlation among themselves rising a common question damaging of tissues spreading widely across the whole human body.

Framing linear regression equation for life expectancy to use predictive modelling.

Regression calculations

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.880391757
R Square	0.775089646
Adjusted R Square	0.774751943
Standard Error	4.965589954
Observations	6004

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	57.42524099	2.62946148	21.83916419	8.4028E-102	52.27055032	62.5799317
Gender	-6.193794094	0.18896096	-32.77816807	6.6356E-217	-6.564225571	-5.82336262
BMI	1.385543687	0.037432409	37.01454732	2.7634E-270	1.312162696	1.45892468
Blood Pressure	-0.454024365	0.017599275	-25.79790169	2.9435E-139	-0.488525277	-0.41952345
Cholesterol	8.343993739	0.26102467	31.96630314	3.519E-207	7.832291459	8.85569602
Lung Cancer	5.280938997	0.2798125	18.87313467	3.17396E-77	4.73240581	5.82947218
Liver Cancer	-2.964204577	0.244487281	-12.12416682	1.93236E-33	-3.443487624	-2.48492153
Stomach Cancer	2.398911539	0.318780137	7.525285479	6.03645E-14	1.773987761	3.02383532
Population	-4.385155273	0.309459937	-14.17034891	7.36366E-45	-4.991808104	-3.77850244
Population Growth	0.069155577	0.048976735	1.412008728	0.157999303	-0.026856447	0.1651676

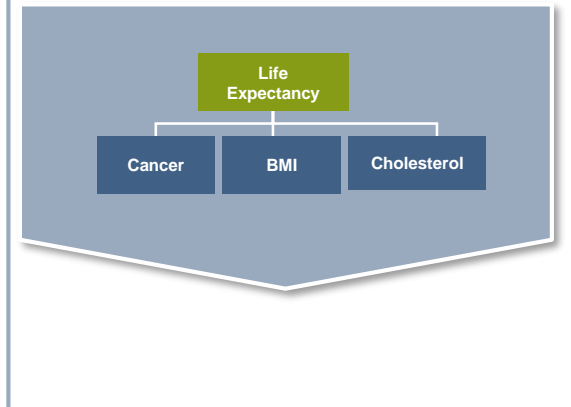


Key Insights

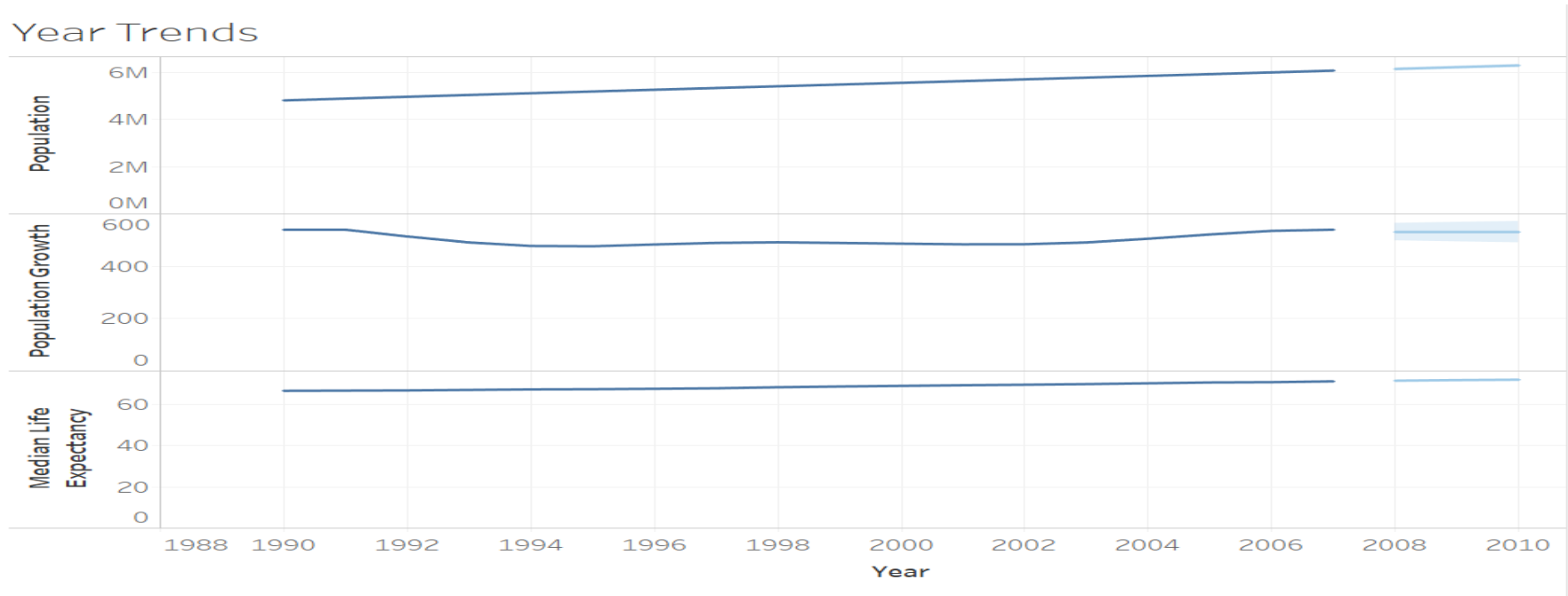
Overarching Insights

- Consistent R value for the gap minder data.
- $Y=m*X+c$ equation is used to frame linear regression.
- Mean expected life expectancy value ~63 closer the population data.

Support points: Cancer, Cholesterol and BMI



Time Series for gap minder data of median life expectancy forecast increasing 0.05%.



Key Insights

- The increasing population neutralising the cancer effect on increasing life expectancy because of constant population growth.
- This leads to further investigation to find missing variables or causality for the case study.