Examination of Factors Leading to Hospitalization, ICU Admittance, and ICU Outcomes due to COVID-19

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End of Program Presentation

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- This presentation is a learning opportunity for pre-college and early college students preparing for a career in scientific research to showcase findings and concepts learned during their summer internship.
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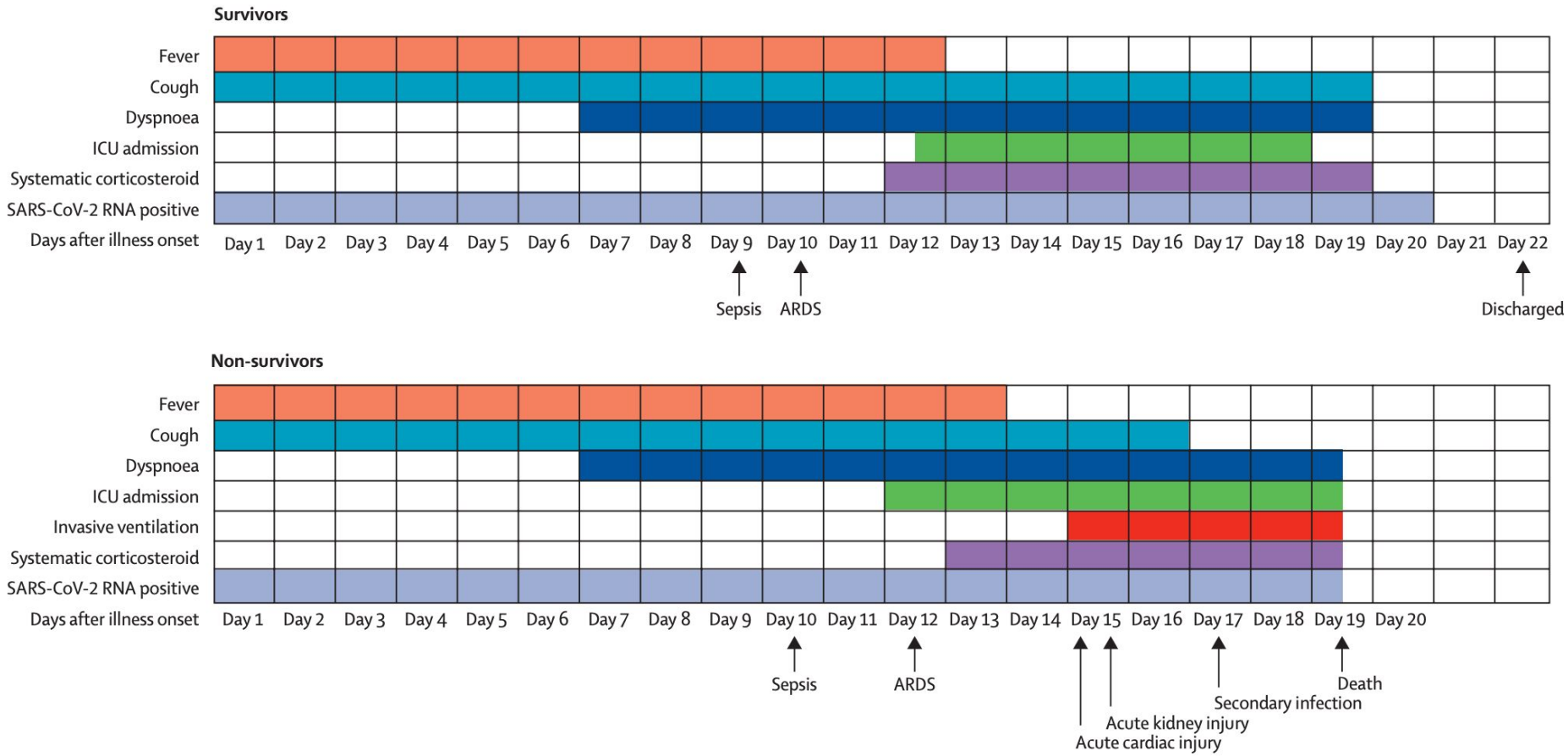
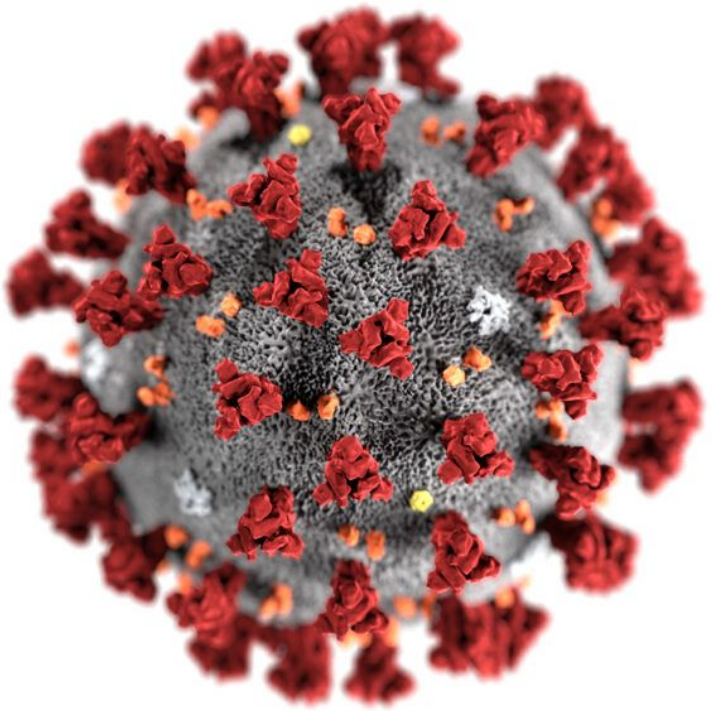
COVID-19 Clinical Course



Clinical courses of COVID-19 Patients. Adapted from *Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study* by Zhou et al. Retrieved from doi.org/10.1016/S0140-6736(20)30566-3

Background

- Clinical course of COVID-19 identified
- Key terms:
  - CoRDaCO
  - Comorbidity
- Data sources
  - INPC
  - IU Health
  - Eskenazi Health
  - Tests and Vital Signs
  - Census Data



Adapted from: *statnews.com*

Research Objectives

- Lab Group Focus
  - Drawing conclusions from CoRDaCO data
- Research focus
  - Correlate rates of hospitalization, ICU admittance, ICU outcomes to factors
  - Identified factors: Gender, Race, Charlson Index, Age, Comorbidities
- Means to identify high risk patients → Save time

Methods

- Using data on IU computing systems
- Variable definitions
  - Hospitalization
  - ICU Admittance
  - ICU Outcomes: Death/Discharge
- Data Tables:

	Gender			
	Male	**Female**	**Unknown**	*Total*
No ICU Admit	21942	26237	236	48415
Yes ICU Admit	536	473	0	1009
Total	22478	26710	236	49424

Characterization

- Queries to summarize data set
- Out of total 49424 patients

Factor	Percent
Gender	
Female	54.04%
Male	45.48%
Unknown	0.48%
Race	
American Native	1.35%
Asian	1.92%
Black	16.47%
Native Pacific Islander	0.55%
Other or Unknown	19.36%
White	60.36%
Charlson Index	
1-5	13.67%
6-10	1.72%
11-15	0.15%
16-20	0.01%
NA	84.46%

Factor	Percent
Comorbidities	
Coronary Heart Disease	3.08%
Chronic Obstructive Pulmonary Disease	2.67%
Chronic Kidney Disease	3.49%
Diabetes	7.28%
Hypertension	1.32%
Carcinoma	0.07%
Age (Years)	
0-9	1.50%
10-19	5.25%
20-29	15.83%
30-39	15.59%
40-49	16.50%
50-59	15.79%
60-69	12.54%
70-79	8.00%
80-89	5.92%
90-99	2.89%
100-109	0.14%
110-119	0.03%
120-129	0.00%
NA	0.01%

Results and Analysis

- List of significant factors
- Blocked by dependent variable
- Check for the smallest p-values

	P-Values		
Factor	**Hospitalization**	**ICU Admittance**	**ICU Outcome**
Gender	< 0.001	< 0.001	0.698
Race	< 0.001	< 0.001	< 0.001
Charlson	< 0.001	< 0.001	0.120
Age	< 0.001	< 0.001	< 0.001
Comorbidities			
Coronary Heart Disease	< 0.001	< 0.001	0.053
Chronic Obstructive Pulmonary Disease	< 0.001	< 0.001	0.656
Chronic Kidney Disease	< 0.001	< 0.001	0.018
Diabetes	< 0.001	< 0.001	0.032
Hypertension	< 0.001	< 0.001	0.755
Carcinoma	< 0.001	0.346	0.400

Conclusion

1. All factors analyzed correlated to rates of hospitalization
2. Nearly all factors correlated to rates of ICU admittance
3. Only race and age correlated to rates of ICU Outcome

Implication → Predict severity of COVID-19

Future work:

- Adding new factors
- Compare to other studies

References

- Wuhan COVID-19 Study: "Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study" by Zhou et al.
  doi.org/10.1016/S0140-6736(20)30566-3

Resources

- Regenstrief COVID-19 Dashboard: https://www.regenstrief.org/covid-dashboard/

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Thank you for your attention!

Any questions?