The Visual Evolution of a COVID-19 Dashboard: Merging Clinical Operations with Public Health

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Ian Tfirn, MPH[2], Guillaume Labilloy, ME, MBA[2], Jennifer Fishe, MD[2]

BACKGROUND

Setting

- Large academic medical center - safety net and trauma care in NE Florida and SE Georgia
- No daily dashboards outside electronic medical record (EMR) prior to COVID-19
- No centralized institutional COVID-19 metric reporting
- Hospital executive leadership commissioned a COVID-19 dashboard from two teams

Dashboard Inception

- Rapid production using existing models (University of Pennsylvania and Vizient)
- Push delivery via daily email

Comparison of Features Over Time

Features	March	April	May	June	July
1 Hospital capacity	*H (A)*	*H,C,R (A)*			
2 COVID-19 cases	*H (P)*	*H (P)* *H,C,R (A)*			
3 Testing results	*H,R (A)*				
4 COVID-19 length of stay		*H (A)*			
5 Epidemiological indicators		*C,R (A)*			
6 Mortality		*H,C,R,U (A)*			
7 Personal protective equipment			*H (P)*		
8 Testing supplies			*H (A,P)*		
9 Surgery volume			*H (P)*		

Legend:
(A)=Actual, (P)=Predicted
H=Hospital, C=County, R=Regional, U=USA

LESSONS LEARNED

Listening to the Voice of the Customer

- Focused on meeting immediate need
  - What information is needed most for operational planning at the hospital executive level?

Optimizing Visualization of Key Information

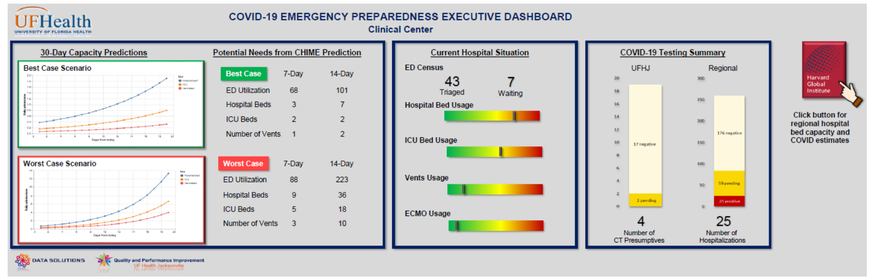
- Designed visualizations in formats for rapid processing
  - Red-yellow-green scale indicators, pie charts, line/bar graphs

Incremental Build for Data Architecture

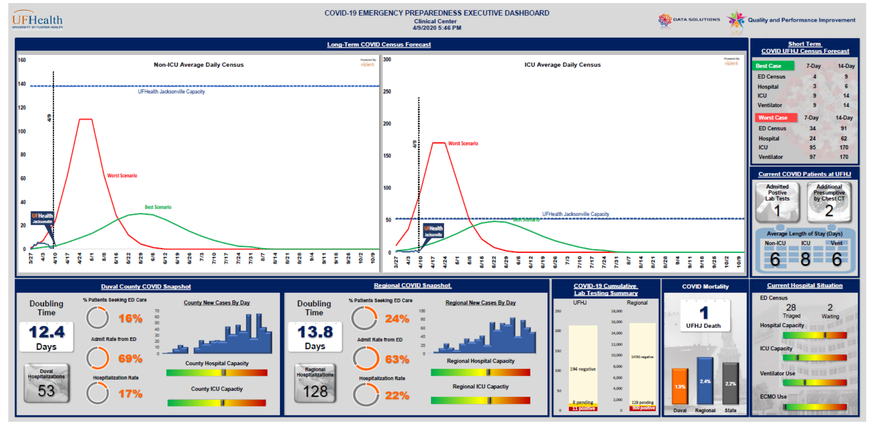
- Division of labor
  - Visualization team for design/design updates
  - Data engineering for database building and automation
  - Analyst for vetting data sources/literature
- Layer in separate database for each additional metric

EVOLUTION OF DASHBOARD AT UFHJ

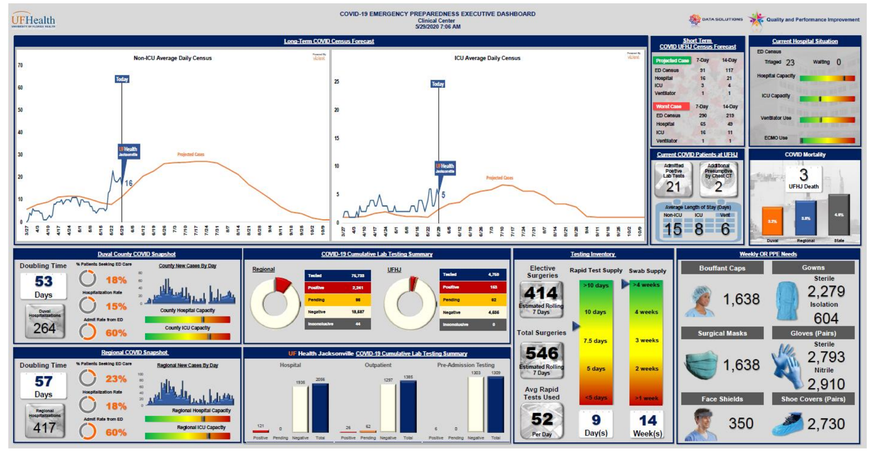
March
Concept development



April
Merging with public health data



May-July
Supply inventory and forecasting



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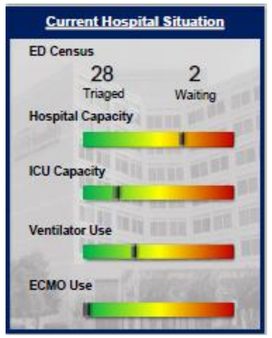
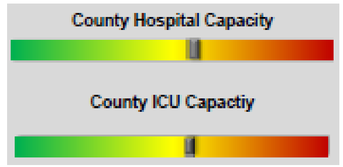
DASHBOARD FEATURES

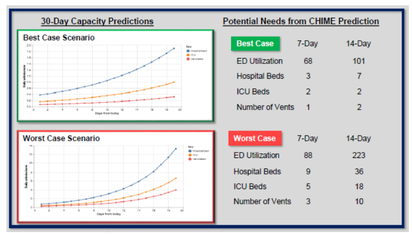
Hospital Capacity



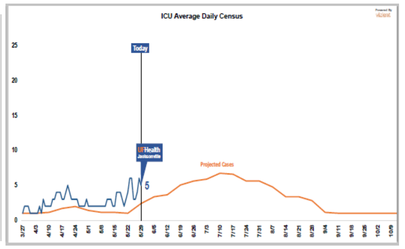


April onwards
- Added county and regional capacity for coordination/planning purposes

COVID-19 Cases

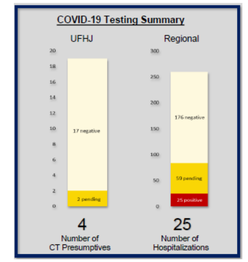


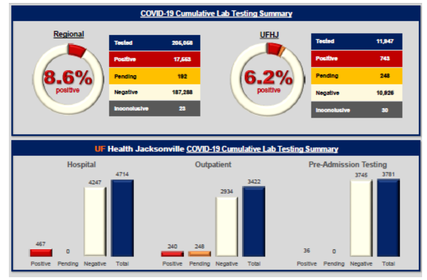
March
Predictions using UPenn model



April onwards
Predictions using Vizient model

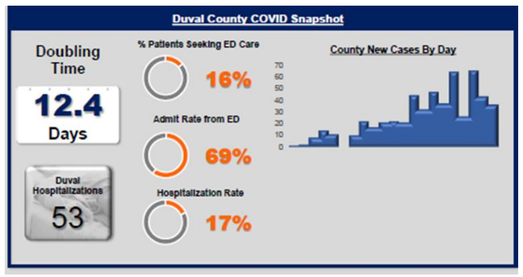
Testing Results





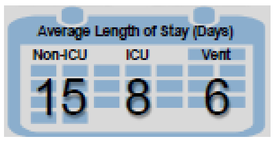
April onwards
- NLP algorithm to identify cases due to initial restrictive testing
- Visualization changed as numbers increased
- Testing results segmented to different locations provide more actionable data

Epidemiological Indicators

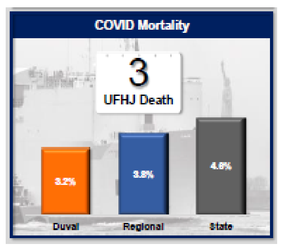


Personal Protective Equipment

COVID-19 Length of Stay



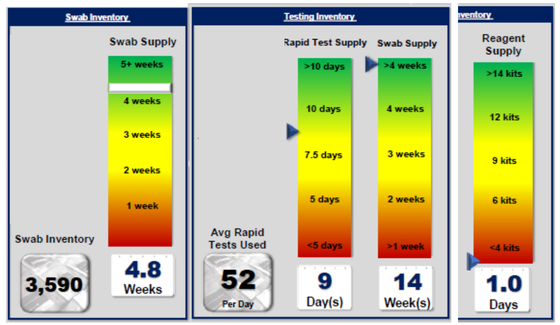
Mortality Data



Surgery Volume

May onwards
- Added predictions for surgery volume as elective surgeries resumed

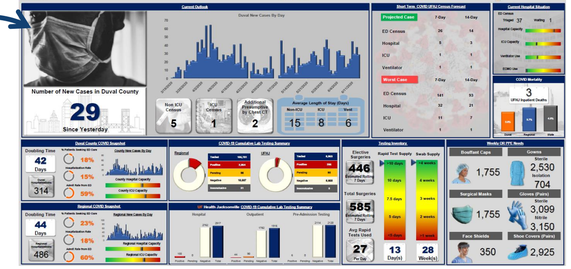
Testing Supplies



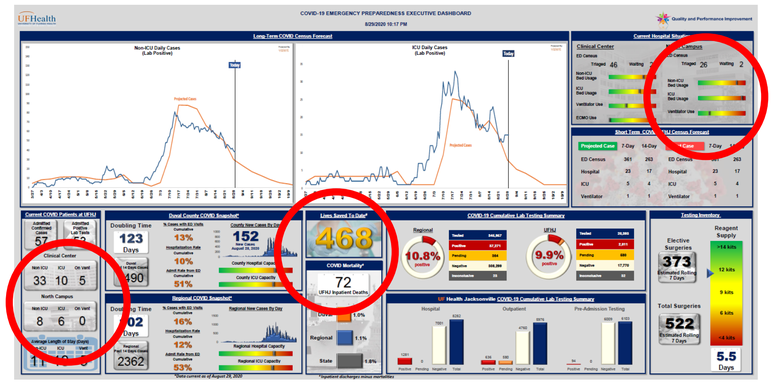
May onwards
- Inventory and predictions reported
- Rate-limiting supplies swapped out as needed

Additional Evolutions

June
- As cases decreased, a separate dashboard highlighting the number of new cases was created, reminding employees to remain vigilant



August
- As death toll increased, the number of lives saved was added to improve morale
- Hospital capacity and number of COVID-19 cases were added for second campus as case load increased



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