



Benchmarking Perspectives

February 17, 2022



AQNetwork.org

Benchmarking Learning Objectives

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- Familiarize you with four perspectives of benchmarking
- Linking benchmarking results to improvement opportunities
- Apply critical thinking skills to understand both the power and the risks associated with benchmarking



Agenda

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- Introduction to benchmarking
- Four benchmarking perspectives
 - Internal
 - External
 - Econometric Modeling
 - Data Envelope Analysis
- Example application of Benchmarking



Introduction to Benchmarking

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“Benchmarking is not the answer,
it is a tool”

Dale Probasco, Managing Director of Navigant Consulting



Definition of Benchmarking¹

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Benchmarking is the process of comparing one's organizations processes and performance metrics to industry bests or best practices from other industries.

Also referred to as "**best practice benchmarking**" or "**process benchmarking**", this process is used in management and particularly strategic management, in which organizations evaluate various aspects of their processes in relation to best practice companies' processes, usually within a peer group defined for the purposes of comparison. This then allows organizations to develop plans on how to make improvements or adapt specific best practices, usually with the aim of increasing some aspect of performance.

Benchmarking may be a one-off event, but is often treated as a **continuous process** in which organizations continually seek to improve their practices.

Dimensions typically measured are **cost, quality, reliability, time and safety**.

1 - Wikipedia



Benchmarking is Not...

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- Easy or trivial
- An indictment on past performance
- A precise comparison between multiple entities
 - No two organizations will be perfectly comparable
 - Compiling data into requested taxonomy can be difficult
- A precise mathematical exercise, results are dependent on:
 - Selected peer group
 - Data quality, which can be affected by:
 - Source
 - Timing
 - Interpretations of questions
 - Metrics selected to measure
- A single numeric result does not tell the whole story!



Benchmarking is...

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Process to provide a platform for dialogue around key management questions:

- What are the appropriate measures of performance?
- Where do we stand relative to those measures, who are the “best”?
- Where do we have areas of strong performance?
- Where do we have opportunities to improve?
- What are others doing, and what should we be doing to improve?
- How will we institute those improvement initiatives?
- How can this benchmark support or challenge strategic decisions?
- How can this benchmark create a baseline from which management can measure the impacts of future strategic decisions?
- Ultimately, how will we measure success?



What Organizations Benchmark?

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- For profit companies
- Non-profit organizations
- Public and Private Universities
- Public school systems
- Local, state and federal government agencies
- Any organization wanting to quantify their performance relative to a peer group



Who Performs the Benchmarking?

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- Benchmarking is performed by any group wanting to quantify their performance relative to a peer group
- The basic capabilities to successful benchmarking is business acumen, data analytics skills, and critical thinking.
- Typical Groups Who Perform Benchmarking
 - Performance Excellence Group
 - Strategy Group
 - Finance and Accounting
 - Operations Groups
 - Human Resources



Basic Benchmarking Process

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1. Determine which benchmarking methodologies to use
2. Determine critical metrics to assess
3. Determine the data sources
4. Determine the peer group
5. Collect available data
6. After initial data collection, adjust steps 1 ~ 4 as necessary
7. Rack, stack, and analyze data
8. Summarize and report out on organizations performance around critical metrics



Thoughts on Critical Metrics and Data Sources

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- Good metrics being tracked by the organization should provide both an internal and external perspective (strengths and opportunities for improvements should be included).
- It is equally important that one has a good understanding of what is being measured, why it is being measured, who utilizes the data and how this is utilized to determine if the metric is relevant to the business.
- The emphasis of any metric should be on timely collection of data, analysis and dissemination of the analysis to the key constituents.
- Data sources may be driven by the metrics selected to measure
 - Example: A cost metric would probably need data from Accounting



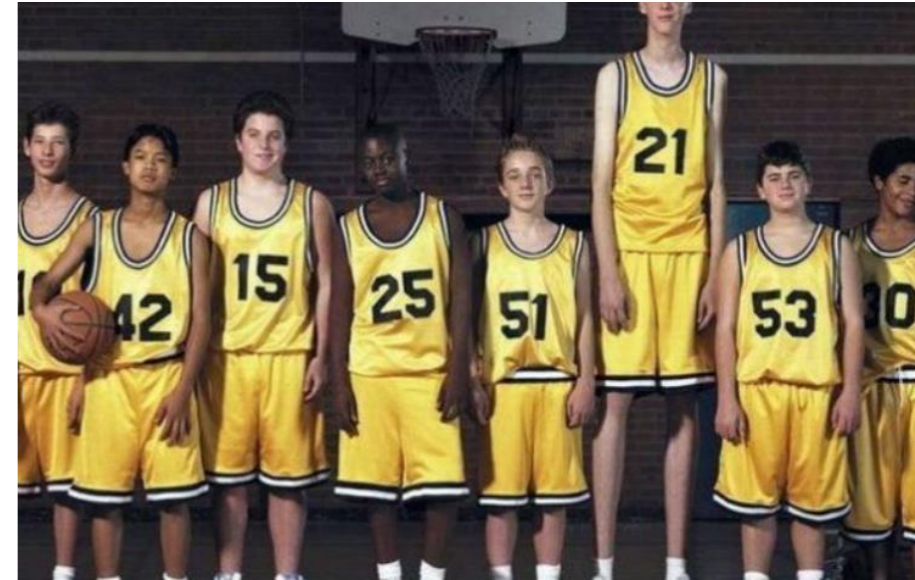
Determine the Peer Group

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Considerations for which organizations to be compared to:

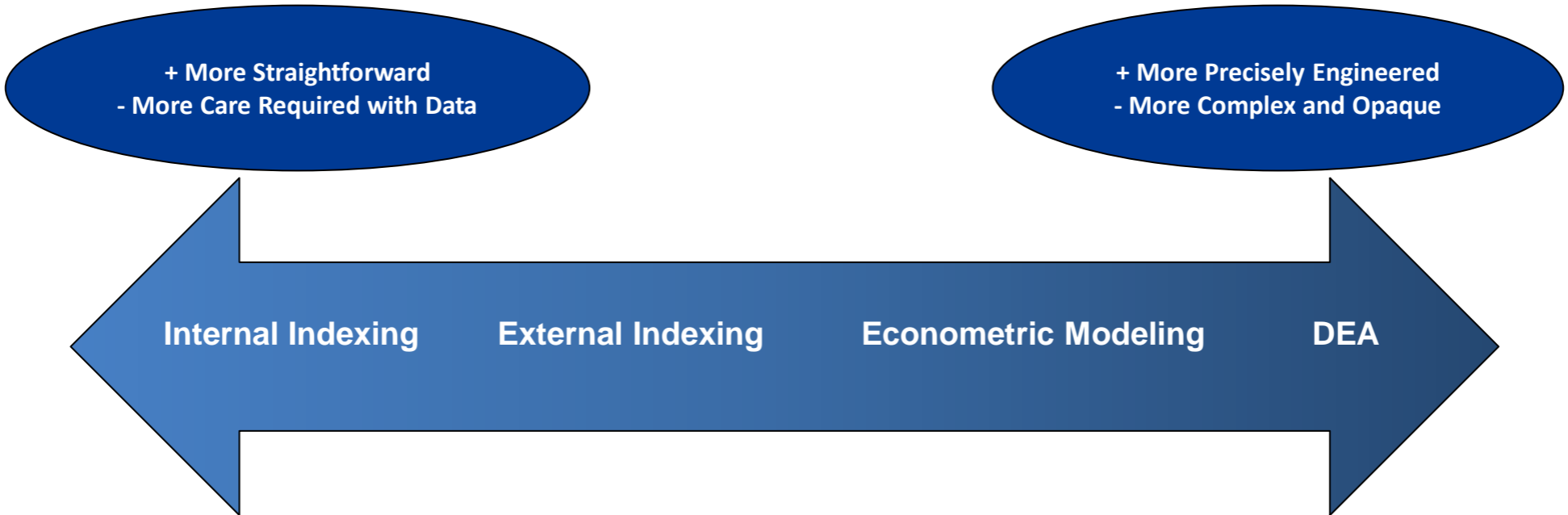
- Size (employees, sales, etc..)
- Markets served
- Geographical location
- Similar business models
- Other

The peer group should resemble your organization!



Determine the Benchmarking Methodology¹

Quantitative benchmarking methodologies may be selected based on the availability or quality of comparable data, and methods may be catered to the intended audience (i.e., Senior Leaders, regulators, Board of Directors, etc). Methodologies include:

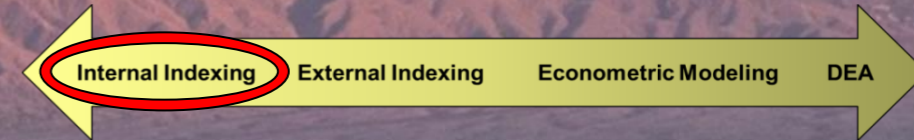


Metrics need to be simple, and complexity should be addressed in the analysis and interpretation

1. Scott Madden Consulting

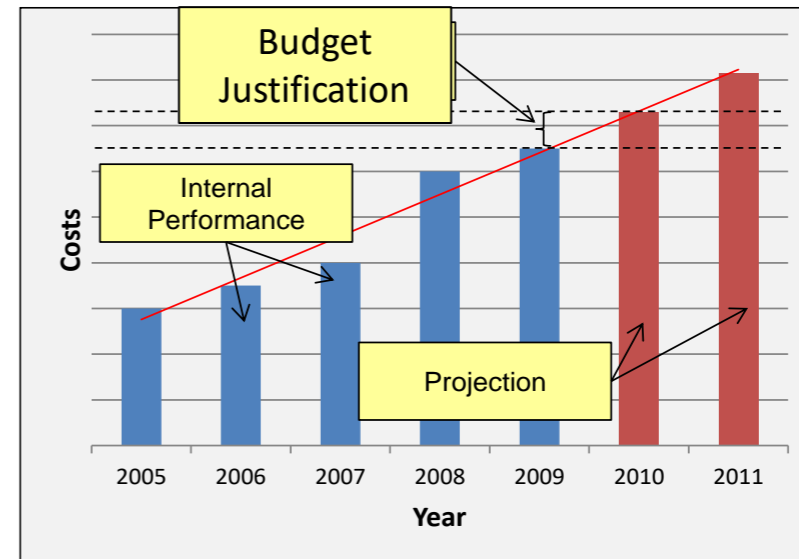


Internal Indexing



Internal indexing is the simplest form of benchmarking, the easiest to administer, and the most straightforward to communicate to stakeholders. Internal indexing simply compares current or projected values to actual historical data, with minimal data manipulation needed to ensure a like-in-kind basis of comparison.

- ◆ Projected costs are sometimes “inflated” from historical costs using macroeconomic indices to adjust for aggregate price levels, but all other deviations should be attributable to internal adjustments within the company
- ◆ Because the benchmark in this analysis is simply past performance, it should be easily understood by all stakeholders and participants – for internal planning and target-setting
- ◆ This approach is used when an external basis of comparison is difficult to attain or validate, or when data is limited and external comparisons are not available



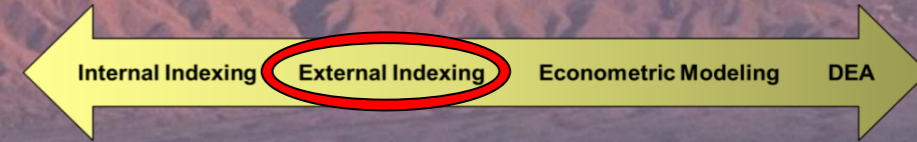
Sample Output

Internal indexing is common practice among all organizations

Pros	Cons
<ul style="list-style-type: none"> ◆ Simple, transparent, and easy to administer ◆ Straightforward and easy to interpret and understand ◆ Convenient access to source data 	<ul style="list-style-type: none"> ◆ Narrow, internal focus, lacks objective external reference ◆ Does not account for factors external to the business ◆ Inability to identify, learn from top performers

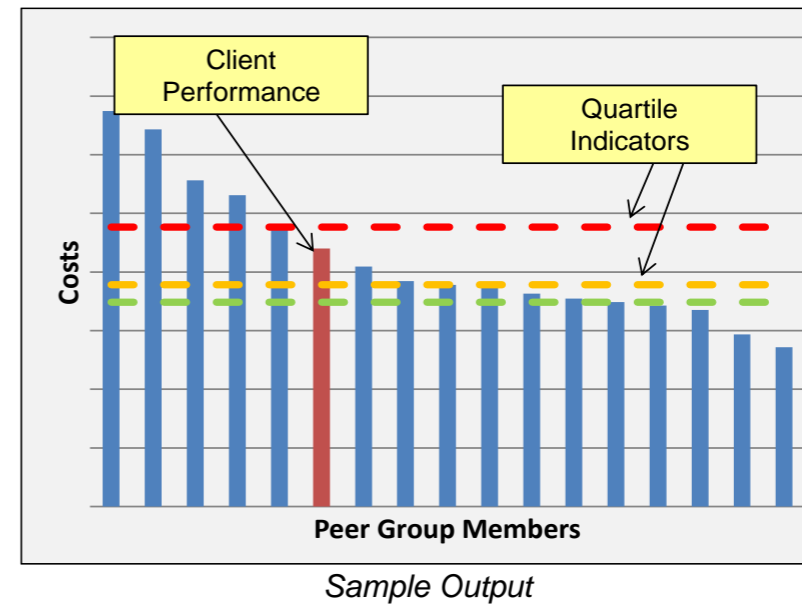


External Indexing



Like internal indexing, external indexing is simple and straightforward to communicate. Rather than relying on intuition or internal trending, external comparisons provide a powerful reference point for cost or productivity by validating objective conclusions about “good” performance and identifying top performers.

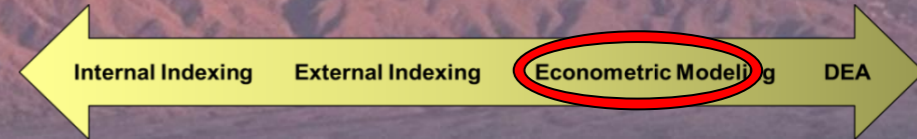
- ◆ Because every organization is different, appropriate care must be taken in developing and tailoring the panel of peers for comparison
- ◆ By looking externally at how others are addressing common challenges, external indexing can provide management with valuable insights about how to improve their business
- ◆ Highlighting areas of disproportionately positive or negative performance also provides management with specific, fact-based tools to prioritize improvement initiatives and measure ongoing performance



Pros	Cons
<ul style="list-style-type: none"> ◆ Straightforward and easy to interpret and understand ◆ External view provides powerful insights and validates conclusions about relative “good” performance 	<ul style="list-style-type: none"> ◆ Requires analogous data for peers ◆ Challenge of change management and buy-in ◆ Peer group selection leaves room for interpretation ◆ Dependent upon consistency of data reporting

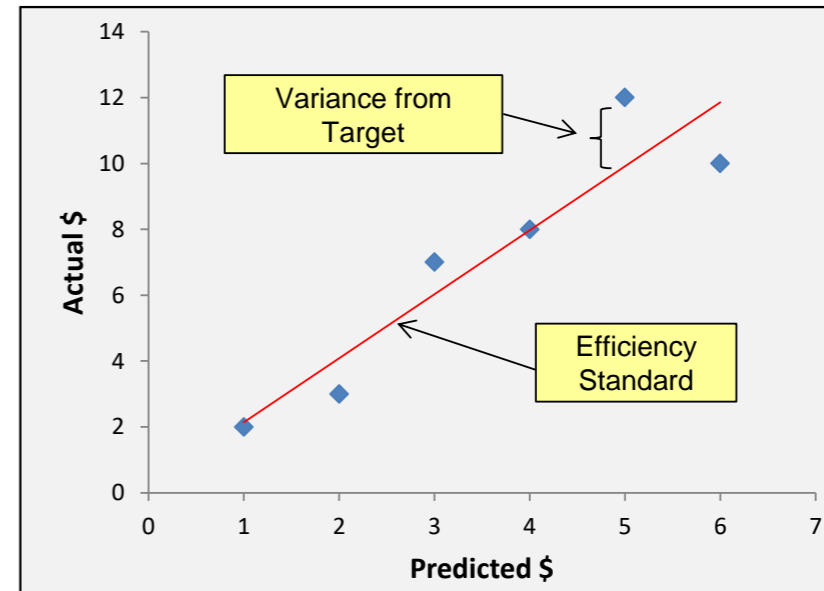


Econometric Modeling



Econometric modeling combines economic theory with statistical regression to identify and forecast relationships between costs and a range of quantifiable local business factors (e.g., miles of transmission line, number of customers, weather, etc.) Based on historical data and known influences, the model identifies significant cost drivers and forecasts their respective impact on predicted costs.

- ◆ Allows for varied inputs and accommodates large data sample sizes with differing operating conditions
- ◆ An econometric model can produce an estimate of the percentage by which a utility's costs are above or below the "efficiency standard"

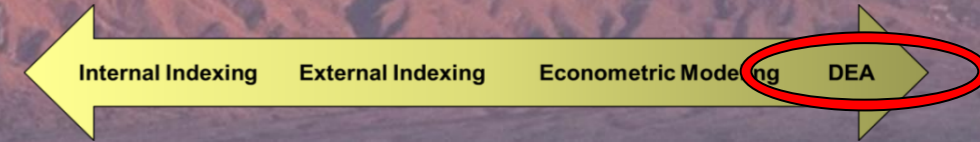


Sample Output

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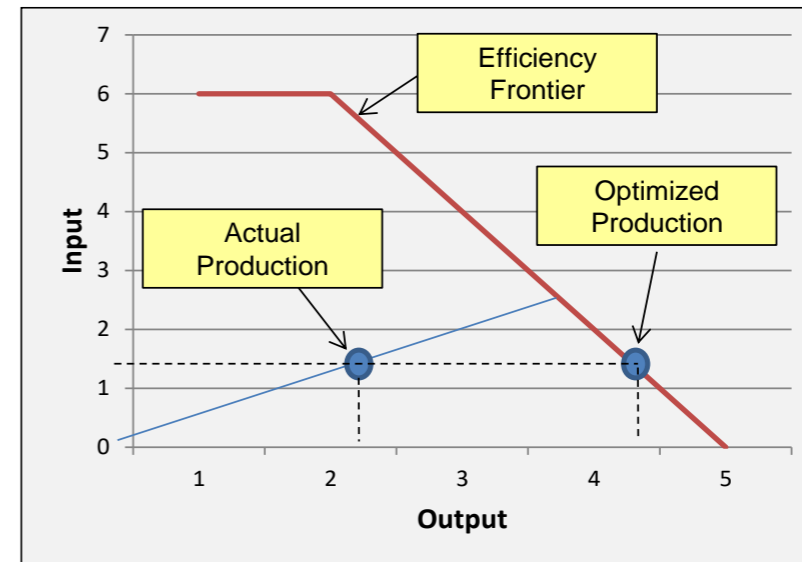
Data Envelope Analysis



Data Envelopment Analysis (“DEA”) utilizes a linear programming function to optimize outputs (such as costs) subject to certain known constraints. The technique identifies blends of inputs which produce equivalent optimized outputs.

- ◆ The goal of DEA is to find the best attainable production for each real input included. Efficiency is measured as the distance from the best attainable curve or “efficiency frontier”
- ◆ The maximized production scheme identifies inefficiencies by either making more output with the same input or making the same output with less input

Note: Though we see some discussion about potential applications of this methodology in utility benchmarking, the majority of our findings were academic in nature – and little evidence exists of proven, valid results.



Sample Output

Pros	Cons
<ul style="list-style-type: none"> ◆ Can uncover otherwise unknown relationships ◆ Potential for increased specificity and precision ◆ Accommodates multiple categories and units of inputs and outputs (e.g., \$ costs vs. MWhs sold) 	<ul style="list-style-type: none"> ◆ Lack of methodological transparency ◆ Increased complexity is difficult to communicate ◆ Precision can be a barrier to practicality



Benchmarking Example



How is New Mexico performing with regards to the negative outcomes from the COVID pandemic?

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Critical Metrics:

- Infections
- Deaths

Data Sources:

New Mexico Department of Health

<https://cvprovider.nmhealth.org/public-dashboard.html>

John Hopkins University

Time period: January 2020 to February 1, 2022

<https://www.cnn.com/interactive/2020/health/coronavirus-us-maps-and-cases/>



Internal Perspective

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Raw Metrics

Total Infections

480,087

Total Deaths

6,454

Total Population

2.1 million

New Mexico Data

Resulting Calculations

Infection Rate = $480,087 / 2,100,000$ = 22.9% of the total population infected

Death Rate = $6,454 / 2,100,000$ = 0.031% of the total population

Infected Death Rate = $6,454 / 480,087$ = 1.34% of the infected population

Do these results answer the original benchmarking question?

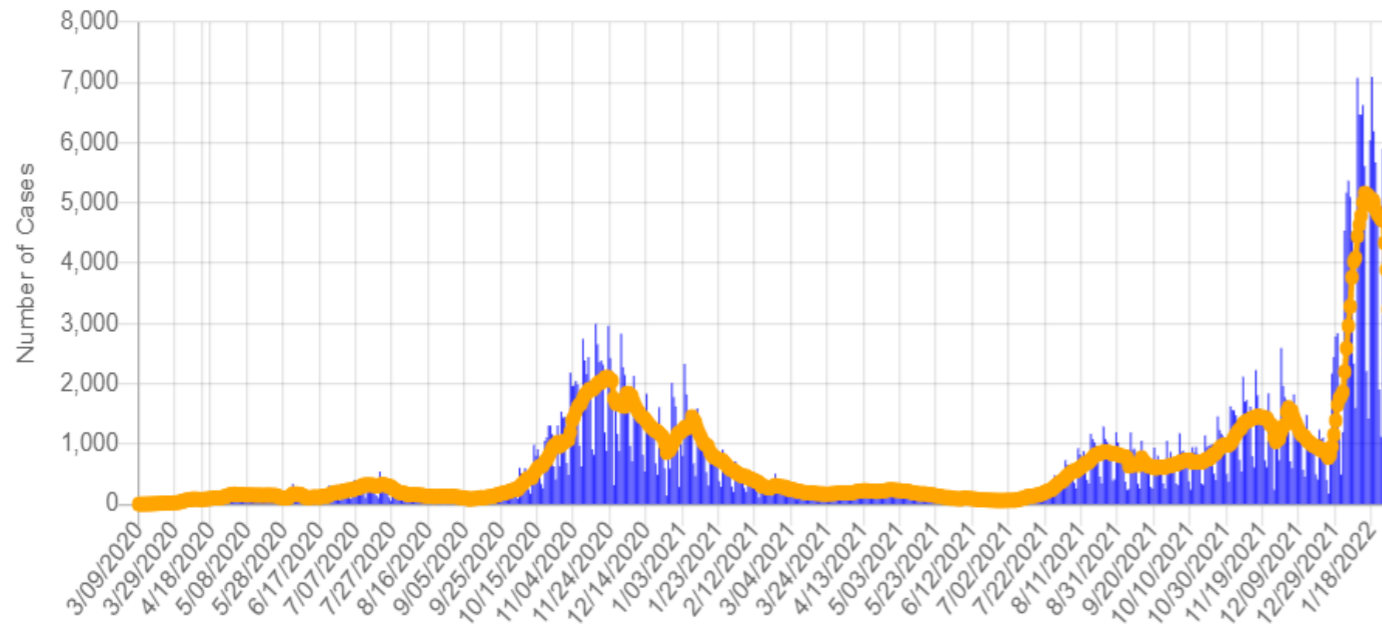


Internal Perspective – Infections Over Time

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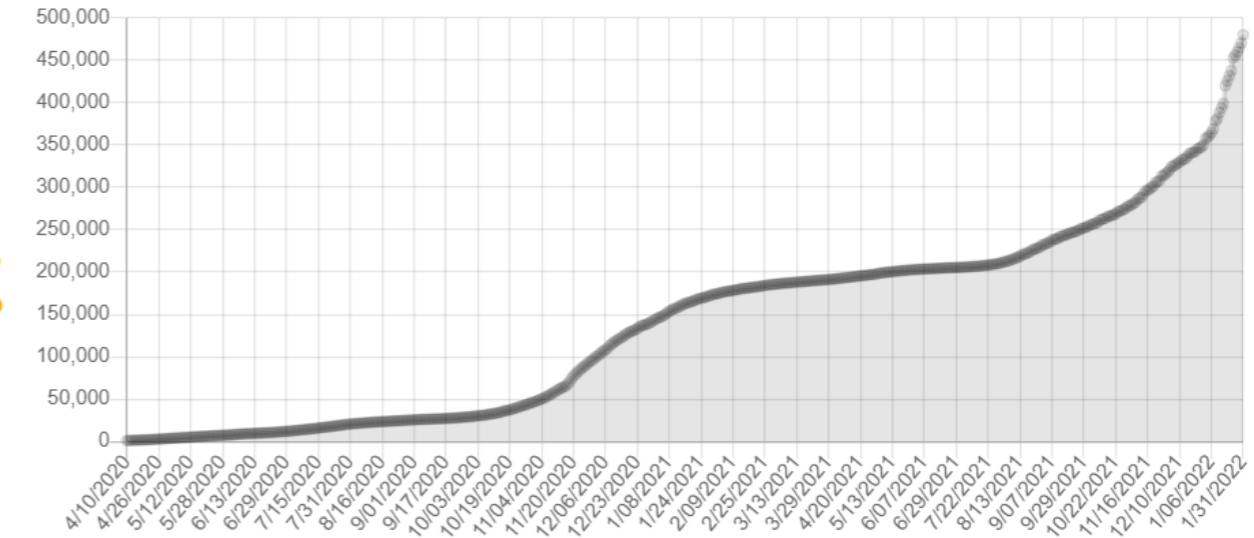
Epidemic Curve

Number of cases per day with 7-day rolling average



New Mexico Weekly COVID Infections

Cumulative Number of Cases



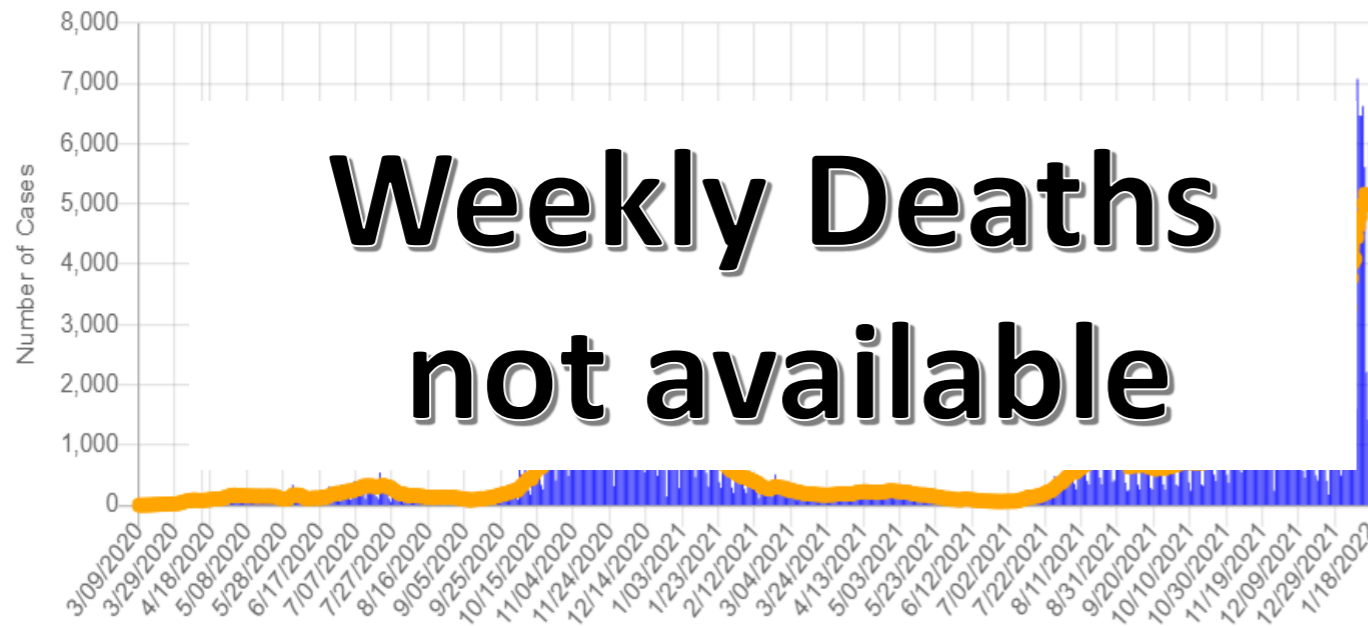
Does this give us a better picture on the infection metric?



Internal Perspective – Deaths Over Time

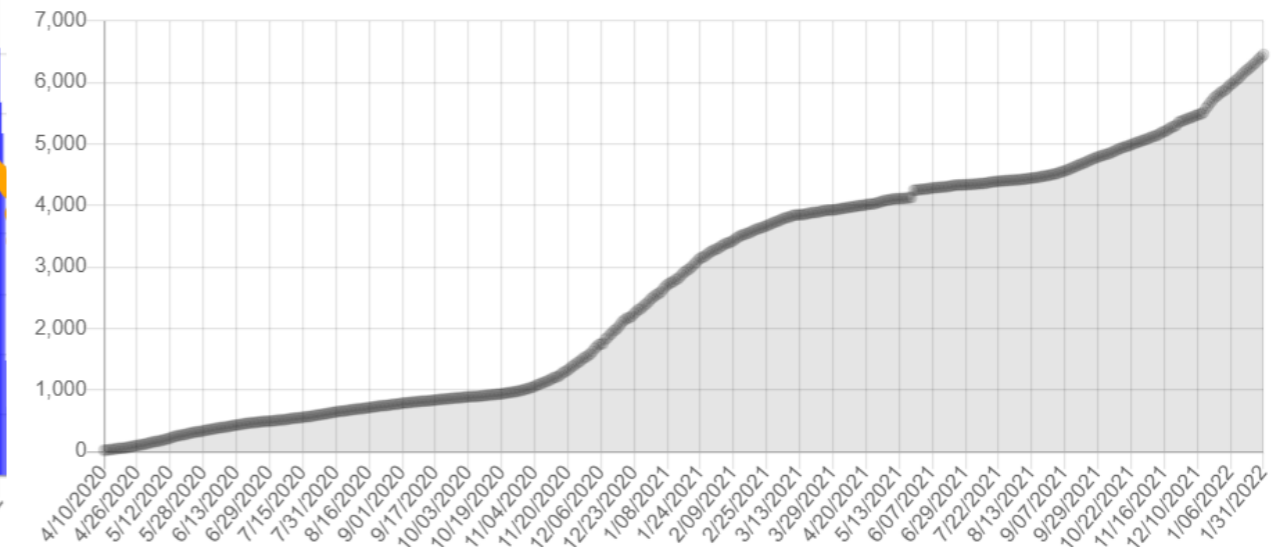
Epidemic Curve

Number of cases per day with 7-day rolling average



New Mexico Weekly COVID Deaths

Cumulative Number of Deaths



Typical, not all the data you may to benchmark is readily available



External Perspective

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Metrics

Infections

Deaths

New Mexico Data

480,087

6,454

Selected Peer Group - 50 states of the U.S.A

- First Quartile 1 – 12 state ranking
- Second Quartile 13 – 25
- Third Quartile 26 – 37
- Forth Quartile 38 - 50

Any comments concerning the selection of the peer group for the external benchmark perspective?



External Perspective Results (50 State Peer Group)

Quartile	Range (1000's Infections)	Notes
First Quartile	0 - 380	Best in peer group: Vermont 104K
Second Quartile	381 - 976	15th: New Mexico 480K
Third Quartile	977 – 1,623	
Fourth Quartile	1,624 – above	Worse in peer group: California 8,417K

Quartile	Range (Deaths)	Notes
First Quartile	0 – 3,666	Best in peer group: Vermont 536
Second Quartile	3,667 – 11,115	17th: New Mexico 6,454
Third Quartile	11,116 – 21,356	
Fourth Quartile	21,357 – above	Worse in peer group: California 80,004

Discuss the results concerning the external benchmark perspective



Econometric Perspective

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Metrics Normalized to Total Population

Infection Rate per 100K

Death Rate per 100K

New Mexico Data

22,896

308

Peer Group - 50 states of the U.S.A

- First Quartile 1 – 12 state ranking
- Second Quartile 13 – 25
- Third Quartile 26 – 37
- Forth Quartile 38 - 50

Same peer group selected, metrics normalized to total population



Econometric Perspective Results (50 State Peer Group)

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Quartile	Range (Infections per 100K)	Notes
First Quartile	0 – 21,327	Best in peer group: Maine 536
Second Quartile	21,327 – 23,091	23rd :New Mexico 22,896
Third Quartile	23,092 – 25,314	
Fourth Quartile	25,315 – above	Worse in peer group: Rhode Island 32,452

Quartile	Range (Deaths per 100K)	Notes
First Quartile	0 – 198	Best in peer group: Hawaii 83
Second Quartile	199 – 281	
Third Quartile	282 – 317	34th :New Mexico 308
Fourth Quartile	318 – above	Worse in peer group: Mississippi 367

Discuss the results concerning the econometric benchmark perspective



Economic Perspective

What Happens if the Peer Group is adjusted to better match New Mexico's population density?

Metrics

	New Mexico Data
Infection Rate per 100K	22,896
Death Rate per 100K	308
Population Density (p/mi ²)	17

New Peer Group

State	Density (people/mi ²)
Wyoming	6
Montana	7
North Dakota	11
South Dakota	12
New Mexico	17
Idaho	22
Nebraska	25
Nevada	29
Kansas	36
Utah	40
Maine	44
Oregon	45



Peer Group - 12 states with similar population densities

- First Quartile 1 – 3 state ranking
- Second Quartile 4 – 6
- Third Quartile 7 – 9
- Forth Quartile 10 – 12

Population Density Notes:

- Alaska has the lowest in the country with 1 person per square mile
- New Jersey the highest in the country with 1,215 people per square mile



Econometric Perspective Results (12 State Peer Group)

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Quartile	Range (Infections per 100K)	Notes
First Quartile	0 – 21,281	Best in peer group: Maine 13,075
Second Quartile	21,282 – 22,711	
Third Quartile	22,712 – 25,314	7th: New Mexico 22,896
Fourth Quartile	25,315 – above	Worse in peer group: North Dakota 29,358

Quartile	Range (Deaths per 100K)	Notes
First Quartile	0 – 145	Best in peer group: Utah 128
Second Quartile	146 – 259	
Third Quartile	260 – 281	
Fourth Quartile	282 – above	Worse in peer group: New Mexico 308

Discuss the results concerning the econometric benchmark perspective



How is New Mexico Performing with regards to the COVID pandemic?

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Summary of Benchmarking Results

Metric	Internal Perspective (Total Count)	External Perspective 50 States (Total Count)	Econometric Perspective 50 States (Rate per 100K)	Econometric Perspective 12 States (Rate per 100K)
Infections	480,087	2 nd Quartile (15 th)	2 nd Quartile (23 rd)	3 rd Quartile (7 th)
Deaths	6,454	2 nd Quartile (17 th)	3 rd Quartile (34 th)	4 rd Quartile (12 th)



Benchmarking Summary

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- Results often confirm existing beliefs of core strengths and weaknesses
- Trends are more important than single data points
- Quality of data directly impacts the resulting value to the organization
- Good comparators are important, however we can learn from all comparisons

Primary Drivers of Variation in a Benchmarking Results

- Data quality
- Metric chosen
- Peer group selected
- Period of benchmark (1 year snap shot vs. 3 year trend)



Benchmarking

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Discussion





Thank you!