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Concurrent Session 5 – Healthcare Trend Monitoring and Forecasting

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Healthcare Trend Monitoring and Forecasting

- Introduction of Trend History and Management Cycle
- Historical Trend Monitoring
  - Trend Reporting Overview
  - Trend Driver Identification & Mitigation
- Trend Forecasting
  - Forecast Overview
  - Trend Modeling
  - Trend Components
  - Seasonality
- Conclusion

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Poll Question

In 2000, US health expenditure was 13.3% of GDP. What is the forecasted value for 2028?

1. 13.8%
2. 15.2%
3. 18.8%
4. 19.7%
5. 21.4%

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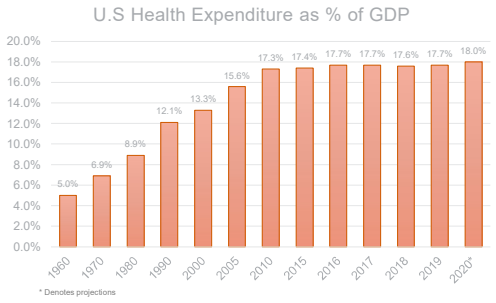
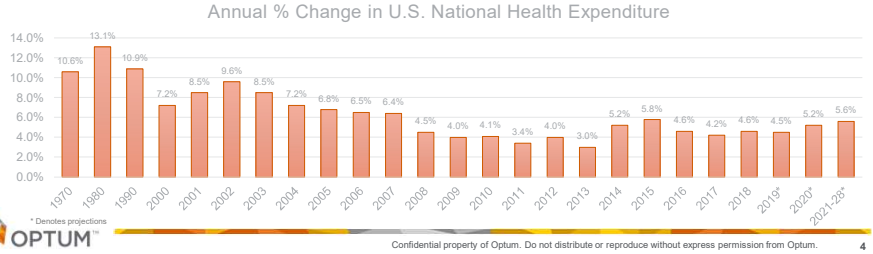
Introduction of Trend History and Management Cycle - Medical Trend History



- Health expenditure as % of GDP currently around 18%; growth anticipated
- Decline in trends from 1970s-1990s related to medical price/inflation stabilization
- Slow down in trend during ACA implementation 2010-2013
- 2014-2015 growth includes coverage expansions (Exchanges and Medicaid Expansion) and Hep C
- Forecast
  - Reflects price acceleration above the recent experience
  - Medicare payer growth
  - Health expenditures expected to outpace GDP (19.7% in 2028)

SOURCES:
- Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group.
- https://www.healthaffairs.org/doi/10.1377/hlthaff.2020.00094



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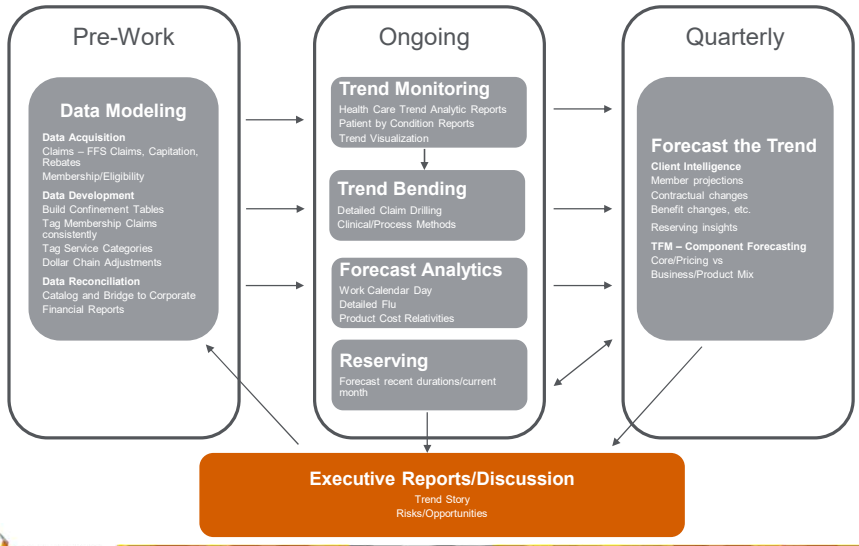
Introduction of Trend History and Management Cycle - Trend Analytic and Management Cycle



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Poll Question

What is the primary challenge you face when analyzing your historical experience?

1. Data quality/availability concerns
2. Lack of adequate staffing/resources
3. No developed process
4. Limited implementation into business strategy
5. Other (include comments in the chat)

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Foundational Elements of Trend Monitoring/Forecasting

Data Quality

- Ensuring data quality is essential to impactful trend monitoring and forecasting.
- Data quality tasks include:
  - Selection of appropriate data
  - Reconciliation to a trusted financial/accounting source
  - Cleansing of unreasonable/inaccurate data elements

Reporting and Modeling

- Historical reports and forecast models should provide valuable insights.
- Reports and models should:
  - Allow for detailed analysis at various levels of grain
  - Be flexible to easily update inputs and assumptions
  - Summarize results and findings clearly
  - Be reviewed thoroughly

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Foundational Elements of Trend Monitoring/Forecasting

Completion/Reserving

- Accurate reserves are needed to create insightful year-over-year trends.
- Primary reserving methodologies used in healthcare:
  - Development methods using lag triangles
  - Expected loss ratio method
- Reserves should be calculated as granularly as appropriate to drive trend observations and forecasting assumptions. Meaningful breakouts include:
  - Health Cost Category (HCC) or Service Type
  - Product Line (Medicaid, Medicare, Commercial)
  - Market
  - Benefit Type (Medical, Behavioral, LTC, Dental, Vision)
- Different completion factors may be appropriate for paid dollars, allowed dollars, and utilization metrics.

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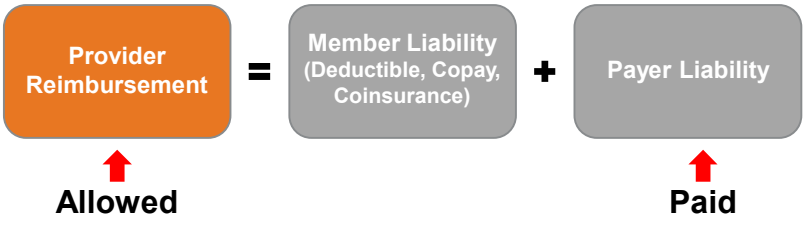
Trend Breakdown – Paid vs Allowed

- Allowed Trend (Gross Trend)
  - Total provider reimbursement (payer + patient liability)
- Paid Trend (Net Trend)
  - Financial statement view
  - Payer liability only (excludes members' out of pocket expenses)



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Trend Breakdown – Paid vs Allowed

Paid vs Allowed Trend Considerations

- Seasonality
  - – Paid/Allowed ratios are generally higher later in the year as members satisfy deductible and maximum out of pocket provisions.
- Leveraging
  - – Paid trends can exceed allowed trends due to fixed member cost-sharing.
- Benefit Design Changes
  - – Changes to members' benefits can alter paid vs allowed comparisons.

Example

	Quarterly PMPMs								YoY Quarterly Trends			
Paid vs Allowed Trends	2019Q2	2019Q3	2019Q4	2020Q1	2020Q2	2020Q3	2020Q4	2021Q1	2020Q2 / 2019Q2	2020Q3 / 2019Q3	2020Q4 / 2019Q4	2021Q1 / 2020Q1
Paid PMPM	3.40	3.78	3.99	3.62	4.73	4.80	4.52	4.02	38.9%	26.9%	13.4%	11.0%
Allowed PMPM	4.96	5.24	5.43	5.51	5.56	5.62	5.82	6.01	12.1%	7.3%	7.2%	9.1%
Paid/Allowed Ratio	68.6%	72.2%	73.4%	65.7%	85.1%	85.4%	77.7%	66.9%	24.0%	18.3%	5.8%	1.8%

New Year

Impact of Benefit Change

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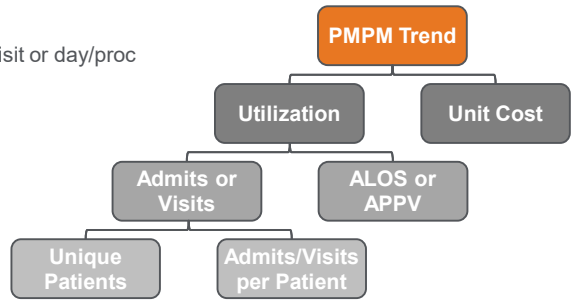
Trend Breakdown - Components

- Components of Trend
  - – Utilization
    - Admits/1,000 or visits/1,000 (dependent on HCC)
    - Average length of stay (ALOS) or average procedures per visit (APPV)
    - Unique patients (penetration)
    - Admits or visits per patient
  - – Unit Cost
    - Average cost per admit/visit or day/proc



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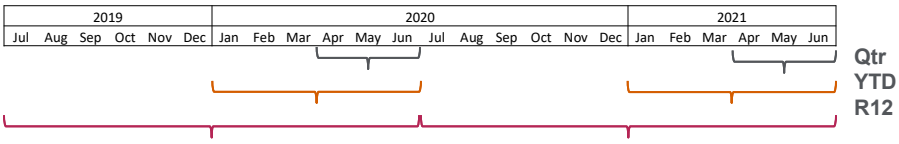
Trend Breakdown – Time Period

- There are numerous options of time periods to use to analyze trends.
- It is important to consider seasonality of experience – trend period and base period should generally align on the months of the year included.
- Common time periods:
  - Most recent month/quarter
  - Year-to-date
  - Rolling quarter/year

Incurred through June 2021 Example



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Trend Driver Identification – Metrics

- Various metrics can be used to identify trend drivers:
  - Trend = percentage PMPM change
  - Spend Change = change in total dollars
  - Rate Difference = PMPM change * current period membership
  - Disproportionate Share = (cohort trend – total trend) * base period PMPM

Metric Calculation Example

Cohort	Base Period MMs	Trend Period MMs	Base Period PMPM	Trend Period PMPM	PMPM Change	Trend	Spend Change	Rate Difference*	Disproportionate Share*
A	1,000	2,000	100.00	95.00	(5.00)	-5.0%	90,000	(10,000)	(16.63)
B	1,500	1,750	90.00	100.00	10.00	11.1%	40,000	17,500	(0.47)
C	50	50	10.00	15.00	5.00	50.0%	250	250	3.84
D	2,000	1,000	80.00	100.00	20.00	25.0%	-60,000	20,000	10.70
Total	4,550	4,800	86.92	97.03	10.11	11.6%	70,250	48,519	0.00

*Rate Difference and Disproportionate Share are not additive

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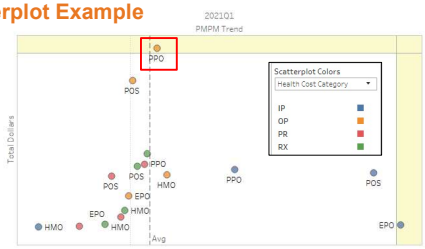
Trend Driver Identification – Visualization

- Incorporating visualization and summarization capabilities into your trend monitoring can assist in identifying trend drivers.

PMPM Trend Scatterplot Example



Rate Difference Example

Product	HCC	Service Category	Rate Diff - Total
PPO	OP	Freestanding Clinical Lab	$3,386.5K
PPO	IP	01-Nervous System	$2,576.5K
POS	OP	Freestanding Clinical Lab	$2,554.0K
POS	IP	18-Infect. and Parasitic Diseases	$1,821.8K
PPO	OP	Outpatient Surgery	$1,809.2K
HMO	OP	Freestanding Clinical Lab	$1,640.3K
PPO	IP	04-Respiratory System	$1,193.2K
EPO	IP	OT_SURG-Surgery-Assoc. with Mult. DRGs	$1,097.9K

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Trend Driver Identification – Determining Root Cause

- Once a trend driver is identified, it is critical to determine the root cause(s) of the trend in order to develop an effective mitigation/management strategy.
- Data splits to analyze further include:
  - HCC
  - Service Category
  - Business Mix
  - Providers
  - Procedure/Revenue Codes
  - Diagnoses
- At more granular levels, consideration should be given to the appropriateness of using completed claims data. Other methods may be more appropriate, including:
  - Uncompleted claims data
  - Applying cut-offs so base period and trend period have equal run-out periods

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Trend Driver Identification – Determining Root Cause

PPO Outpatient Surgery Example

Revenue Code

Top 6 | Revenue Code - OP Only | ordered by | Total Dollars

	Total Allowed 2021Q1	Total Allowed Change 21Q1 / 20Q1	Total Allowed Trend 21Q1 / 20Q1
0490-AMBULATORY SURGICAL CARE-GENERAL	$2,309,039	($27,676)	-1.2%
0360-OPERATING ROOM SERVICES-GENERAL	$1,395,939	$667,767	47.8%
0370-ANESTHESIA-GENERAL	$808,797	$277,111	34.3%
0710-RECOVERY ROOM-GENERAL	$674,198	$195,537	29.0%
0272-MEDICAL/SURGICAL SUPPLIES AND DEVICES-STERILE SUPPLY	$501,283	$262,219	52.3%
0481-CARDIOLOGY - CARDIAC CATH LAB	$437,444	($271,213)	-62.0%

Diagnosis Category

Top 6 | AHRQ Diagnosis Detail Category | ordered by | Total Dollars

	Total Allowed 2021Q1	Total Allowed Change 21Q1 / 20Q1	Total Allowed Trend 21Q1 / 20Q1
203 OSTEOARTHRITIS	$701,894	$114,995	16.4%
205 SPONDYLOSIS; INTERVERTEBRAL D	$627,604	$97,355	15.5%
149 BILIARY TRACT DISEASE	$424,474	$200,223	47.2%
143 ABDOMINAL HERNIA	$345,951	$41,626	12.0%
101 CORONARY ATHEROSCLEROSIS AND	$312,378	($242,889)	-77.8%
258 OTHER SCREENING FOR SUSPECTED	$294,914	($140,778)	-47.7%

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Trend Driver Identification – Determining Root Cause

PPO Outpatient Surgery Example

Provider

Top 4 | Provider - IP, OP, & PR Only | ordered by | Total Dollars

	Total Allowed 2021Q1	Total Allowed Change 21Q1 / 20Q1	Total Allowed Trend 21Q1 / 20Q1
GENERAL HOSPITAL 53553	$3,337,712	$459,773	13.8%
GENERAL HOSPITAL 53706	$1,515,044	$69,347	4.6%
GENERAL HOSPITAL 53346	$1,499,821	$352,140	23.5%
GENERAL HOSPITAL 54067	$944,133	$136,996	14.5%

General Hospital 53346

	2020Q1	2021Q1
Allowed	$1,084,095	$1,499,821
Visits	202	201
Allowed / Visit	$5,380.05	$7,451.28

Procedure Code - OP & PR -- *Select Outpatient or Professional at the top to show Procedure Codes*

93458-CATH PLMT, HRT & ARTS W/NJX & ANGIO IMG S&I
43239-EGD TRANSORAL BIOPSY SINGLE/MULTIPLE
C1713-ANCHOR/SCREW OPPOSING BN-TO-BN/SOFT TISSUE-TO-BN
47562-LAPAROSCOPY SURG CHOLECYSTECTOMY
31267-NSL/SINUS NDSC MAX ANTROST W/RMVL TISS MAX SINUS
45380-COLONOSCOPY W/BIOPSY SINGLE/MULTIPLE
63030-LAMNOTMY INCL W/DCMPRSN NRV ROOT 1 INTRSPC LUMBR

- In this example, General Hospital 53346 experienced a ~40% increase in cost/visit driving the overall trend.

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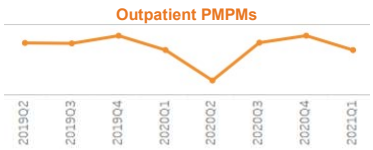
Trend Driver Identification – Significant Changes

- Significant items may occur in historical data that disrupt the year-over-year flow of comparable data.
- Examples:
  - Large environmental events (COVID-19 pandemic, hurricanes, etc.)
  - Significant benefit changes (new drugs, broader provider network, etc.)
  - Regulatory changes (Affordable Care Act, Medicaid expansion, etc.)
- These items may appear in historical data as trend drivers and overshadow other drivers that are driving costs that can be managed more effectively.
- Approaches for significant changes:
  - Normalize historical data
  - Choose different base period
  - Focus on core business
  - Awareness/communication



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Historical Trend Monitoring – Benchmarking

- Benchmarking is another tool that can identify trend drivers can provide insights into savings opportunities.
- Potential benchmarks:
  - Internal sources:
    - Comparable line of business
    - Forecast/expectations
  - External sources:
    - Publicly available data
    - Published studies

PMPM Benchmarking Example		
HCC	New Business	Established Business
Inpatient	150	160
Outpatient	350	335
Physician	200	200
Pharmacy	200	120

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Historical Trend Monitoring – Cost Mitigation

- Identifying trend drivers and the root cause allows business to implement cost savings initiatives and cost mitigation strategies aimed at decreasing costs/trends.
- Health plans can mitigate future costs in a variety of ways. Examples include:
  - Strengthening administrative controls
  - Re-evaluating network
  - Provider and member education
  - Case management
  - Evaluating billing practices
- Health plans need to consider the "triple aim" of healthcare when evaluating and implementing mitigation strategies:
  - Improve the experience of care
  - Improve the health of the population
  - Reduce costs

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Poll Question

Why is a forecast important to you?

A. Financial Planning

B. Reserving

C. Setting Expectations

D. Other (include comments in chat)

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Forecast Overview: Why do a Forecast?

- Financial Planning
  - Help understand future claims expense and profitability
- Reserving
  - A forecast can guide reserves for recent durations where the claims experience it too immature for lag based reserving methods
- Setting Expectations
  - Internal and External audiences

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Forecast Overview: Process

- Forecast Process
  - Stage 1: Break down historic trend into components
    - Top-Down Approach
    - Explain each component using historic data
      - "What's driving trend?"
    - Identify recurring vs one-time events
  - Stage 2: Forecast each component and re-aggregate
    - Bottom-Up Approach
    - Based on recurring historic baseline trend and other anticipated trend drivers
  - Stage 3: Benchmark results
    - Does applying seasonality patterns to YTD results yield similar results?
    - Do medical projections align with revenue expectations?

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Trend Modeling – Types of Trend

- Allowed Trend (Gross Trend)
  - Total provider reimbursement (payer + patient liability)
- Paid Trend (Net Trend) **(a)**
  - Financial statement view
  - Payer liability only (excludes members' out of pocket expenses)
- **Business Mix Trend (b)**
  - Trend related to items that can be priced primarily related to membership churn
- **Core Trend (c)**
  - The underlying medical trend

$$a=(1+b)*(1+c)-1$$

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Trend Modeling – Business Mix

- Includes trend components that can be priced for
- Accounts for the impact that membership churn has on trends

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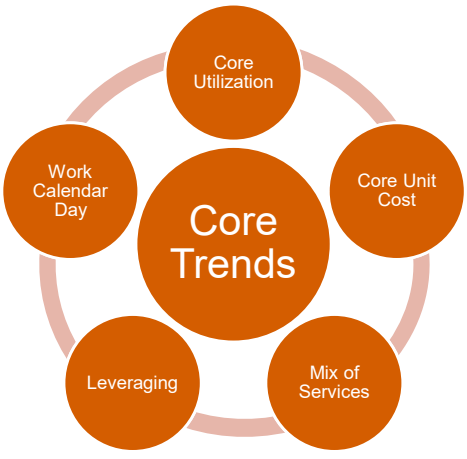
Trend Modeling – Core Trend

- Core Trends are the underlying medical expense trends for the renewal population
- Core trends are also referred to as Underwriting, Rating, or Pricing Trends



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Trend Modeling – Core Trend Setting (NRT) Analysis

- Underlying Core Trend is calculated by looking at the renewal membership trend
- Membership is classified either at the member level
  - **New Members**
    - Members that are new
  - **Renewal Members**
    - Members that elected to stay
  - **Terming Members**
    - Members that have left
- The Core Trend is equal to the Renewal Membership Trend
- Note that Renewal Membership Trends for Core Trend may not be appropriate for all populations

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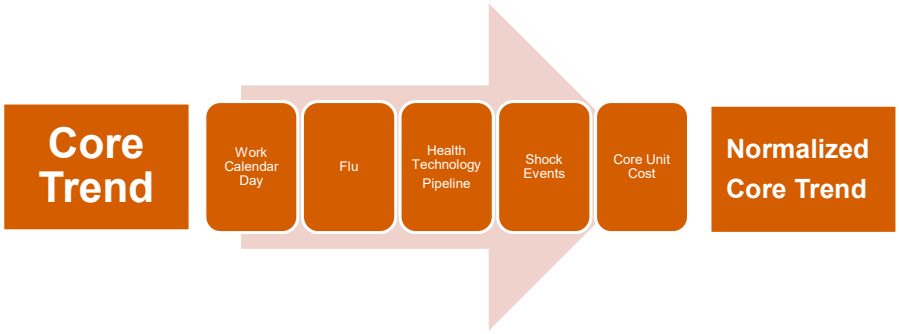
Trend Modeling – Normalizing/Forecasting Core Trends

- Normalized Core Trend
  - Baseline underlying core utilization and mix trends
- To derive Normalized Core Trends, we start with the Core Trend and **remove** core normalizing items that we can quantify



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Trend Modeling – Trend Walk Forecast

	Historical	Forecast
Year	2020	2021
Net Trend	-1.8%	7.3%
Business/Product Mix Total	-1.5%	-2.5%
+ Benefit Changes	0.5%	0.0%
+ Product Mix	-0.5%	-0.5%
+ Demographic Mix	-0.5%	0.0%
+ Geographic Mix	-0.5%	-0.5%
+ Durational Mix	0.5%	-0.5%
+ Small Group Underwriting	-0.5%	-0.5%
+ Customer Industry Mix	-0.5%	-0.5%
+ Other Population Mix	0.0%	0.0%
Core Trend	-0.3%	9.8%
+ Flu	-0.5%	0.0%
+ Unit Cost	2.0%	2.5%
+ HTP	1.0%	1.5%
+ Shock Events	-5.0%	4.0%
+ Work/Calendar Day	0.2%	-0.2%
+ Leveraging	0.5%	0.5%
Normalized Util/Mix	**1.5%**	**1.5%**

Business Mix Components

Core Trend Components

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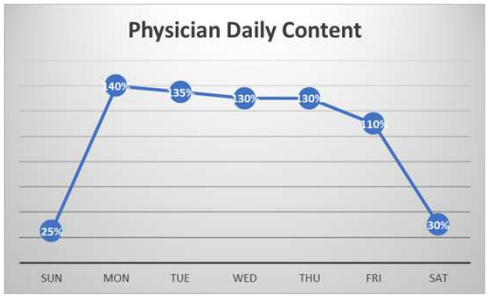
Trend Components – Work Calendar Day



- The make-up of the calendar can greatly impact the monthly cost
- During the week, experience is lowest on the weekends and highest on Mondays
- Holiday experience is lower than a normal weekday and needs to be adjusted

June 2019						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

7.7% more costly

June 2019 has 20 Weekdays compared to 22 in June 2020

June 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

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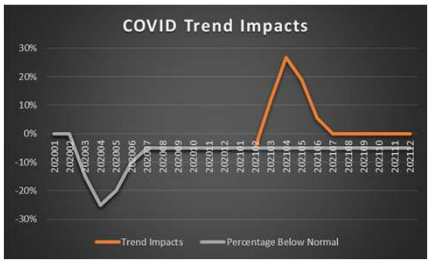
Trend Components – Shock Events

- Exogenous events can depress experience due to service delivery disruptions
- COVID Historical Quantification
  - This can be quantified comparing to prior forecast expectations
  - It is important to understand the abatement to know how much the forecast needs to bounce back



- COVID Prospective Impact
  - Short term prospective abatement and treatment can be measured from relationships to case rates
  - Long term is more of an artform

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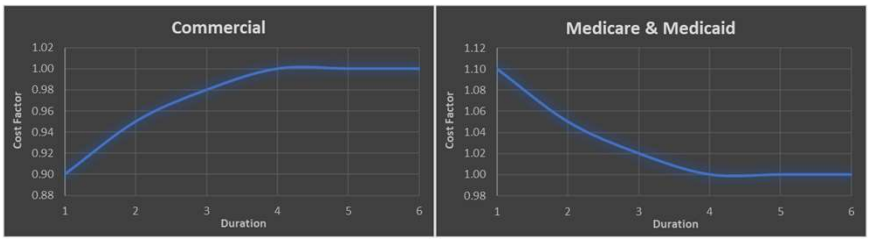
Trend Components – Duration

- The cost profile of new member may be different than longer term members



- The type of business and type of health service may have different new member cost profiles
- To the extent there is a higher proportion of new members, that may explain changes in experience

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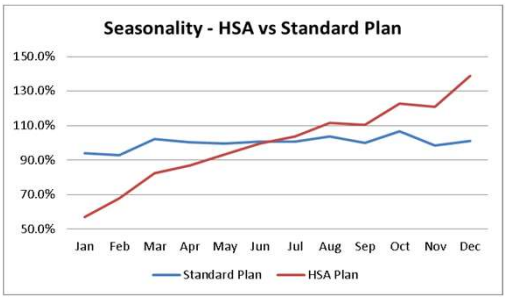
Seasonality Forecast Method

- Seasonality can be an alternative forecast method that seeks to use emerging experience
- It normalizes the base period for historical components and then layers on the prospective components to the base period experience
- Beyond the components, experience needs to reflect the underlying seasonality



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Conclusion

- Trend management is a multi-step process
  - Historical Analysis, Benchmarking & Mitigation, Forecasting
- Historical analysis is critical to bending trend and forecasting
- Key tenants for historical analysis
  - Data preparation
  - High level review using methods that resonate with business and context on expected changes
  - Plan for drilldowns to determine root cause
  - Mitigation actions
- Forecasting is complex; several key trend components with additional segmentation
- Trend components allow for A:E
- Executive buy-in for both historical and forecast relies on “telling the story”, driving action, and highlighting risks/opportunities

Know your trend...

Bend your trend…

Predict your trend…

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Questions

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