# Analytic Approaches to Managing Claims Risk in Evolving Healthcare Markets
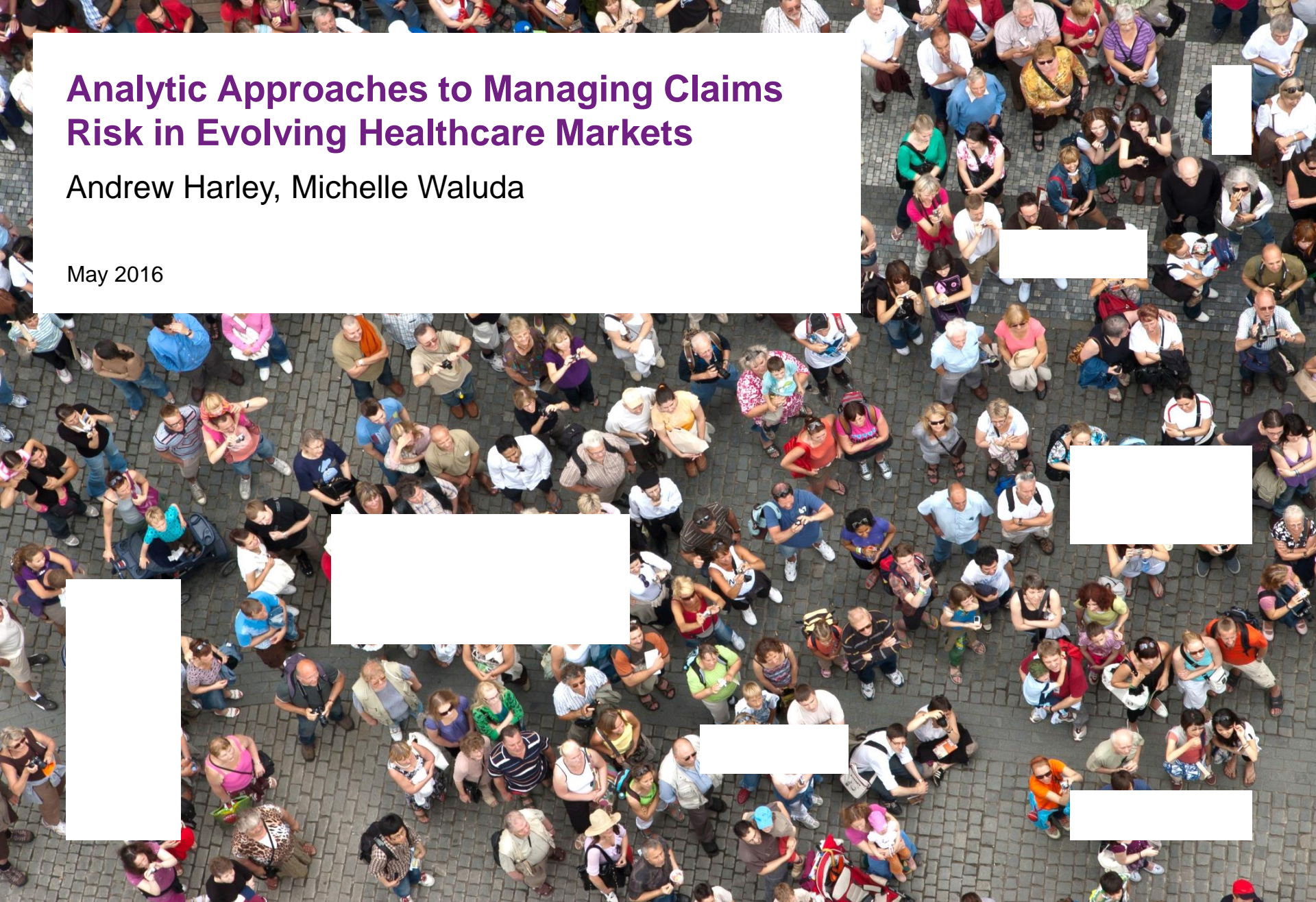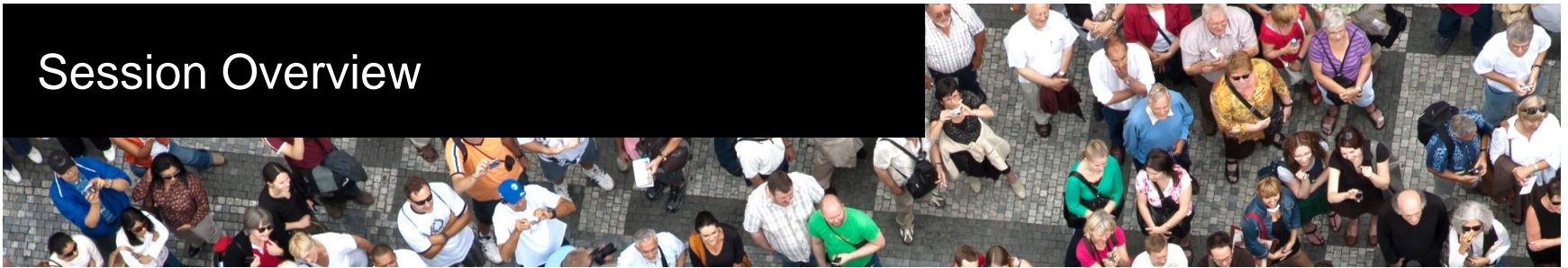
Andrew Harley, Michelle Waluda

May 2016

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# Session Overview

- Provide overview of global healthcare cost trends

- Examine drivers of healthcare costs

- Identify different sources of data and strategic design to capture the data

- Discuss key changes in different healthcare markets and potential analytics to best manage these changes

- Discuss building blocks for successful advanced analytics implementations

# Globally, healthcare costs are increasing at a much higher rate than inflation

Insurers are being forced to examine and address the cost drivers

| | Gross | | | Net* | | |
|---|---|---|---|---|---|---|
| | 2014 | 2015 | 2016 (Expected) | 2014 | 2015 | 2016 (Expected) |
| Global | 7.5% | 8.0% | 9.1% | 5.0% | 5.1% | 5.3% |
| Americas | 10.6% | 13.3% | 15.3% | 6.0% | 5.7% | 6.1% |
| Brazil | 14.1% | 15.7% | 18.0% | 7.8% | 6.8% | 11.7% |
| Mexico | 8.9% | 11.8% | 13.7% | 4.9% | 9.0% | 10.7% |
| Asia Pacific | 7.3% | 6.4% | 7.9% | 4.9% | 5.1% | 5.6% |
| Hong Kong | 7.6% | 8.6% | 8.8% | 3.2% | 5.7% | 5.8% |
| **India** | **9.8%** | **11.0%** | **12.0%** | **3.8%** | **5.6%** | **6.5%** |
| Europe | 5.3% | 5.2% | 5.7% | 4.3% | 4.2% | 4.2% |
| Germany | 4.3% | 4.0% | 3.8% | 3.5% | 3.8% | 2.6% |
| **UK** | **5.8%** | **6.4%** | **6.5%** | **4.3%** | **6.3%** | **5.0%** |
| Middle East/Africa | 10.3% | 12.6% | 12.2% | 6.4% | 8.4% | 7.5% |
| South Africa | 8.1% | 8.0% | 9.4% | 2.1% | 3.1% | 3.5% |
| U.A.E | 15.0% | 15.0% | 15.0% | 12.7% | 11.3% | 12.0% |

**57% of insurers expect trend to increase over the next 3 years as compared to current trends**

*Net of general inflation

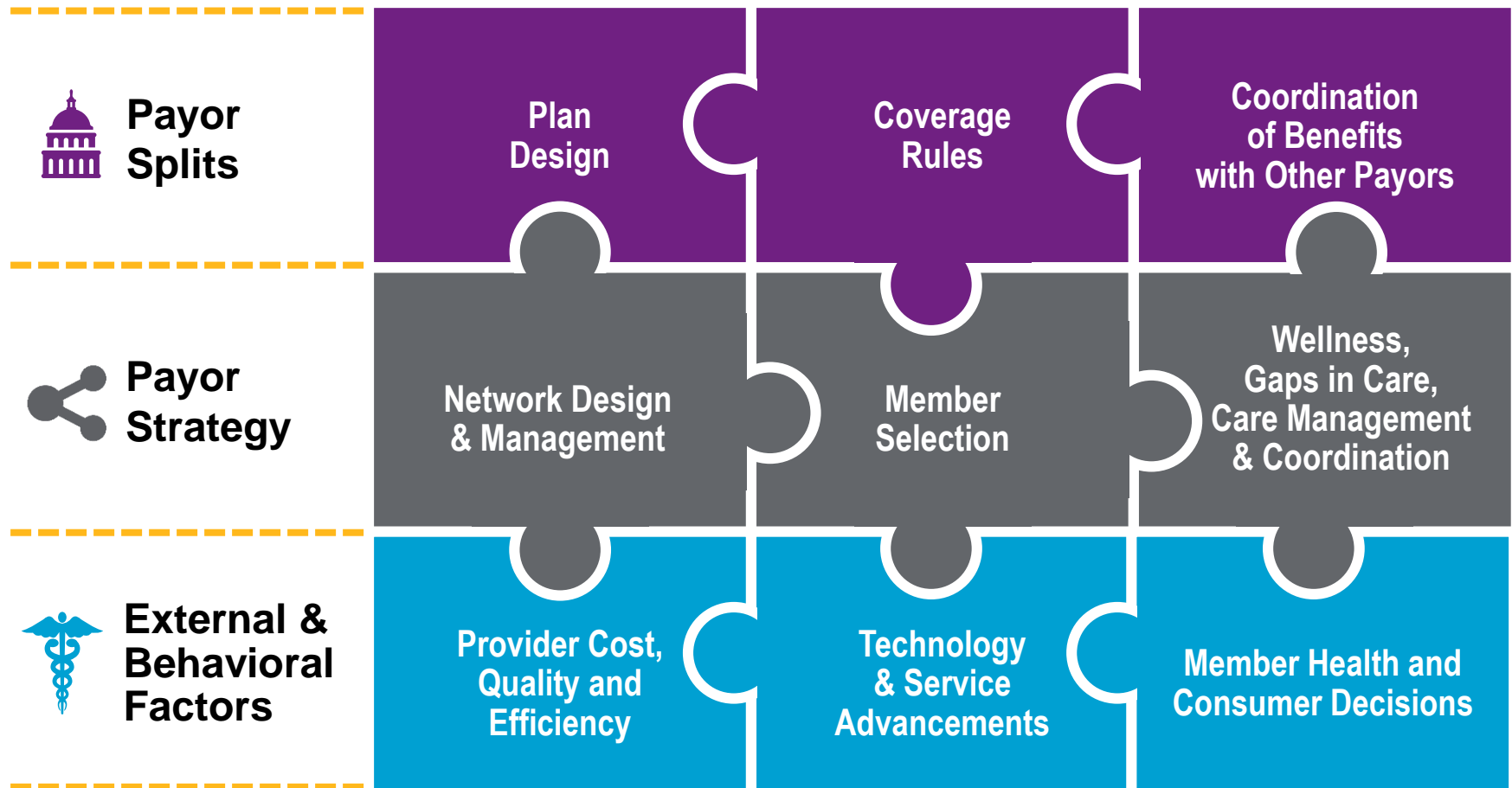Source: Willis Towers Watson 2016 Global Medical Trends Survey

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# Health plan costs are built up by a combination of factors

They can be broken down into three key areas

| | | |
|---|---|---|
| | **Payor Splits** | Government funding , health plan coverage rules and plan designs result in the cost split between the government, member and health plan |
| | **Payor Strategy** | Payors develop strategies, as available, to direct members to higher performing providers, improve lower performing provider results, attract healthier members to enroll in the plans, and improve the health of members enrolled in the plan |
| | **External and Behavioural Factors** | The underlying demand for healthcare services is driven by provider practices, new technologies, and member health and decision making. The demand for healthcare services technically exists because of healthcare needs, and will exist regardless of who is paying for those services |

# The drivers are comprised of multiple pieces

Understanding how they all fit together is critical

| | | | |
|---|---|---|---|
| **Payor Splits** | Plan Design | Coverage Rules | Coordination of Benefits with Other Payors |
| **Payor Strategy** | Network Design & Management | Member Selection | Wellness, Gaps in Care, Care Management & Coordination |
| **External & Behavioral Factors** | Provider Cost, Quality and Efficiency | Technology & Service Advancements | Member Health and Consumer Decisions |

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# Service demand, payor strategies and payor splits

Each influences costs differently
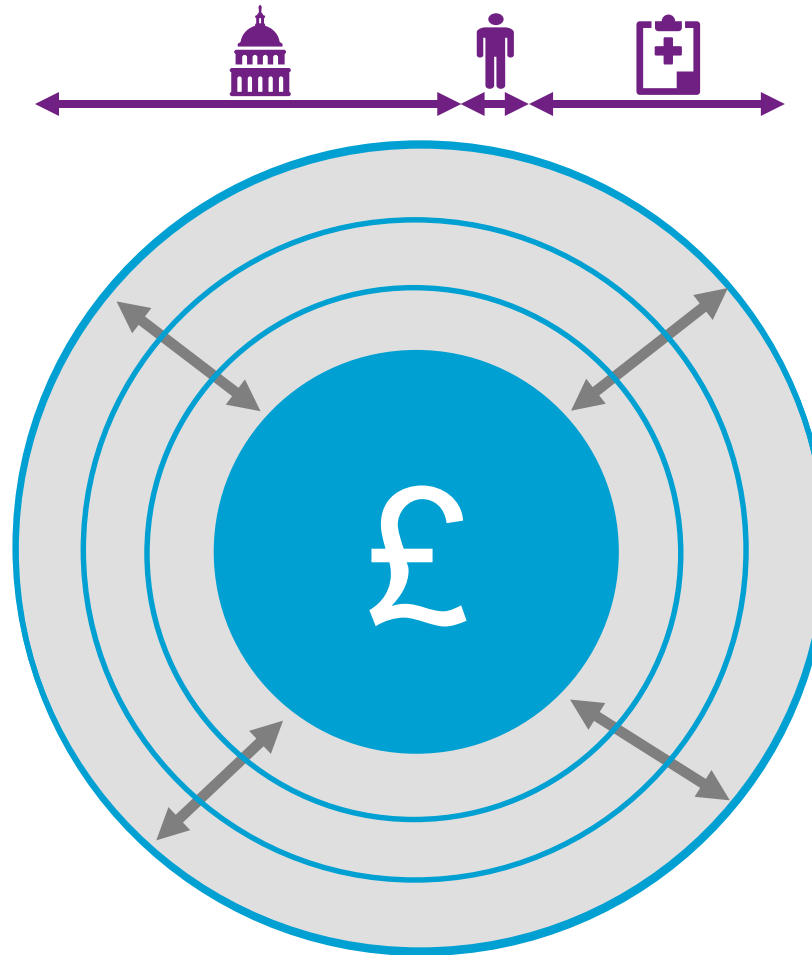
# Service demand, payor strategies and payor splits

Each influences costs differently



## External and Behavioral Factors:

The service demand is driven provider practices, new technologies, and member health and decision making. It technically exists regardless of the existence of any plan or payor

# Service demand, payor strategies and payor splits

Each influences costs differently



**Payor Strategy:**

The payors use a combination of strategies to manage the amount of spend such as:

- selecting high performing providers
- changing provider practices
- selecting healthier members
- improving member health

# Service demand, payor strategies and payor splits

Each influences costs differently
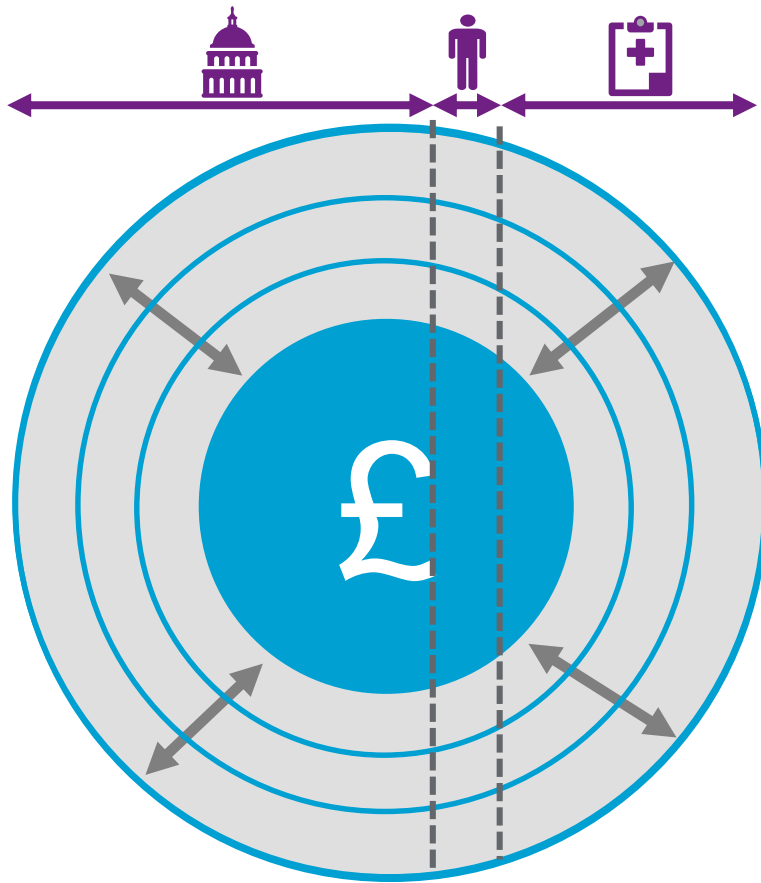


**Payor Splits:**

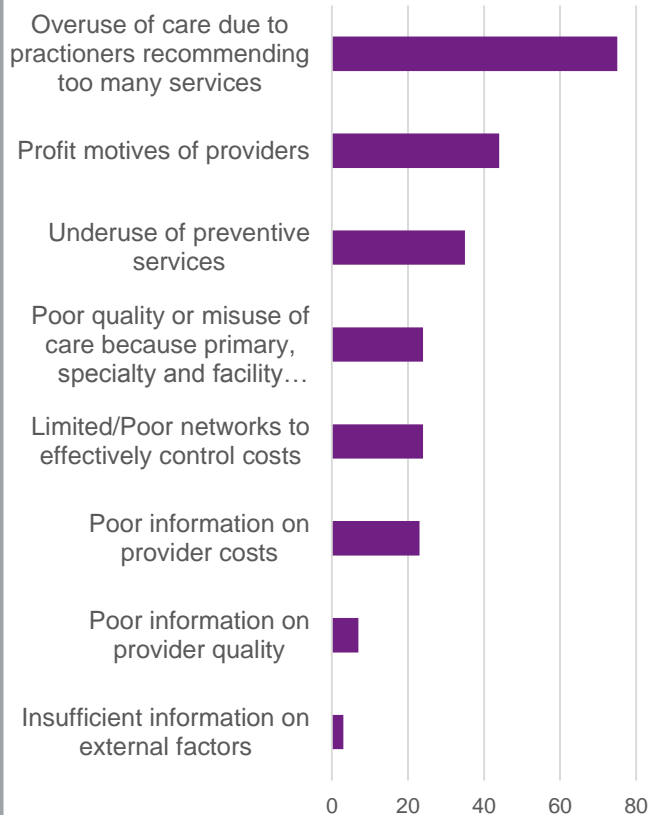A combination of government funding policies, health plan coverage rules and plan designs result in the cost split between the government, member and health plan
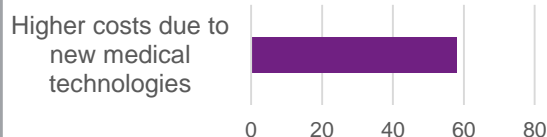
# Understanding the largest contributors to medical cost increases

Globally, insurers identify provider issues as a top driver

## 1. Provider cost, quality and efficiency

- Overuse of care due to practioners recommending too many services
- Profit motives of providers
- Underuse of preventive services
- Poor quality or misuse of care because primary, specialty and facility…
- Limited/Poor networks to effectively control costs
- Poor information on provider costs
- Poor information on provider quality
- Insufficient information on external factors

(scale: 0 20 40 60 80)

## 2. Technology & service advancements

- Higher costs due to new medical technologies

(scale: 0 20 40 60 80)

## 3. Member health and consumer decisions

- Overuse of care due to employees seeking inappropriate care
- Employees' poor health habits
- Changes in workforce demographics
- Plan design without any cost sharing features
- Poor employee understanding of how to use the plan
- Insufficient information on employee/provider behavior
- High cost catastrophic cases and end of life care
- Higher per capita income

(scale: 0 20 40 60 80)

Source: Willis Towers Watson 2016 Global Medical Trends Survey

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# Managing costs

## The tools insurers primarily employ

### Plan Design

- Coverage for catastrophic claims
- Other special design features

*(scale: 0, 50, 100)*

### Coverage Rules

- Limits on certain services
- Preapproval for scheduled inpatient services
- Preapproval for diagnostic or advanced tests

*(scale: 0, 50, 100)*

### Coordination of benefits with other payors

- Alternative cash allowances for using public facilities

*(scale: 0, 50, 100)*

### Network Design & Management

- Contracted network of providers for all treatments
- Contracted networks for specific care

*(scale: 0, 50, 100)*

### Member selection

*Survey on group programs only so no member selection features surveyed*

**Legend:**
- Global
- Americas
- Asia Pacific
- Europe
- Middle East/Africa

### Wellness, gaps in care, care management & coordination

- Wellness/Well-being features
- Second medical opinion
- Chronic condition or disease management programs

*(scale: 0, 50, 100)*

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# Managing costs

The tools insurers primarily employ fall into three key areas



**Coverage Rules**

- Limits on certain services
- Preapproval for scheduled inpatient services
- Preapproval for diagnostic or advanced tests

0 — 50 — 100

**Network Design & Management**

- Contracted network of providers for all treatments
- Contracted networks for specific care

0 — 50 — 100

**Wellness, gaps in care, care management & coordination**

- Wellness/Well-being features
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0 — 50 — 100

Legend:
- Global
- Americas
- Asia Pacific
- Europe
- Middle East/Africa

Source: Willis Towers Watson 2016 Global Medical Trends Survey

# New interfaces are becoming available for medical care,

## Many members are willing to use them, creating new sources of meaningful data

### New healthcare interfaces

**Monitoring**
Glucometers, scales and wearables

**Assessment**
Scanners, "tricorders"

**Data storage and review**
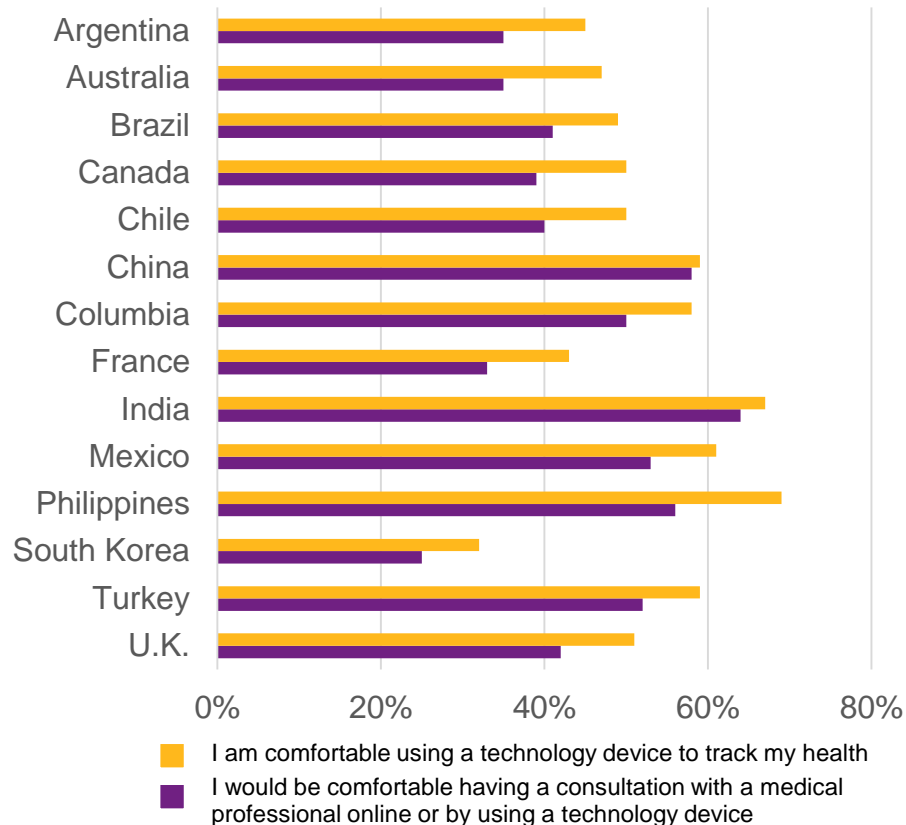Images, video, EHR and other clinical data

**Remote consultations**
Kiosks, video and virtual visits

*Communication/ Education*
*Apps and portals*

### Member willingness to use



Countries (top to bottom): Argentina, Australia, Brazil, Canada, Chile, China, Columbia, France, India, Mexico, Philippines, South Korea, Turkey, U.K.

Axis: 0% – 20% – 40% – 60% – 80%

■ I am comfortable using a technology device to track my health
■ I would be comfortable having a consultation with a medical professional online or by using a technology device

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***Data capture is reliant upon the insurer's consumer interface strategy,
and analytics strategic planning must be integrated into the overall program strategy***

Source: Willis Towers Watson 2015/2016 Global Benefits Attitude Survey

# These new data sources, as well as other meaningful, linkable data exist to support emerging analytics

They must be evaluated and prioritized based on value provided vs. effort to collect/house

## Structured Private Health Data

- Medical Claims
- Pharmacy Claims
- Biometric Screenings and other lab data
- Claim aggregator data

## Unstructured Private Health Data

- Electronic Health Records
- Paper Claims
- Medical Device Monitoring
- Telephonic and virtual visits

## Structured Less Protected Data

- Consumer purchase and social status data
- Click stream data
- Wearable device data
- App data, such as appt. scheduling & incentive tracking

## Unstructured Less Protected Data

- Blog Data
- Customer service/concierge records
- Provider reviews (i.e. Yelp-like data for providers)

# Sample opportunities to advance analytics using new data sources
## Provider Cost, Quality and Efficiency

| Market Dynamics | Sample Analytic Opportunities |
|---|---|
| **Restrictions on underwriting and issue:** **United States, India** | Incorporate new sources of data that are likely to become available to improve prediction of member conditions and barriers to treating those conditions. This information can then be used to strategically design provider pay for performance approaches. Data = claims, labs, EHR, consumer, wearable device, provider reviews |
| **Provider capacity shortages:** **Hong Kong** | Use all sources of data available to identify underlying cost drivers, which may include unit cost, utilization efficiency, or population health. This information can then be used to assess opportunities such as adding care extenders or medical tourism to address the underlying issues Data = claims, labs, virtual visit, consumer, app data, customer service, provider reviews |
| **Advancing consumer technologies:** **U.K., U.S.** | Strategically design and offer consumer interfaces that capture information on provider satisfaction and assess the implication of that on member compliance/cost, using this to educate and design the network Data = claims, labs, EHR, virtual visit, consumer, app data, customer service, provider reviews |
| **Advancing care extension technologies:** **U.K., U.S.** | Identify the largest gaps in care and sources of inefficient care to assess opportunities to add care extenders, improving access and efficiency, as well as capturing more data Data = claims, labs, EHR, virtual visit, consumer, app data |

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# Sample opportunities to advance analytics using new data sources
## Member Health and Consumer Decisions

| Market Dynamics | Sample Analytic Opportunities |
|---|---|
| **Restrictions on underwriting and issue:**<br>**United States, India** | Incorporate new sources of data that are likely to become available to improve prediction of member conditions and barriers to treating those conditions. This information can then be used to strategically design programs and incentives.<br>Data = claims, labs, EHR, consumer, wearable device, provider reviews |
| **Provider capacity shortages:**<br>**Hong Kong** | Based on expected savings, assess the amount of incentives (or cost concessions) that can be allocated toward care extender and medical tourism designs, and assess the ability to drive utilization to new channels within population sub-groups, feeding into program design decisions<br>Data = claims, labs, virtual visit, consumer, app data, customer service, provider reviews |
| **Advancing consumer technologies:**<br>**U.K., U.S.** | Strategically design and offer consumer interfaces that capture information on member personalities and assess the implication of that on member health/compliance/cost, using this to design the programs and incentives<br>Data = claims, labs, consumer, app data, customer service, provider reviews |
| **Advancing care extension technologies:**<br>**U.K., U.S.** | Stratify member health/cost by condition, and population sub-groups, to target most needy members for additional outreach and care coordination<br>Data = claims, lab, EHR, consumer, wearable device, app, customer service |

# Fundamental building blocks for successful advanced analytics

| | |
|---|---|
| **Data** | What data should we use when performing advanced analytics? |
| **Applications** | How should we identify and prioritise analytics opportunities? |
| **IT infrastructure** | What hardware and software is needed to take advantage of these opportunities? |
| **People and process** | What skills are needed and what are the processes we need to follow? |

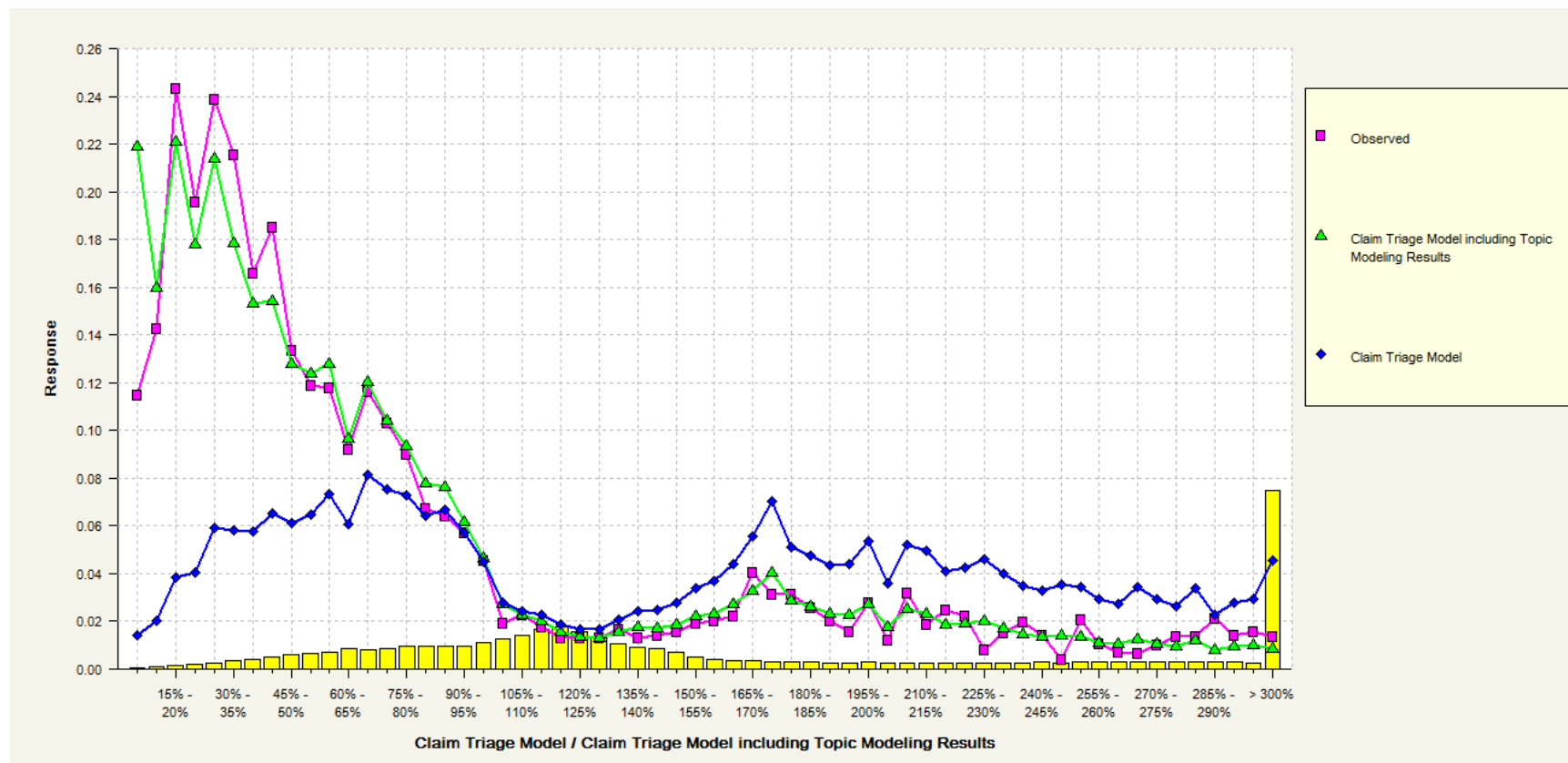# Fundamental building blocks for successful advanced analytics

## Data

- Existing internal data assets
- New proprietary data assets
- External data sources
- Ethics and your risk appetite

**Do you have a sufficiently forward looking data strategy in place today?**

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# Benefits of topic modelling in claims triage

# Fundamental building blocks for successful advanced analytics

## Data



- Existing internal data assets
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**Do you have a sufficiently forward looking data strategy in place today?**

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# Fundamental building blocks for successful advanced analytics

## Applications

- Business purpose – use cases
- Entire value chain
- Assessment and prioritization process



| Marketing and Distribution | Customer Experience | Underwriting and Risk Management | Policy Admin and Management | Claims Management | Asset Management |

**How will your business generate and prioritize ideas for advanced analytics projects?**

# Fundamental building blocks for successful advanced analytics

## IT Infrastructure

- Physical and security infrastructure
- Operational databases
- Data organization and analytics tools
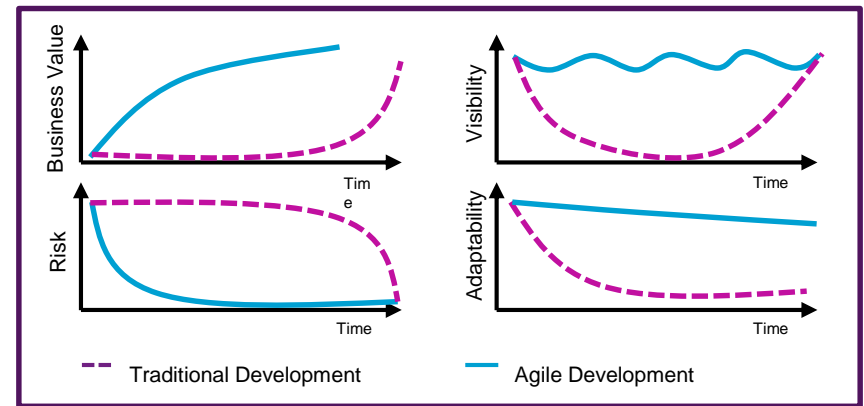- Reporting and visualization
- Apps
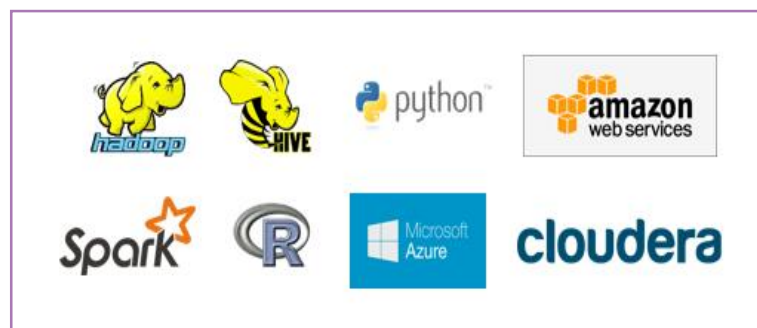


**How do you plan to implement new technologies
into your existing IT infrastructure?**

# Fundamental building blocks for successful advanced analytics
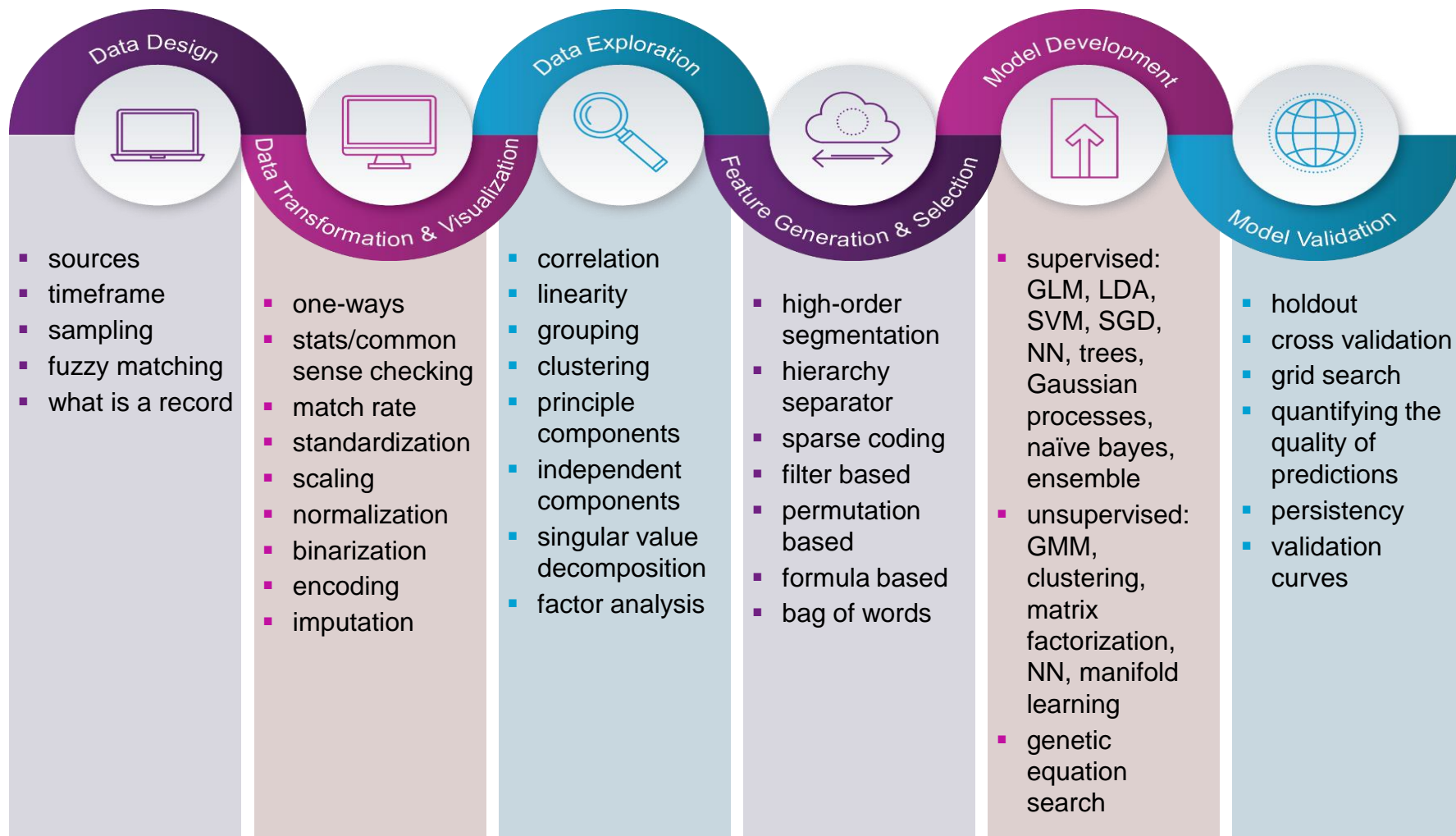
## People and process

- Team make up
- Agile project management
- Recruitment
- Operating model



**Do you have a HR strategy in place to identify, employ, utilise and retain new associates?**

# Modelling process

**Data Design**
- sources
- timeframe
- sampling
- fuzzy matching
- what is a record

**Data Transformation & Visualization**
- one-ways
- stats/common sense checking
- match rate
- standardization
- scaling
- normalization
- binarization
- encoding
- imputation

**Data Exploration**
- correlation
- linearity
- grouping
- clustering
- principle components
- independent components
- singular value decomposition
- factor analysis

**Feature Generation & Selection**
- high-order segmentation
- hierarchy separator
- sparse coding
- filter based
- permutation based
- formula based
- bag of words

**Model Development**
- supervised: GLM, LDA, SVM, SGD, NN, trees, Gaussian processes, naïve bayes, ensemble
- unsupervised: GMM, clustering, matrix factorization, NN, manifold learning
- genetic equation search

**Model Validation**
- holdout
- cross validation
- grid search
- quantifying the quality of predictions
- persistency
- validation curves

# Fundamental building blocks for successful advanced analytics

## People and process

- Team make up
- Agile project management
- Recruitment
- Operating model



**Do you have a HR strategy in place to identify, employ, utilise and retain new associates?**
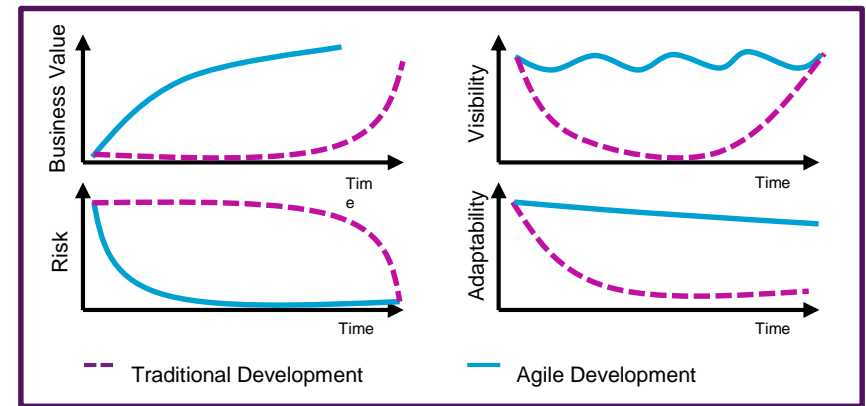
# Summary

- Healthcare costs are consistently increasing at a rate greater than inflation

- Provider decisions, member decisions and new technologies are the key drivers of healthcare cost increases

- Payors can take advantage of advancing consumer technologies to capture new sources of valuable data to utilize in advance analytics

- Data capture is reliant upon the insurer's consumer interface strategy, and analytics strategic planning must be integrated into the overall program strategy

- As well as data capture, successful exploitation of new information sources requires a holistic advanced analytics strategy

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