ARKANSAS DEPARTMENT OF HUMAN SERVICES
DIVISION OF MEDICAL SERVICES

EPISODE-BASED PAYMENT SYSTEM (EBPS)
TO SUPPORT PAYMENT IMPROVEMENT INITIATIVE

SUBMITTED: July 20, 2012

Submitted by:
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EXPERIENCE AND QUALIFICATIONS

Truven Health Analytics appreciates the opportunity to respond to this Request for Information (RFI) from the Arkansas Department of Human Services’ Division of Medical Services (DMS). We understand that the agency is seeking information to support an efficient and scalable model for launching, administering, and maintaining episode-based payments to providers. We also understand that a major component of a statewide, multi-payer effort to transform Arkansas’ healthcare system includes transitioning from a fee-for-service payment model to models that pay for value and patient outcomes, beginning with episode-based payment.

Truven Health Analytics (previously known as Thomson Reuters (Healthcare) Inc.) is the world’s leading source of intelligent health information for organizations and professionals. Our mission is to help our customers increase the value of healthcare by improving outcomes and reducing costs. We serve all healthcare markets: providers, health plans, large employers, government, and pharmaceutical manufacturers. Our company’s solutions inform healthcare decisions affecting more than 150 million people in the U.S. Truven Health is privately owned and independent; our independence enables us to remain a source of objective and credible information to everyone in the business of healthcare.

Truven Health possesses decades of relevant experience in episode grouping, health claims data analytics, Medicaid partnerships, and provider performance assessment.

Performance-Based Payment

We have a wide range of experience with provider performance measurement and paying for value and outcomes. We have played a key role in a number of seminal pay-for-performance (P4P) initiatives, including projects for the Leapfrog Group, Bridges to Excellence (BTE), and the Integrated Healthcare Association (IHE). Our activities across these projects varied, spanning program design, methodology and measure development, data management and reporting, payment administration, and program management. Information about these projects is included in our response in Section B.1.2.

We also developed a specialized performance assessment methodology, our Provider Performance Assessment (PPA) tool that measures clinical effectiveness and cost efficiency to assess the performance of primary care and specialty physicians. More than 40 health plans use PPA or one of our comprehensive decision support systems to manage their provider networks.

Episode-Based Payment

Truven Health has extensive experience in the development of episodic bundles, for both commercial provider programs and the Center for Medicare & Medicaid Innovation (CMMI) bundled payment program. Examples of our experience with episode-based payment are listed below.

- We consulted to a large provider organization to help 15 hospital members understand the potential return on investment for managing knee episodes on a bundled payment basis. We analyzed the risks and sized the opportunity for the client, which gave their leaders a deeper appreciation of the factors that can influence the success or failure of an episodic payment arrangement.

- We guided 10 clients through various aspects of the CMMI Bundled Payment application process, including application assistance, guidance on physician hospital gain-sharing arrangements, financial modeling of the upside and downside risk of taking on bundles, and market assessments
of local opportunities for bundling. As part of these efforts, we completed designs for a joint replacement bundle and five cardiovascular bundles (CABG, valve replacements, PCI, pacemakers and defibrillator bundles). In addition, we developed initial definitions for seven medical and procedural bundles for our CMMI applicant customers.

Episodes in General

Our company is a leader in episode grouping methodology. Our Medical Episode Grouper™ (MEG) is an industry-respected tool that uses diagnosis codes to organize healthcare data into clinically relevant, severity stratified, groups based on medically accepted disease staging.

We have experience in the development of specialized episode groupers. We developed a prototype episode grouper for Medicare, funded by the Centers for Medicare & Medicaid Services (CMS), the Medical Episode Grouper-Medicare Prototype (MEG-MP). To do this, we used our MEG grouper as the foundation, then refined and extended it to deal with issues specific to the Medicare population.

Data Assets for Research

Truven Health has excellent data for modeling episode-based payment bundles—our own MarketScan® database. MarketScan is the industry’s largest database of integrated, well standardized, high-quality longitudinal healthcare information on the insured population in the United States. MarketScan integrates the healthcare experience of individuals covered by Truven Health clients nationwide; it links paid claims and encounter data (inpatient, outpatient, professional, and drug) to detailed eligibility data, over time. MarketScan spans 28 years of data across 94 million lives. MarketScan has been the source of data for more than 210 peer-reviewed clinical and policy studies over the past ten years.

A large, high-quality, objectively-source, data set such as MarketScan is important to the modeling of payment bundles, because a large database reveals risks that may be hidden in small database.

Medicaid Experience

We have 30 years of experience in Medicaid policy, data, and analytics. We currently work with more than 26 states, to deliver large-scale Medicaid decision support systems and research and policy engagements.

A Broad Industry Perspective

Because we serve all markets in the healthcare industry, Truven Health brings an integrated perspective to the design of episode-based payment design. We employ hundreds of professionals with experience in clinical practice, health system administration, plan administration, payment processing, and Medicaid policy. To build our payment reform consulting teams, we assign staff from several disciplines to ensure that the risk and reward implications of bundle design are examined from all perspectives.

Original Sourcing

If you work with Truven Health, you will be working directly with the originators of the methodologies in use, not through a second-party consulting firm. The value to DMS is our first-hand expertise, built over more than 30 years of research and analytics with more than 3,000 healthcare organizations.
COMPONENT A: EPISODE DESIGN (RFI §4.1)

A.1 For each function described in Section 3, please describe (1) your current capabilities, (2) your proposed approach and solution; (3) new capabilities that you will need to build as a result.

A.1.1 Episode Definition

A.1.1.1 Current Capabilities

As the developer of an industry leading episode methodology, the Medical Episode Grouper (MEG), Truven Health has extensive experience using administrative data (claims/encounters, eligibility, and provider files) to create clinically-based episodes. We have delivered MEG in our analytic databases, and have delivered consulting services using MEG, to hundreds of clients. MEG remains a valuable analytical tool for retrospective analysis of the cost, use, and quality of care.

Collecting and analyzing healthcare is data a core competency of Truven Health. On an ongoing basis, we manage data on the care given more than 150 million Americans, data that we collect from thousands of hospitals and approximately 400 payer sources, including 26 state Medicaid MMIS operators.

In 2010, we combined our experience with episodes, and our 30 years of experience in data analytics and research in the provider and payer industries, to develop a new and complete methodology for payment bundling that is now in its third generation of refinement. We have completed detailed design for the following seven procedural and medical payment bundles:

- Major joint replacements (combined)
- Knee replacements
- CABG
- PCI
- Cardiac valve procedures
- Pacemaker implants
- Defib implants

These bundles were submitted by our clients in response to the recent Request for Application (RFA) and to support commercial bundle client engagements from CMMI. In addition, we have developed specifications for seven other bundle categories:

- Pneumonia
- Stroke
- AMI
- CHF
- Back surgery
- Peripheral vascular disease
- Bariatric surgery
A.1.1.2 Proposed Approach

We recommend that the Department of Medical Services take the following approach:

(We use the term “anchor event” below to signify the diagnosis or charge that acts as a trigger event for starting the methodology to compose the bundle.)

First: Collect and Validate the Arkansas Medicaid MMIS data: We use a proven system for collecting data electronically and securely. We apply the following processes and controls to assess the quality of the data and standardize it for accurate comparative analysis:

- **Reasonableness of data**—We ensure that relationships between two or more fields are reasonable by comparing them with normative data. For example, we check to see if the age and gender distribution of the data continues to follow the expected distribution in AHRQ’s Medical Expenditure Panel.

- **Validity**—We ensure that selected fields are valid by comparing records with lists of possible valid values. Data require additional processing if invalid results are present more than one percent of the time.

- **Completeness**—Data completeness is evaluated in two areas: completeness of coding (per column) and evaluation of aggregate record and payment totals.

Second: Determine Potential Bundle Targets: Given the Department’s stated goal to develop and implement episodes that cover 75% of the Medicaid population spend, we believe a detailed market assessment is an important step in the episode definition process. The purpose of the market assessment is to understand the characteristics of the initial five episodes of care already launched across the state (pregnancy, ambulatory upper respiratory infections, hip and knee replacements, congestive heart failure, and ADHD) and to identify additional episodes to design and implement. As part of a market assessment, Truven Health will create a set of episodes to evaluate total Arkansas Medicaid spend, in- versus out-of-network utilization, in order to identify best candidates for additional episodes. In preparation for this response, as one indicator of possible future bundles, we produced the following list of top DRG’s for inpatient care from the Truven Health MarketScan Medicaid database, which combines data from our state Medicaid clients:

<table>
<thead>
<tr>
<th>MSDRG AND DESCRIPTION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>003 ECMO Trach Mv 96+ Hrs/Pdx X Face Mth Neck w Major OR</td>
<td></td>
</tr>
<tr>
<td>004 Trach w Mv 96+ Hrs/Pdx X Face Mth &amp; Neck wo Major OR</td>
<td></td>
</tr>
<tr>
<td>207 Resp System Dx w Ventilator Support 96+ Hours</td>
<td></td>
</tr>
<tr>
<td>392 Esoph Gastroent &amp; Misc Digest Disorders wo MCC</td>
<td></td>
</tr>
<tr>
<td>765 Cesarean Section w CC/MCC</td>
<td></td>
</tr>
<tr>
<td>766 Cesarean Section wo CC/MCC</td>
<td></td>
</tr>
<tr>
<td>774 Vaginal Delivery w Complicating Dxs</td>
<td></td>
</tr>
<tr>
<td>775 Vaginal Delivery wo Complicating Dxs</td>
<td></td>
</tr>
</tbody>
</table>
While we expect that some of the needs and characteristics of the Arkansas Medicaid population are unique, our MarketScan data suggest a need to evaluate potential episodes related to:

- Mental health;
- Substance abuse; and
- Several high cost complication events involving ventilator support.

Third: Prioritize the bundles for implementation. Once potential targets for bundles is identified, Truven Health would produce initial episode profiles containing the following components:

- Demographics of the patient populations.
- Location of services in both the inpatient and post-acute setting.
- Utilization and payment profile of inpatient anchor events.
- Variation in physician referrals to post-acute providers.
- Utilization of services in vs. out of network.
- Impact of patient characteristics on required services and resulting cost.
- Number and potential causes of outlier patients and services that may or may not be related to the episodic bundle.
- Episode payment profile by service type.
• Readmissions profile.
• Enrollee risk scores.
• Distribution of related/unrelated services.

Using the data from the market assessment, Truven Health will guide DMS on the best bundles to choose by looking at:

• Opportunities to reduce costs through greater physician alignment.
• Improved clinical care resulting in lower readmission and post acute spending.

Fourth: Complete Detailed Bundle Design—Truven Health has developed a rigorous process to define detailed payment bundle specifications. Our bundle design process, now in its third generation of refinement, is iterative, using empirical data based on large data sets with clinical input to determine what services should be included/excluded from a bundle. The framework for determining services to be included in the bundle is described below in Section A.1.3, Clinical and Business Exclusions.

![Episode Design Framework](image)

A.1.1.3 New Capabilities to be Built

The general methods we describe in this RFI response are in use today by our existing customers. We would approach the Arkansas project as a custom-designed services engagement; we would modify existing episode definitions and create new ones based on DMS’ particular needs and Arkansas’ program dimensions. We incorporated customization time into the timeframe estimates in Section A.4.c.
A.1.2 Principal Accountable Provider Selection

A.1.2.1 Current Capabilities

Truven Health has developed provider assignment methodologies for a variety of applications and services. The examples below demonstrate our ability to work with a wide variety of data and analytic methods for attributing care to a provider or practice. These methods could be customized to meet the specific requirements of Arkansas DMS.

- We helped a large mid-western health system determine the impact of forming an accountable care organization (ACO) in a specific state region. As part of this project, we worked with CMS Standard Analytic Files and developed a provider imputation algorithm that attributed Medicare claims to that facility’s primary care physicians.

- We have developed a Physician Performance Assessment (PPA) tool that examines several variables to attribute physician performance for both cost and quality measurement. Physician attribution is a complex problem and often varies depending on the objective. Our PPA tool attributes care as follows:
  - **PCP**: Attributed by looking at all claims for the reporting period.
  - **Episode Managing Physician**: Attributed using claims within the episode.
  - **By Quality Indicator**: Attributed using claims in the denominator of the quality measure.

Using PPA, we include different methods for cost and quality reporting. The attribution methodologies for cost and quality of care reporting are variations on a theme, with the main difference being time unit for analysis. The cost reporting attribution is episode-based because this creates a logical unit to compare efficiency (e.g., the total inputs [services] applied to attain a given output [restoration of health from an illness]). The time and event boundaries for many quality measures do not neatly fit into episode windows and are patient-based. Additionally, we impute a PCP to each patient using the method described above.

Our method in PPA provides flexibility to customers in terms of how the member is attributed and how the quality scores are rolled up. For example, some quality measures (hemoglobin tests) may be used to evaluate both primary care physicians and endocrinologists. Our standard attribution logic assesses the physician with the greatest number of Evaluation & Management Visits (recommended) or the highest Relative Value Units (RVUs), most appropriate for certain specialties, over a designated period. For the quality measures, this is done looking at the claims for a patient that are in the denominator of the measure. For certain quality measures, we have a decision tree that focuses on likely specialties first and then defaults to other types of physicians if no data is found for the target specialty.

We have several ways to attribute members to physicians within our products. For primary care physician attribution, we typically recommend an option in which we designate a managing physician based on the physician with the highest number of
Evaluation and Management (E&M) visits (based on CPT procedure coding) during the previous 12 months.

Another method useful for specialists uses our episode grouping methodology. This methodology assigns the types of providers to each episode.

- **Episode Managing Physician:** This is the physician with the largest number of Evaluation and Management visits during the course of the episode.

- **Episode Primary Physician:** This is the physician with the highest sum of total RVU’s, excluding anesthesiologists, radiologists, and pathologists.

Because the measure calculation is patient-centric, customers can select which attribution approach to use for which set of measures. For example, use the primary care physician for the preventive care measures, but for the cardiology measures, use the Episode Primary Physician. We can also be flexible in supporting an approach that gives credit to multiple physicians for the same measures (e.g., if a PCP and an Endocrinologist treated the same patient with diabetes, both would get credit if the patient received the appropriate care as long as they met a specific threshold of treatment such as 25% of the RVUs).

**A.1.2.2 Proposed Approach**

For the Arkansas Episode-Based Payment System, we propose to use the methodology developed for our Physician Performance Assessment (PPA) tool as described above, to identify the Principle Accountable Providers for attribution and performance measurement.

**A.1.2.3 New Capabilities to be Built**

We would not have to build new capabilities for assigning principal accountable providers.

**A.1.3 Clinical and Business Exclusions**

**Proposed Approach**

Arriving at a bundle definition that is neither too inclusive nor too exclusive is critical to the successful implementation of the bundle. The goal of bundled payment is to shift performance risk to the providers, while maintaining insurance risk with the payer. Successful bundles will be inclusive enough to accurately reflect the full spectrum of related care, without including care that is unrelated or is outside the influence of the providers involved in the episode. In addition, included care must be accurately represented in historical data in order to adequately model the current (and potential changes to) reimbursement/cost patterns.

We have taken a three-part approach to determining the appropriate balance between bundle inclusion and exclusion:

- First, we utilize large data sets to analyze the type of care that actually occurs in the population. For this initiative, Truven Health would leverage a combination of Arkansas DMS data, national Medicare Standard Analytic Files (SAF), and our proprietary
MarketScan Medicaid database. Data analysis informs the design regarding what is happening to patients after the anchor event, where and when it happens, what variation may exist, and how it appears in administrative data. Large datasets, in particular, allow for the analysis of outlier events as well as the exploration of multiple treatment pathways with less impact due to small sample sizes.

- Second, we obtain clinician input regarding the most typical courses of treatment for patients with the anchor condition. Our clinicians are highly skilled in bundle design and possess deep knowledge of coding. They provide valuable insight into what "should" happen to patients (and what might happen if things go wrong), which types of patients may require what follow up care, and where potential opportunities for improvement exist today. We would also seek the input of DMS’ own Medical Director.

- Third, we would share results of the design process and obtain feedback with local experts familiar with Arkansas care delivery processes. This feedback would be used to fine tune code sets and finalize the episode definition.

The following summarizes the exclusion rationale we have developed:

- **Clinically Unrelated Categories** – Clinically unrelated categories contain DRGs that belong to body systems (or other broad diagnosis categories) that are clinically independent of the bundled procedure or the underlying condition. The rationale for excluding these DRGs from the bundle is threefold:
  1. The hospital is very unlikely to be able to impact the rate of these unrelated readmissions. Including these may discourage clinicians from "buying in" to meaningful readmission reduction strategies.
  2. The readmission is likely to involve a different set of clinicians and resources than the original bundled procedure, thus adding unwarranted complexity.
  3. The frequency with which these readmissions occur is rare. Thus excluding these readmissions does not exclude a significant amount of financial risk.

- **Unrelated DRGs** – Clinically unrelated DRGs occur when the related body system is not independent of the anchor DRG, but the specific DRG is deemed to be unrelated. The readmission DRG represents neither a risk factor for anchor DRG nor something likely to be exacerbated by the anchor hospitalization.

- **Coincidental DRGs** – These were determined by clinicians using literature reviews and analysis of proximity of readmissions to anchor event in national SAF data. These may be risk factors for anchor condition and/or exacerbated by the anchor hospitalization without relating directly to the anchor stay.

- **Related Procedures** - DRGs for procedures likely related to the anchor DRG, but often part of a planned care pathway and therefore not considered targets for reduction. The rationale is that it is not possible from administrative data to ascertain whether a readmission was "planned" or not.

- **Anchor Procedures** - For some bundles, the occurrence of a second anchor stay significantly alters the bundle price, making it more appropriate to start a new bundle for
the new procedure (e.g., a second joint replacement within the bundle time period of the first joint replacement).

- Rare High Cost DRGs – These rarely occur yet carry a significant amount of facility reimbursement on a per-case basis. Qualifications were based on analysis of the 2010 SAF inpatient dataset. DRGs were evaluated at the “Base DRG” level; that is, the set of DRGs representing a condition or procedure, both with and without CC/MCC. To qualify for this category, the base DRG must have been in the top quartile in terms of per-case facility reimbursement, and have represented less than 0.5% of all inpatient stays for the year. Further, the DRG must not have been already excluded based on one of the above categorizations.

The rationale for excluding this category of DRGs is that a customer database may not have sufficient historical volume to accurately price the bundle to account for the possibility of a readmission. However, use of a stop-loss threshold may provide adequate financial risk protection to enable some or all Rare High Cost DRGs to be included in the episode.

New Capabilities to be Built

We would modify the clinical and business exclusion logic described above to account for Arkansas Medicaid’s coverage policies, program design, and unique data aberrations. To make the modifications, we would work with the DMS Medical Director and provider advisors that DMS may involve.

A.1.4 Patient and Provider-level Adjustments

Proposed Approach

Patient-level adjustments

Within any healthcare event, patient variation will exist. Much of the variation can be explained by the specific type of event and/or the underlying severity of the condition; some is dependent on patient characteristics; and, some is simply random in nature. Bundle design requires accommodation for the first two types of variation, as well as an understanding of the impact of the third.

Truven Health has traditionally used its Disease Staging methodology to adjust expected episodic costs for condition severity. In order to address the additional variation that can occur within a payment bundle (event type and patient characteristics), we utilize clinical input and data-driven analytics. Clinicians are often aware of variations in treatment that they believe to have an impact on follow-up care. For example, patients undergoing a knee replacement may have a total or partial replacement, even though the DRG does not distinguish between the two. Orthopedic surgeons are aware that partial knee replacements are less invasive, and have observed that patients seem to have a quicker post-surgical recovery with fewer complications. Large datasets allow for empirical analysis of the impact of these differences. These types of distinctions in care can result in significant cost differences and may warrant bundle stratifications. Similarly, clinicians may have observed that patients of a certain age, or with specific comorbidities tend to have more difficulty with particular types of care. Again, large data analysis can either confirm or disprove the suspicions of the clinicians.
The final bundle design can address patient adjustments in different ways. Separate bundle prices could be created for different patient cohorts. Some patients with rare but impactful comorbidities could be excluded from the bundle. Finally, a risk-adjustment methodology could be derived to adjust the bundle price to fairly reflect procedure mix and/or patient characteristics. The specific approach to risk adjustment will be determined empirically based on a combination of MarketScan data from Truven Health and Arkansas DMS data.

**Provider-level adjustments**

Three main factors drive cost differences among providers: patient severity, geographic location, and (for inpatient hospitals) hospital classification. Patient severity has been discussed above. Various methodologies are available to adjust pricing to reflect local geographic variation, including some proprietary to Truven Health. Geographic differences can also result from local practice pattern variation. We have provided customers with benchmark information in order to assess local practice pattern differences (which may or may not be appropriate to accommodate in a bundled arrangement). Hospital classification (teaching, community, etc.) can have a significant impact on provider overhead, which must be accounted for in the bundled pricing arrangement. Again, using large datasets allows for comparison of hospital types across the state, which can then inform the bundle pricing accordingly.

**New Capabilities to be Built**

We do not anticipate having to build new adjustment capabilities. We may customize the specific methods used to support DMS' specific needs.

### A.1.5 Quality Metrics

**Current Capabilities**

For more than 30 years, Truven Health has developed and implemented a variety of databases and methods to support comparative analysis of provider quality and efficiency for government and commercial clients. Core capabilities include methods to evaluate quality of care using claims data, clinical data, and patient-reported outcomes. Truven Health has developed approaches to profiling hospitals, primary care physicians, and specialists using a broad set of quality, utilization, and cost measures. These approaches incorporate complex technical methods required for profiling, such as attribution of care among multiple providers, risk adjustment modeling for patient severity, parametric and nonparametric statistical testing, composite measure development and testing, and provider scoring and reporting.

One example of a relevant project is the California Better Quality Information to Improve Care for Medicare Beneficiaries (BQI) project, the largest of six pilot projects nation-wide that were funded by CMS to test methods of aggregating Medicare fee-for-service claims and other payer claims data for the purpose of comprehensively reporting the quality of physician care. Truven Health was contracted by the California Cooperative Healthcare Reporting Initiative (through its fiscal agent, the Pacific Business Group on Health) to conduct data aggregation, analytic, and reporting activities for the California BQI project. Our primary responsibility involved integrating the Medicare and commercial data, and applying a series of nationally-endorsed quality measures to calculate performance results for tens of thousands of physicians in the state of California. Critical data processing activities included data acquisition, standardization, and quality review;
measure production; physician linking; patient attribution; and measure calculation and assessment.

Since 2003, Truven Health has supported the development of the National Healthcare Quality and Disparities Reports (NHQR/NHDR) by applying the AHRQ Quality Indicators (AHRQ QIs) to hospital data and producing tables for the NHQR/NHDR. Truven Health staff developed and calculated the summary measures, composite measures, scores, and statistical tests reported on the NHQR State Snapshots Website. Various purchaser coalitions have used the State Snapshots to provide quality benchmarks for use in pay for performance initiatives.

Proposed Approach

In support of our bundled payment engagements, we have created national Medicare benchmarks for readmission rates and post acute care usage rates (SNF, HH, Rehab) for joint replacements and five cardiac procedural bundles. These benchmarks, constructed by hospital peer group, can be used to evaluate hospital specific performance to peer groups for these key indicators of quality and efficiency. Similar methods could be employed to construct benchmark rates using the Arkansas DMS data set.

In part spurred by the ACA, the number and range of quality metrics has been rapidly increasing. Key measure developers include the NCQA, AHRQ and CMS. Further, in addition to hospital, health plan, and physician measures, quality measures are being developed and reported for other providers, for example, SNF and home care. In some cases, states have developed and implemented their own measures for their Medicaid programs. Finally, endorsement of measures by the NQF is further advancing the standardization of quality measurement. In some cases, adoption of these measures may be appropriate and effective in assessing the quality of an episode of care. For example, AHRQ Patient Safety Indicator 3, Pressure Ulcer Rate may be appropriate for episodes that involve hospitalization. For chronic episodes, other, more population-oriented quality measures may be appropriate – for example the rate of HbA1c testing for members with diabetes. Truven Health will ensure that the quality metrics used to assess bundles leverage the available, standardize metrics being used to assess providers. It will also develop episode-specific measures as warranted.

The CMMI Bundled Payments for Care Improvement (BPCI) initiative requires participants to measure quality as part of the demonstration. Aspects of quality being measured include clinical process/outcomes and patient satisfaction using the Continuity Assessment Record and Evaluation (CARE) tool developed for CMS. Through the BCPI initiative, we expect that quality metrics used to assess certain bundles will become standardized. Truven Health will closely monitor the design, evolution and availability of bundle-specific quality metrics and, as appropriate, will help the State to adopt and/or adapt them as part of this project.

New Capabilities to be Built

We would use existing industry-standard quality metrics wherever possible. We know from experience that not all bundles have standard measures available. When necessary, we would create new measures. We have many years of experience in the design of healthcare performance measures; we have developed a robust Measures Catalog for our analytic products that contains more than 3000 metrics, including ones we have developed and metrics from national standard-setting organizations. To develop new quality metrics, we would apply the expertise of our in-house physicians and quality measurement experts together with the
Department’s clinicians and program experts to produce measures that meet Arkansas’ specific needs.

A.1.6 Maintenance and Algorithm Updates
Truven Health intends to propose a customized scope of work that includes on-going maintenance of the bundles we design for DMS. Maintenance would include annual updates to account for coding changes (e.g., annual diagnosis code and NDC code updates), and Arkansas-specific changes that you may desire, incorporated on a frequency we would negotiate with you. In addition, with every annual maintenance release, additional enhancements may be incorporated based on refinements that we make for bundles that multiple customers use to enhance the analytic value of the methodology. We would make these multi-customer enhancements completely transparent to Arkansas.

A.1.7 Threshold Setting
Truven Health has developed an interactive financial risk modeling tool to complete scenario modeling around potential gain and loss scenarios for Shared Savings and Bundled Payment arrangements. This approach has been embraced by our clients seeking CMMI bundled payment grants and CMS Pioneer ACO awardees. We would employ a similar approach to assist DMS in understanding the financial implications of various threshold scenarios. Furthermore, this capability would enable DMS to assess the impact of potential care design modifications on the final bundle spend as well as the impact of various bundle lengths and inclusion code sets. The tool provides a clear understanding of the financial impact of any proposed changes, which is critical to pricing bundles appropriately. For example, the tool allows modeling the price impact of reducing readmissions by a specific percentage, or the impact of lowering the percent of patients being sent to inpatient rehabilitation within an acute bundle.

A.2. If you have existing claims grouping algorithms and solutions, please indicate:
A.2 (a) Whether your episode definitions include the following components, and if so, your clinical and economic rationale for how they are implemented

- **Claims grouping**
  Truven Health has a long history of episode development using claims data. Truven Health developed the Medical Episode Grouper (MEG). MEG is a rigorous, clinically rich episode construction methodology which has more than 560 clinically homogeneic, mutually exclusive episodes of care groupings. MEG captures services provided in both inpatient and outpatient settings, by relying on diagnosis codes and incorporates methodology for case-mix and severity adjustments.

  As described above, in addition to our MEG claims grouping algorithms, Truven Health has developed code sets for payment bundles listed in Section A.1.1.

- **Exclusions (e.g., co-morbidity)**
  Our episodes-based payment bundles include rules for exclusions, on such bases as clinically unrelated conditions, coincidental DRGs, related procedures, anchor procedures, and rare high cost DRGs. The rationale for these is described on page 8.
- **Risk severity adjustments**
  Please see Patient and Provider-Level Adjustments section on page 10.

- **Other adjustments**
  No adjustments not otherwise noted.

- **Quality metrics**
  Please see Quality Metrics section on page 11.

- **Integration with non-claims data sources**
  Please see Integration of non claims data into episode algorithms Section B.1.3 on page 20.

- **Payment thresholds**
  Please see Threshold Setting section on page 13.

A.2 (b) Indicate your willingness to publish the details of these episodes to the provider community.

Truven Health believes and supports transparency behind our bundle design methodologies. We think this is critical for physician engagement in the process and will actively collaborate in the development of and share all our final episode code sets and algorithms with all stakeholders.

A.2 (c) For each supported episode, please provide the following:

Truven Health has over 180 customers who license and use our Medical Episodes Grouper (MEG). These customers use MEG for a variety of reasons including disease staging, provider performance assessment, and bundled episode development. In addition to our broad set of production implementations using MEG, the table below highlights specific bundled payment engagements.

<table>
<thead>
<tr>
<th>EPISODE NAME</th>
<th># DEPLOYMENTS</th>
<th># PAYMENT DEPLOYMENTS</th>
<th># PRODUCTION PAYMENT DEPLOYMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Replacement</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Knee Replacement</td>
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<td>1</td>
<td>0</td>
</tr>
<tr>
<td>CABG</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
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<td>Valve Replacement</td>
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<td>1</td>
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<td>PCI</td>
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<td>Pacemaker Implants</td>
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<td>EPISODE NAME</td>
<td># DEPLOYMENTS</td>
<td># PAYMENT DEPLOYMENTS</td>
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</tr>
<tr>
<td>Pneumonia</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stroke</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AMI</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>CHF</td>
<td>1</td>
<td>0</td>
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</tr>
<tr>
<td>Spinal Fusion</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Peripheral Vascular Disease</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bariatric Surgery</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

A.3. For capabilities you will need to build, please describe how you intend to build those, the timeline for development, and how you propose working with DMS to develop your offerings in a manner that is suitable for Arkansas.

As mentioned previously, Truven Health is currently involved in what we consider to be the third generation of bundled payment design. The first two generations of bundle applications were developed using custom SAS programming. Our intent is to build upon this base, along with components of our MEG episode grouper, to quickly arrive at a flexible bundled software methodology that can be easily customized and applied to various claims datasets. Our extensive expertise in working with claims data, along with the solid foundation we have already developed, will allow for a very rapid development cycle. Partnering with DMS during this development effort will ensure that Arkansas has significant influence over the features and flexibility provided in the software.

A.4 Please describe your proposed timeframe and capacity to scale up to reach 75%+ of medical spend within the next 3-4 years.

Truven Health possesses resource capacity with existing skill sets to support the timeframe suggested below:

### Implementation Outline

<table>
<thead>
<tr>
<th>STAGE</th>
<th>DESCRIPTION</th>
<th>TIMEFRAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kickoff</td>
<td>Meeting(s) with Arkansas DMS and its stakeholders, such as participating providers, for project planning.</td>
<td>1 month</td>
</tr>
<tr>
<td>STAGE</td>
<td>DESCRIPTION</td>
<td>TIMEFRAME</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Market Opportunity Assessment</td>
<td>Truven Health will intake Arkansas DMS claims and enrollment data and identify the Medicaid episodes of care driving 75% of spend for the Arkansas Department of Human Services. Truven Health will use Medicaid state data files, SAF, and MarketScan for benchmark data.</td>
<td>6 months</td>
</tr>
<tr>
<td>Bundle Design</td>
<td>Once bundle targets are identified, Truven Health consultants will share results of analysis of existing bundle algorithms, obtain feedback, and implement minor modifications as requested by Arkansas DMS. Truven Health will complete design work on additional episodes identified and prioritized from Market Opportunity Assessment. Bundle design includes defining inclusion/exclusions and provider accountability algorithms.</td>
<td>1 year concurrent following Market Opportunity Assessment and concurrent with development of physician quality performance assessment</td>
</tr>
<tr>
<td>Physician Quality Performance Assessment</td>
<td>We will work with the DMS and its stakeholders to identify appropriate quality measures for each episode chosen</td>
<td>6 months concurrent with bundle design</td>
</tr>
<tr>
<td>Financial Modeling and Threshold Setting</td>
<td>Complete historical analysis of episode, propose thresholds and obtain stakeholder buy-in</td>
<td>3 months following bundle design phase</td>
</tr>
<tr>
<td>Payment system Development</td>
<td>Work with outside bundle administration entity to implement bundle specifications within claims processing system driven by the episode-based payment quality assessment.</td>
<td>1 year following completion of bundle design and concurrent with Financial Modeling and Threshold Setting</td>
</tr>
</tbody>
</table>

A.5. Please describe your approach to ensuring all design dimensions are made with sufficient clinical input.

Truven Health employs several clinical doctors, including our medical directors Drs. Ray Fabius, Bill Bithoney, Michael Taylor and several consultative and analytic physicians including Drs. Michael Udwin, Janet Young, Sivana Heller, and Elizabeth Campbell. These clinicians have a wide variety of clinical expertise including internal medicine, oncology, pediatrics, general practice, and obstetrics and gynecology. In addition, when appropriate, we utilize the clinical knowledge of the many registered nurses, doctors of pharmacy and pharmacists on staff who provide additional insights into the correct clinical construction of bundles. Our clinical staff participate in all aspects of product and methodology development, and were active in providing clinical input into the construction of MEG.
Our clinicians are integral to the bundle design process. They work alongside our analysts, programmers and customers to review each step of the bundle design to assure that the appropriate clinical pathways are constructed using their knowledge and data analysis to answer such questions as:

- What patient characteristics might lead to variability in the care related to the bundle?
- When are post-acute services most likely to occur as they relate to the anchor event?
- What are typical and appropriate post-acute care settings?
- What complications and readmissions are most realistically related to the anchor event—either procedure or medical condition?
- What services and comorbidities should be excluded from the bundle?

After we construct a bundle definition, the bundle design process can include a meeting or meetings with representative physicians from your partner hospitals to ensure buy-in and physician cohesiveness as the project goes forward.

A.6. Please compare your offering and capabilities to other solutions and vendors in the marketplace

Truven Health has a proven track record for providing our customers with both the analytics and the strategic insights needed to take on episodic payment reimbursement arrangements. We believe in providing our customers and their partner organizations with actionable information to maintain or improve quality and set realistic pricing that mitigates risk and offers the best opportunity for cost savings. We do this by:

1. Utilizing a set of guiding principles in each episodic bundle design. Episode-based payments should:
   a. Provide incentives to improve both the efficiency and quality of care.
   b. Provide financial incentives for change and actionable information to help physicians make change.
   c. Encourage care consistent with demonstrated effective care processes and not unverified innovation.
   d. Include those services clearly related to the trigger-event.
   e. Include payer/provide agreement on the specific types/cause of readmissions and complications to target for better control, rather than set a price based on general reduction target for all-cause readmissions.
   f. Not create a financial disincentive to move a patient into best/appropriate treatment pathway.
   g. Include those services that can be clearly related to the trigger-event.
   h. Create an incentive to delay the use of new technology until there is evidence of improved outcomes.

2. We use robust data derived from our own MarketScan™ databases, Medicare Standard Analytic Files (SAF), AHRQ HCUP Medicaid data, and partner data when available, to derive the full picture of care across the care continuum at a hospital, local or regional
level when appropriate. We currently have 10-12 State Medicaid clients who contribute de-identified Medicaid data to MarketScan for a total of 6 million lives.

3. Use our knowledge of episode grouping for services across the continuum of care: MEG, CMS Grouper, Bundle Payments, Treatment Pathway.

4. Our skills around episode grouping are recognized by the CMS. Because of our experience in developing MEG, CMS chose Truven Health as the only finalist candidate to modify an existing commercial episode grouper to develop episodes for nine conditions of interest.

5. We do not believe in a one-size-fits-all solution for episode development. A sustainable solution requires that all the stakeholders come to agreement on the accountability for the care provided for the claims in the bundle design. For example, accountability for related readmissions and preventable complications has to receive buy-in from the Medicaid provider community. If problems exist with the quality or the cost resulting in these problems, providers need to be comfortable with the risk they are taking on.

6. We believe in transparency in our methods. This also relates to stakeholder buy-in and a cooperative spirit in the undertaking of the bundle arrangement between the state of Arkansas and its provider organizations. Not all of our competitors take this approach to bundle design.

COMPONENT B:
ADMINISTRATION/INFRASTRUCTURE (RFI §4.2)

B.1. Please describe your approach, capabilities, and experience for each of the following:

B.1.1. Executing technical episode algorithms (designed internally and/or by 3rd parties) and input results to payment system of record.

Our business focus is on analytics rather than direct payment administration. To meet your needs, we would partner with or interface to your fiscal agent or third-party administrator to deploy the episode bundle logic in payment and penalty processing. We have experience collaborating with every Medicaid fiscal agent and all major industry payment administrators.

B.1.2 Generating reports that highlight performance and define payment (batch/realtime).

Truven Health would deliver a report generation capability to enable Arkansas to analyze both payment activity and performance via standard reports and ad hoc reporting capabilities. We have vast experience in delivering report generation capabilities that include extensive healthcare intelligent analytics. We have proven our ability to deliver reporting systems and reports for just this purpose. Examples of how our reporting capabilities have been used are represented in three pay for performance engagements described below.
Leapfrog Group – We were selected as the Leapfrog Group’s data partner for its Leapfrog Hospital Rewards Program (LHRP), a pay-for-performance program to recognize and reward hospitals for their performance in both the quality and efficiency of inpatient care. We partnered with Leapfrog for the data collection, aggregation, and reporting for the Leapfrog Hospital Reward Program. We are also a participating vendor supporting our JCAHO Core Measures customers who are enrolled in the program.

Leapfrog’s programs are aimed at mobilizing payer purchasing power to alert America’s health industry that big leaps in healthcare safety, quality, and customer value will be recognized and rewarded. Funding to set up Leapfrog came from the Business Roundtable (BRT), and The Leapfrog Group was officially launched in November 2000. Leapfrog is now supported by its members and others.

The Leapfrog Hospital Rewards Program was the first nationally standardized program that could be licensed and implemented by private healthcare purchasers – employers, healthcare coalitions, and health plans – to reward hospitals for performance. These rewards include the following:

- Bonus payments to hospitals.
- Higher reimbursement rates from health plan payers.
- Public recognition.
- Increased patient market share.

The program focuses on five clinical areas that account for a significant share of inpatient hospital admissions and cost for private purchasers. Together, the five clinical areas represent 20% of commercial inpatient spending and 33% of commercial admissions. Following the direction of the National Quality Forum to standardize provider performance measurement, the program emphasizes using existing data reported by hospitals wherever possible and minimizing additional reporting requirements of hospitals.

Bridges to Excellence -- We served as general contractor on the Bridges to Excellence (BTE) initiative (http://www.hci3.org) from its inception and throughout its pilot programs phase. BTE is a coalition of large employers, health plans, and provider organizations dedicated to improving the delivery and outcomes of care through rewarding physicians and patients for quality care. Bridges to Excellence programs recognize and reward clinicians who deliver superior patient care.

We played an integral role in the design of the program, the methodologies utilized, and the reports produced. Our involvement in this effort demonstrates our experience promoting and participating in industry-wide efforts designed to improve healthcare through quality performance measurement and its alignment with financial incentives.
We developed a system to manage reward administration, which has been used in the BTE project. This comprehensive electronic system can support all aspects of management of a pay-for-performance program. It integrates data from multiple sources, conducts automated data processing routines, and provides real-time access to the program management function.

BTE recognitions programs currently cover all major chronic conditions, plus office systems and a Medical Home measurement scheme. Under BTE’s programs, top-performing doctors potentially see income gains of up to ten percent in the form of financial incentives. BTE now implements its programs via licensing to health plans who serve as program administrators. We continue to support BTE by directly contracting with health plans for BTE program management services.

- **Integrated Healthcare Association** -- In August 2006, the Integrated Healthcare Association (IHA) awarded us the Physician Organization Efficiency Performance Metric Evaluation and related services initiative. The project was one of the first and largest attempts to measure and financially reward physician (group) efficiency.

Under this Pay for Performance (P4P) program, seven California health plans (with over six million lives for more than 200 physician groups) agreed to go forward with Efficiency Measures as part of the IHA P4P measure set. We helped IHA define, develop, test, and administer new Efficiency Measures for use in their expanded P4P measure set for IHA members. This included the development and distribution of the P4P efficiency results to the participating Medical Groups in the state of California. This was a multi-year project.

We produced efficiency scores based on our Medical Episode Grouper-generated episodes that were risk-adjusted by our Disease Staging Software and Diagnostic Cost Group’s relative risk score. Additionally, Thomson Reuters developed generic prescribing measures and comprehensively assessed the quality and completeness of the data to ensure that it supported efficiency measurement.

### B.1.3 Integrating non-claims data into episode algorithms.

Truven Health capabilities and experience include integrating non-claims data into our healthcare data warehouse and decision support systems, which include episode algorithms. We bring extensive qualifications in clinical data analysis, such as our offerings in clinical decision support in the provider market, research and consulting on quality of care and performance measurement, and experience building and operating large-scale Health Information Exchange (HIE) installations that support statewide backbones, disease surveillance, public health reporting, and clinical decision support. We have been actively using clinical data such as of lab results, vital statistics, and health risk assessments within our healthcare decision support solutions for many years.

We are also making major investments in the integration of clinical data and claims data related to healthcare reform, value-based reimbursement, and clinical integration. Our
early work in using clinical data collected through Health Information Exchanges illustrates that this clinical data is far less codified and standardized, and we are investing in utilities to standardize coding and to mine text data and codify. We are also extending our significant set of analytic measures to build out new outcome measures using clinical data and new predictive models. Lastly, we are adapting our systems to support market needs around value-based reimbursement systems. This includes use of non-claims data for episode algorithms.

Our HIE work has given us experience working in the state environment to integrate clinical and administrative data and influence and understand the quality of the clinical work environment. This work includes:

- **West Virginia and Alabama**

  The West Virginia Health Information Network (WVHIN) and the State of Alabama’s One Health Record (OHR) recently selected HIE Advantage from Truven Health as the technology backbone for statewide HIE. Both WVHIN and OHR are state agencies governed by healthcare payer, provider, consumer, and government stakeholders. Each installation will securely capture real-time clinical and administrative data from electronic medical records, healthcare claims, and other sources to provide clinicians with comprehensive patient histories at the point of care so that they can make better, informed clinical decisions. These statewide HIEs will improve the coordination of care and clinical outcomes, reduce unnecessary and redundant diagnostic tests, create a less fragmented clinical and administrative workflow, and help control healthcare costs.

- **South Carolina**

  In South Carolina, HIE Advantage technology from Truven Health is the backbone of South Carolina’s Health Information Exchange (SCHIEx), which currently covers a 10-year health history of more than six million citizens inferred from Medicaid and UB92/HCFA1500 claims, and is available for use by more than 4,000 care providers across South Carolina. SCHIEx embodies the type of HIE platform that CMS is stimulating through NwHIN, HITECH, ARRA and other incentive programs.

  Using this proven technology, we connected our Medicaid and Medicare claims repositories to SCHIEx. The result was an HIE backbone that contains both clinical data feeds from around the state, in addition to claims data from Medicaid and UB92 data from hospitals across South Carolina. *SCHIEx can now link administrative and clinical data, and create meaningful use and other quality measures that can be distributed to providers throughout the state.* This capability is central to South Carolina Medicaid initiatives to use HIT to improve the quality of care, with a current focus on pediatric care.

  The table below provides additional examples of our experience in integrating a variety of non-claims data into our analytical algorithms.
<table>
<thead>
<tr>
<th><strong>NEED</strong></th>
<th><strong>PROBLEM</strong></th>
<th><strong>SOLUTION</strong></th>
<th><strong>RESULTS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing care</td>
<td>A health plan needed to identify members with specific conditions for inclusion in disease/care management programs.</td>
<td>Advantage Suite produced reports that included lab results data, HDL cholesterol, LDL cholesterol, serum creatinine, BUN, and HbA1c, to identify patients with “poor” results who could be targeted for intervention.</td>
<td>The plan was able to identify the right people for the right programs.</td>
</tr>
<tr>
<td>Improving quality and outcomes</td>
<td>A Medicaid agency wanted to leverage Health Information Technology to improve pediatric quality of care.</td>
<td>The agency is integrating EHR data from several pediatric practices with the data from Advantage Suite to produce quality metrics.</td>
<td>The agency will be able to provide enhanced reporting to pediatricians to improve patient care.</td>
</tr>
<tr>
<td>Improving quality and outcomes</td>
<td>A Medicaid agency wanted to improve neonatal care and outcomes.</td>
<td>The client added birth records data to its database and produced more refined quality of care measures than could be produced based on claims data alone.</td>
<td>The State was better able to identify specific areas for improvement.</td>
</tr>
<tr>
<td>Measuring results</td>
<td>A major employer wanted to monitor the status of their disease management population to make sure the program was improving health and reducing absenteeism.</td>
<td>Our consultants produce quarterly reports in Advantage Suite that incorporate diabetes and hypertension lab results.</td>
<td>The customer is able to hold the disease management vendor accountable for results.</td>
</tr>
<tr>
<td>Evaluating program effectiveness</td>
<td>Medicaid researchers wanted to determine the effectiveness of the Breast Cancer Prevention and Treatment Act.</td>
<td>Medicaid eligibility and claims data from Advantage Suite were linked to cancer registry data.</td>
<td>The researchers found that the program had a positive impact in facilitating earlier enrollment and treatment.</td>
</tr>
<tr>
<td>Value-based purchasing</td>
<td>A government regulatory agency wanted to establish a ranking system for all hospitals using internationally established performance standards.</td>
<td>Truven Health collated data from insurance claims, pharmacy safety warnings, and patient surveys; programmed and applied over 130 performance indicators; and prepared 29 reports showing hospital-level results with national and international benchmarks.</td>
<td>The agency has a growing base of information to promote transparency, value-based purchasing, quality monitoring, and public health campaigns.</td>
</tr>
<tr>
<td>Risk adjusting payments</td>
<td>A health plan wanted to fine-tune its risk-adjusted reimbursement methods.</td>
<td>The plan incorporated health risk assessments with biometric data in Advantage Suite and compared predictive models with and without these clinical data.</td>
<td>The plan improved the predictive power of its risk adjustment methods.</td>
</tr>
</tbody>
</table>

**B.1.4 Administering rewards payments and penalties.**

Although Truven Health has been heavily involved in the design and operation of episode algorithms, quality measurement, analytics, and reporting, including the support of pay-for-performance (P4P) initiatives, our business focus has not included direct payment administration. Instead, we would interface and partner with fiscal agents and/or third-party administrators to provide them the necessary algorithms, measurements, and data analysis that provide the required instructions to administer payments and penalties.
B.2. Please describe how many relevant deployments you have.

B.2.1 Total

With respect to episode-based bundled payment per se, we have launched 15 client engagements in 2011-2012:

- Two commercial engagements in bundle design covering 16 participating health systems;
- Ten clients seeking CMMI bundled payment program grants; and,
- Three health plan engagements.

With respect to measuring provider performance in managing episodes of care, we have hundreds of clients using our MEG episode grouper and attribution methods to hold providers accountable for quality, efficiency, and/or outcomes. These clients include large employers such as GE and FedEx, health plans such as HCSC and many other BCBS plans, and state Medicaid agencies such as Georgia and Ohio.

B.2.2 In production (vs. pilot)

All of our episode-based bundled payment engagements are in the pilot planning stage.

B.2.3 Number of providers in production

None of our bundled payment clients are in production yet. (The CMMI activity is very recent; grant applications were due only three weeks ago.)

Our overall customer base consists of organizations that tend to be leaders in healthcare reform. Many of our existing clients have asked us for assistance in devising new ways to share risk with providers. When ACA was enacted, demand accelerated; in response, we ramped up our capacity and expertise in payment reform. In the past two years, we have quadrupled our efforts in this area; we added analytic staff with expertise in methods and metrics, and we added professional staff with experience in the implementation and management of risk-based payment incentive programs.

Having more than 2,200 employees serving the entire spectrum of the healthcare industry, Truven Healthcare Analytics is uniquely positioned to help Arkansas Medicaid capitalize on the promise of payment reform by implementing this episode-based payment system. We would welcome the opportunity to assist the State in this important project.