



Maryland High School Assessments

Maryland High School Assessment  
2016 Technical Report

Biology  
Government

Educational Testing Service  
January 2017

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## **Foreword**

The technical information included in this report is intended for use by those who evaluate tests, interpret scores, or use test results in making educational decisions. It is assumed that the reader has some technical knowledge of test construction and measurement procedures, as stated in *Standards of Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014).

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## Section 1. Introduction

The current Maryland High School Assessments (MD HSAs) in 2016 consist of end-of-course tests in Biology and Government. Please note that starting from 2016, the end-of-course tests in Algebra and English are being replaced by PARCC (Partnership for Assessment of Readiness for College and Careers) tests.

Prior to the Summer 2011 administration, the HSAs included a test in Government. From Summer 2011 to October 2012, the Government test was excluded from the MD HSAs. Starting in January 2013, the Government test was re-introduced into the MD HSAs. The MD HSAs are referred to as “end-of-course” tests because students take each test as they complete the appropriate coursework. In addition, results from the Biology administrations are used in the Maryland State Department of Education (MSDE) Adequate Yearly Progress (AYP) reports, required under the No Child Left Behind (NCLB) Act for the 2016 school year.

With the reinstatement of Government tests in January 2013, students entering 9<sup>th</sup> grade in the 2012-2013 school year or in a prior year (including students who entered 9<sup>th</sup> grade in 2011-2012, 2010-2011, or 2009-2010) have the option of earning a combined score of 1602 on all four MD HSAs or a combined score of 1208 on three MD HSAs (excluding Government) to be granted a Maryland High School Diploma.<sup>1</sup> Students entering 9<sup>th</sup> grade in 2013-14 and beyond will be required to pass all four HSAs, including Government, or obtain a combined score of 1602 to fulfill the graduation requirement.

Students who were enrolled in HSA-aligned courses (Government and Biology) during the 2015-2016 school year are required to pass the HSA, achieve an approved combined score, or satisfy the graduation requirement via the Bridge Plan<sup>2</sup>. Students in the graduating class of 2016 were not required to pass the Government HSA, but may use the score on the HSA towards a combined score option. The combined score options for the graduating class of 2016 vary depending if students have a score from the previous HSA English or HSA Algebra assessments.

All MD HSAs contain selected-response (SR) items, which require students to choose between four short response options. Starting in January 2014, Government tests include brief constructed-response (BCR) items which require students to write a short response. All MD HSA items are based on content outlined in Maryland’s Core Learning Goals (CLGs).<sup>3</sup> The SR items are machine-scored and the BCR items are scored by two raters (with resolution ratings as needed.) For BCR items, the higher rating was used for both calibration and scoring. Since May 2009, the MD HSAs have been administered online as well as in paper-and-pencil format.

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<sup>1</sup> More information on the testing requirement for graduation is available on the Maryland State Department of Education website at [http://mdk12.org/assessments/high\\_school/index.html](http://mdk12.org/assessments/high_school/index.html).

<sup>2</sup> Bridge plan provides a process that helps ensure all students have a fair opportunity to demonstrate their knowledge and skills if traditional testing instruments are not effective measures for them. See more details at [http://mdk12.msde.maryland.gov/share/pdf/bridge\\_final.pdf](http://mdk12.msde.maryland.gov/share/pdf/bridge_final.pdf).

<sup>3</sup> The HSA Core Learning Goals documents can be found on the Maryland School Improvement website at <http://www.mdk12.org/assessments/standards/9-12.html>.

Studies of the comparability of online and paper forms of the MD HSAs were conducted in 2009 and 2010. The 2009 report is provided in the 2009 HSA Technical Report in Appendix 1C. The 2010 results were provided to the MSDE (Educational Testing Service, October 29, 2010). Further mode comparability studies have not been conducted.

This report provides information about the October 2015 administration and the January, May, and Summer 2016 administrations. For the October 2015 administration, one form was administered. For the January 2016 administration, three forms were administered: two forms for the primary administration, and one form for the makeup administration. For the May 2016 administration, ten test forms were administered: eight for the primary testing window (each has the same core set with different field test sets) and two for each of two makeup testing windows. For the Summer 2016 administration, two primary forms were administered: one for the first week of testing and the other one for the second week of testing.

Each test form consisted of operational and field test items. The operational items were used to produce student scores. Field test items were scored along with the operational items, but test takers' scores on these items were not included in the computation of their total test scores. For the January and May administrations, performance on the field test items was analyzed, and all flagged items were reviewed. Field test items that were approved by ETS content specialists and calibrated were then marked as available for use in the item bank. Items that were deemed unacceptable were marked as "Unavailable" and may be revised and field tested again in the future. With the exception of items selected for public release, which are not reused, the operational items that are returned to the item bank must remain unused for at least one year to minimize item exposure.

The item response model used to calibrate the items on the MD HSAs is the three-parameter logistic (3PL) model for the selected response items (see Section 2 for an introduction to item types) and the generalized partial credit model (GPCM) for the brief constructed response items on the Government HSA. These models are used to generate both total test scores and subscores using item-pattern (IP) scoring. Total test results in the scale score metric are reported to students. Subscores are not reported to students but are aggregated at the classroom level to provide teachers and administrators with additional information about student performance in each of the subscore categories.

Pre-equated item parameter estimates are used to generate student scores. When pre-equated item parameter estimates are used, the parameters are not estimated following an administration; instead, existing bank parameter estimates are used to produce student scores. Using this approach, scores can be calculated and assigned to students immediately after their answer documents have been processed. (Prior to 2004, students' scores were based on item parameter estimates after each administration.)

All technical support and analyses were carried out in accordance with both the *ETS Standards for Quality and Fairness* (2014) and the *Standards for Educational and Psychological Testing*, issued jointly by the American Educational Research Association [AERA], American Psychological Association [APA], and National Council on Measurement in Education [NCME] (2014).



The MD HSA chapter of this technical report consists of seven sections and two appendices.

- Section 1 provides an introduction to the MD HSA program.
- Section 2 describes the procedures used for test construction and administration.
- Section 3 discusses the validity of the MD HSAs.
- Section 4 delineates the scoring procedures and score types.
- Section 5 summarizes the results of the analyses of test reliability, decision consistency and decision accuracy.
- Section 6 provides summary statistics and descriptive information about student characteristics.
- Section 7 gives the results of the analysis of field test data, including classical item analysis, differential item functioning, and item calibration and scaling.
- Appendix A provides classical item statistics for each operational test item by form administered.
- Appendix B provides classical item statistics for each field test item administered.

## Section 2. Test Construction and Administration

### Test Development

#### *Planning*

Planning for the test development process began with the creation of item development plans for each content area. ETS content leaders collaborated with their content counterparts at MSDE to create these plans. The item bank was reviewed to determine how well the available item pool matched the test form requirements set forth in the test form blueprint as defined by the Core Learning Goals (CLGs) and the 2016 form construction templates provided by MSDE. Areas that contained low item counts were given priority when determining which indicators were to be addressed by the item writers. After these areas with critical need were defined and addressed, any remaining items to be developed (as determined by the requirements set forth in the RFP) were distributed among the indicators in a fashion that would best ensure sufficient numbers of items for use in the construction of forms for future administrations.

#### *Item Types*

As noted in Section 1, two item types were included on the 2016 MD HSA tests. These item types include the following:

- Selected response (SR)—questions in multiple-choice format with four answer options;
- Brief constructed response (BCR)—an item type used in Government only, for which the students need to write a short response.

Table 2.1 shows how these item types were distributed by content area. Each SR item is worth one point, and each BCR is worth 4 points.

Table 2.1 Number of Operational Items by Item Type for Each MD HSA Content Area

Content Area	Operational Items by Item Type		
	SR	BCR	Total
Biology	76	-	76
Government	62	5	67

### Test Specifications and Design

MSDE predetermined the basic test design and provided it to ETS in the form of the content-specific “Test Specifications—Test Form Matrix” document. This basic test design document provides information based on specified expectations and the distribution of the number of items by item type for each reporting category. How the specific items were placed throughout the forms was left to the collaborative efforts of ETS and MSDE content specialists. Construction of the forms was based on test blueprints approved by MSDE. Blueprints for each content area are presented in Tables 2.2 and 2.3.

Table 2.2 MD HSA Biology Blueprint

	Number of Items	Total Points per Category
Goal 1*		
Skills and Processes of Biology	16	16
Expectation 3.1		
Structure and Function of Biological Molecules	12	12
Expectation 3.2		
Structure and Function of Cells and Organisms	13	13
Expectation 3.3		
Inheritance of Traits	13	13
Expectation 3.4		
Mechanism of Evolutionary Change	9	9
Expectation 3.5		
Interdependence of Organisms in the Biosphere	13	13
Total	76	76

*Note.* Information on the referenced indicators can be found in the Maryland Core Learning Goals for Biology, available on the Maryland School Improvement website at <http://www.mdk12.org/assessments/standards/9-12.html>. Goal 1 includes Expectation 1.1 through Expectation 1.7

Table 2.3 MD HSA Government Blueprint

	Number of Items	Total Points per Category
Goal 1		
Expectation 1.1 U.S. Government Structure, Functions and Principles	21	24
Expectation 1.2 Protecting Rights and Maintaining Order	17	20
Goal 2 Systems of Government and U.S. Foreign Policy	9	12
Goal 3 Impact of Geography on Governmental Policy	8	11
Goal 4 Economic Principles, Institutions and Processes	12	15
Total	67	82

*Note.* Information on the referenced indicators can be found in the Maryland Core Learning Goals for Government, available on the Maryland School Improvement website at <http://www.mdk12.org/assessments/standards/9-12.html>.

### *Item Writing*

Item writers were employed to develop high-quality test items that were aligned with the Core Learning Goals. For each of the content areas, most of the item writers were Maryland educators. Only a small portion of the total number of items written was developed by ETS content specialists. Item writers were selected on the basis of their depth of content knowledge and familiarity with the MD HSA program. Many were experienced MD HSA item writers.

Item writers were trained on general item writing techniques as well as writing guidelines that are specific to the MD HSA program. Approximately one month after the initial item writer training, a follow-up training session was provided. The session was designed to evaluate how well the item writers' writing skills had developed to that point, to facilitate peer review of items, and to provide constructive feedback to guide the rest of their writing assignment.

Upon completion of their writing assignment, item writers submitted their items to ETS. Items that were accepted proceeded to the item review and revision process.

### *Item Review and Revision*

All items underwent a series of editorial reviews in accordance with the following procedures:

- Items were edited according to standard rules developed in conjunction with MSDE.
- Items were reviewed for accuracy, organization, comprehension, style, usage, consistency, and fairness/sensitivity.
- Item content was reviewed to establish whether the item measured the intended Goal-Expectation-Indicator-Assessment Limit, with the Goal being the broadest category and Assessment Limit being the narrowest parameter of content being assessed.
- Copyright and/or trademark permissions were verified for any materials requiring permissions, for both field test and operational material.
- Internal reviews were conducted and historical records were established for all version changes.

After ETS performed the required internal reviews, items were submitted to MSDE for review. If the MSDE content specialist requested an original version of the item as submitted by the item writer, a copy was provided. Any associated stimulus material, graphic, and/or art was provided as well as information regarding the Goal-Expectation-Indicator-Assessment Limit that each question addressed.

MSDE content specialists performed a review of the items and provided feedback to ETS content specialists. The edits suggested by the MSDE specialists were incorporated into the items. MSDE and ETS content specialists then met to conduct a side-by-side review of the items. Any further edits to the items were made. Finally, the items were prepared for review by the Content and Bias/Sensitivity Review Committees.

The Content and Bias/Sensitivity Review committees, selected by MSDE, were composed of diverse groups of Maryland educators. The committees reviewed each item to ensure that the content (a) accurately reflected what was taught in Maryland schools; (b) correctly matched the intended CLG indicator; and (c) did not unfairly favor or disadvantage an individual or group. Upon completion of this final round of reviews, MSDE and ETS content specialists conducted side-by-side meetings to evaluate the reviews and to reconcile the results of the various groups. ETS then applied the requested edits to the items and/or revisions to the accompanying graphics.

A total of 445 items were taken to the 2015 summer meetings for Biology and Government tests. Of the 445 items submitted for committee reviews, 420 items were accepted by the Content and Bias/Sensitivity Review Committees, so the acceptance rate was 94%. The status for each accepted item was then set to field test ready and it is eligible for placement in the field test positions for future test forms.

### *Testing Accommodations*

A number of alternate test formats are available to MD HSA test takers, including large-print, braille, online audio, and Kurzweil versions of the MD HSA developed for each content area. All

four alternate test formats are available at each administration. Data from these alternate formats are included in the psychometric analyses.

### **Test Specifications**

All 2016 test forms were constructed using items from the Maryland item bank. The pool of items available for use in the construction of the 2016 forms included all items that had been administered, calibrated, and linked to the operational scale. For Biology and Government, the MD HSA operational scale was defined in 2003 and included items administered in 2002 and 2003. Items flagged for poor fit were excluded from the item pool. Items flagged for substantial differential item functioning (DIF) against any of the comparison groups are marked as such in the item bank and they are not used unless required to fulfill content specifications, and then, only after review and approval by MSDE. (See Section 7 for a more detailed account of these analyses and flagging criteria.)

Each test form was constructed to meet specific test blueprint specifications. Tables 2.2 through 2.3 indicate the distribution of items within each reporting category by item type and the number of score points associated with each item type.

### **Item Selection and Form Design**

To conserve the item pool, when multiple forms were included in an administration, each test form consisted of a common set of operational items shared across forms within an administration, as well as a unique set of items. Within these administrations (i.e., January, May, and Summer), approximately 60 percent of the operational items in each form were common across the test sections. The remaining items in the forms consisted of combinations of items that varied across forms. The guidelines used to construct the forms are provided in Tables 2.4 through 2.7. The exact composition of the forms varied slightly based on available items in the pool.

Table 2.4 Form Construction Specifications for the MD HSA October 2015 Administration

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Primary Week
Form R
Operational and Field Test items—
Reuse of intact form from a prior administration

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Table 2.5 Form Construction Specifications for the MD HSA January 2016 Administration

Primary Week Form A	Primary Week Form B	Makeup 1 Form C
Common set—60%	Same as Form A	Common set—60%
Unique items—40%	Same as Form A	Unique items—40%
Field Test Section—Unique items	Field Test Section—Unique items	Field Test Section—Reuse of field test set from Form A or B, or a combination of both

Table 2.6 Form Construction Specifications for the MD HSA May 2016 Administration

Primary Week Forms D–L	Makeup 1 Form X	Makeup 2 Form Y
Common Set—60%	Common Set—60%	Common Set—60%
Unique Items—40%	Half of items from primary week’s 40% unique items—20%	Half of items from primary week’s 40% unique items—20%
	Unique items—20%	Unique items—20%
Field Test Section—Unique sets of items for Forms D–L	Field Test Section—Reuse of one or a combination of the field test sets used in forms D–L, with a preference for form D; however, the actual selection of field test items was determined by the constraints imposed by the operational items	Field Test Section—Reuse of one or a combination of the field test sets used in forms D–L, with a preference of using the same set used for form X; however, the actual selection of field test items was determined by the constraints imposed by the operational items

Table 2.7 Form Construction Specifications for the MD HSA Summer 2016 Administration

Primary Week 1 Form P	Primary Week 2 Form Q
Common Set—60%	Common Set—60%
Unique items—40%	Unique items—40%
Field Test Section—Reuse of prior administration field test set	Field Test Section— Reuse of prior administration field test set

In addition to the operational items, embedded field test items were included with each version of the test form, resulting in multiple versions of a test form containing different sets of field test items. The percentage of field test items per form varied by content area, as shown in Table 2.8.

Table 2.8 Number of Operational (OP) and Field Test (FT) Items by MD HSA Content Area

Content Area	OP Items	FT Items	% FT Items
Biology	76	23	23%
Government	67	14	21%

Items being field tested were primarily newly written items, with a small number of previously administered items that had been revised due to content concerns or problematic item statistics. Items with problematic statistics were ones that were judged to be acceptable from a content perspective but had one or more of the following statistical characteristics:  $p$ -values less than 0.10 or greater than 0.90 (For CR items, divide the average item score by maximum score points to obtain the  $p$ -value); item-total correlations of less than 0.15 for both the dichotomous and polytomous items; very high omit rates (5% or more for SR items and 15% for CR items); or SR items with a positive point-biserial correlation for one or more distractors. For administrations in which there was more than one primary form available at the same time (January and May), the forms were spiraled at the student level. Spiraling at the student level means that multiple forms of the test were packaged in order (e.g., D, E, F) and distributed to students according to this order. Spiraling at the student level helps ensure that all forms are randomly distributed throughout the state.

Forms were constructed using the test construction software associated with the customer item bank. The goal was to match the test characteristic curves (TCCs) and the conditional standard error of measurement (CSEM) curves with the “target” form defined as the base form used to set the operational scale. For Biology and Government, the base forms were originally developed in 2003. These base forms contained brief constructed response (BCR) items. Between summer 2009 and October 2013, BCR items were discontinued on the MD Government HSAs and the target TCCs for the HSAs were revised so that they were no longer influenced by the characteristics of CR items. Refer to ETS memorandum: *Considerations for Setting New Target Test Characteristic Curves for the Maryland High School Assessments (HSAs)* (Educational Testing Service, 2009) for details on how new target TCCs were created. However, starting in January 2014, BCR items were re-introduced to Government HSAs so the government target TCCs have been revised back to include BCR items in the calculation of TCCs and CSEMs.

The following general steps were completed during the test construction process:

1. For each administration, all forms were constructed simultaneously in order to provide the best opportunity to construct parallel forms.
2. Items that matched the test blueprint were selected to match the target TCCs and CSEMs.



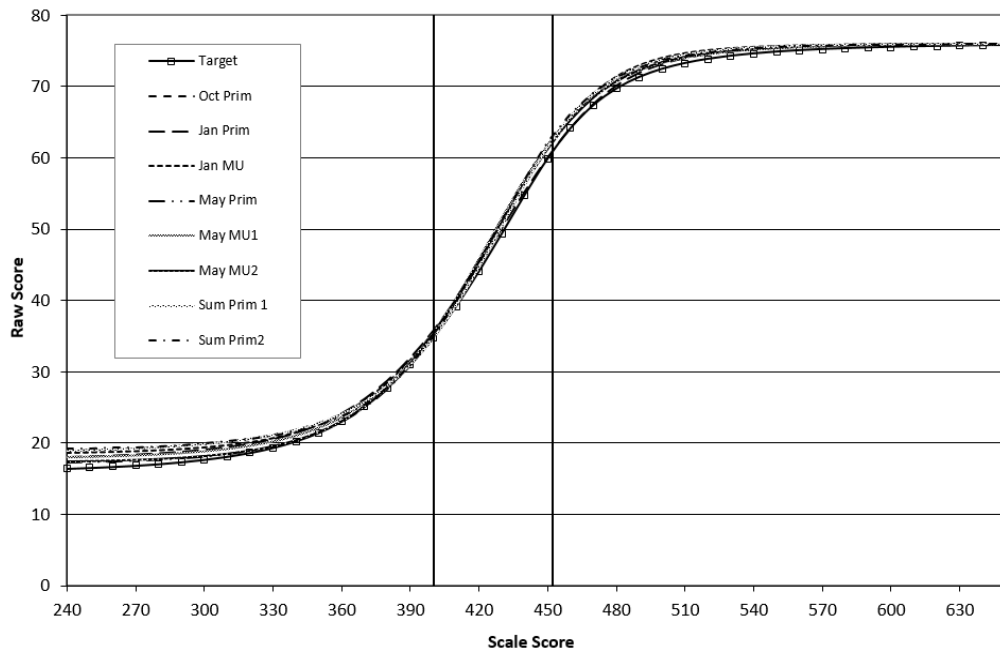
3. Test developers were careful to ensure that the item selections met all content specifications, including matching items to the test blueprint, distribution of keys, and avoidance of clueing<sup>4</sup> or clanging.<sup>5</sup>
4. After the operational items were selected for the test forms, the field test sets were constructed. Field test sets consisted of SR items in all content areas as well as BCR items for Government. While the field test sets were not constructed to meet any psychometric criteria, they were constructed to meet content criteria. For Biology and Government, the field test sets were estimated to be able to be completed by students in approximately 30-35 minutes. The field test items were embedded in the test according to a variety of content and template criteria, including, but not limited to, coverage of the reporting categories and assessment limits, cognitive balance, key balance/distribution, and clueing/clanging within the field test set and among the surrounding operational items.

Figures 2.1 to 2.4 show the plots of the TCCs and CSEMs for the target form and forms developed for each content area. The vertical lines in the figures are the proficiency (Proficient and Advanced) cuts for each content area. Government has only one cut- Proficient. It is important to note that the TCCs and CSEMs shown in the plots are based on preequated item parameters and therefore are curves calculated prior to administration of the tests. In general, the TCCs and CSEMs were similar to the target curves. The TCC plots indicate that all forms for each content area were within or very close to the acceptable range of the target curve for the full range of scale score values. When forms varied in difficulty, differences between forms were typically less than 5 percent of the total raw score across the score range, especially in the range of the cut scores. When forms had differences slightly greater than 5 percent, these larger differences were typically seen at the very low end of the scale score range and at the high end of the scale. As expected, the CSEM plots indicate that the CSEMs for each content area were lowest in the middle range of scale scores, where the majority of student scores are located. (Please refer to Figures 6.1 to 6.2 for histograms of student performance.)

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<sup>4</sup> Clueing refers to information within a passage, stimulus, item, graphic, or other test component that allows respondents to select/construct the correct answer to one or more items in an assessment without the knowledge and/or skill targeted by the item.

<sup>5</sup> Clanging occurs when an identical or similar word(s) appears in both the item stem and one or more item distractors. Also, if two or more items that are near each other share common key words, even if the item content does not clue, the items are said to clang because the interpretation of the word in one item can affect the interpretation of another item.



Note: Maximum possible raw score is 76.

Figure 2.1 Test Characteristic Curves for the MD HSA 2016 Biology Forms

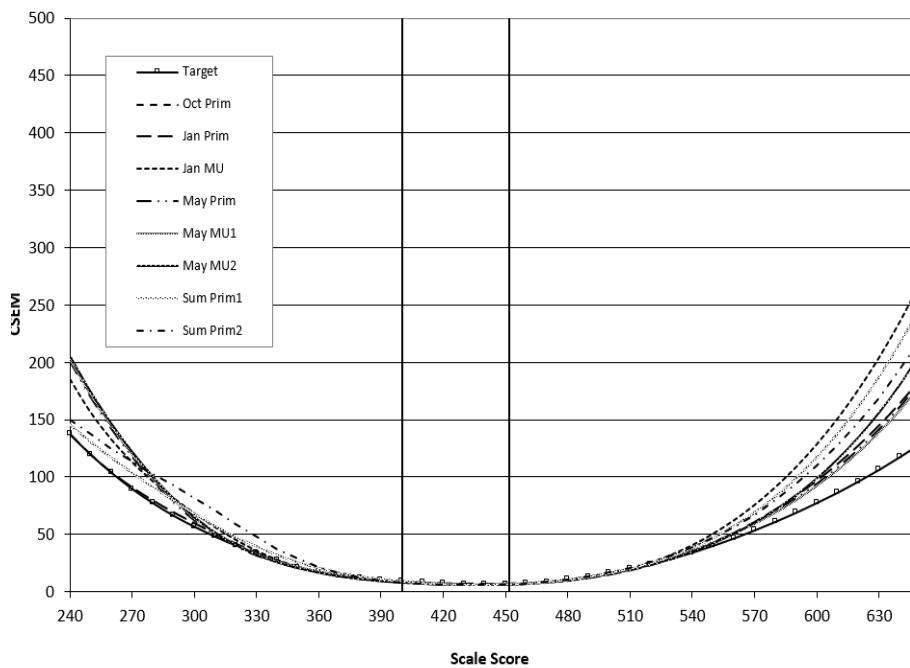
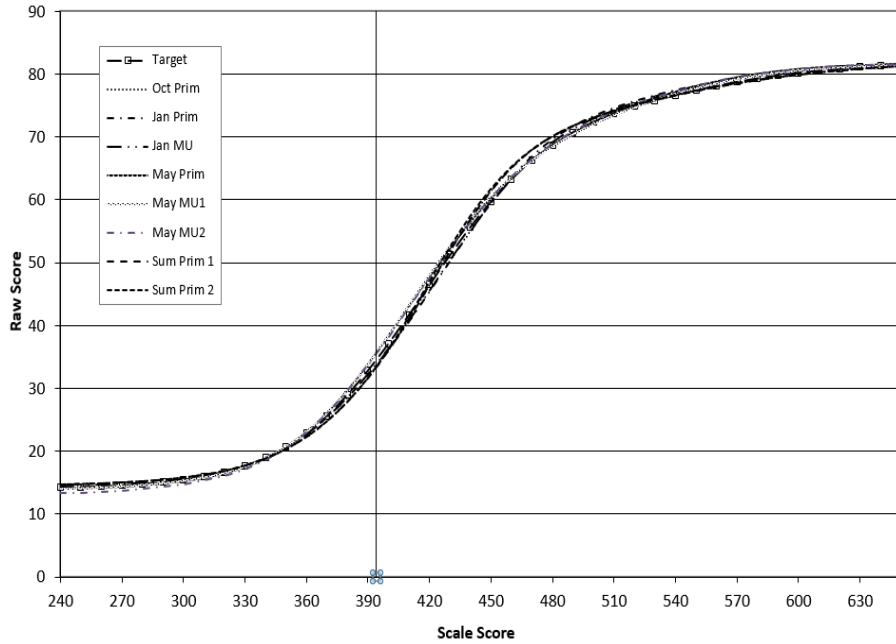


Figure 2.2 Conditional Standard Error Measurement for the MD HSA 2016 Biology Forms



Note: Maximum possible raw score is 82.

Figure 2.3 Test Characteristic Curves for the MD HSA 2016 Government Forms

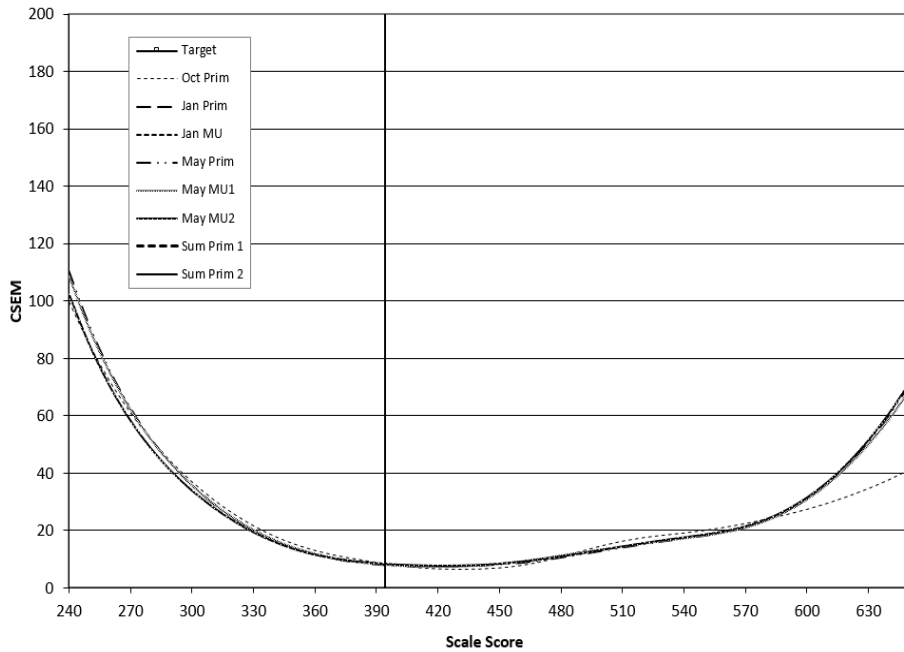


Figure 2.4 Conditional Standard Error of Measurement for the MD HSA 2016 Government Forms

## Test Administration

For all MD HSA tests administered in 2016, both paper-and-pencil and online versions were available.

For all administrations, paper-and-pencil primary forms were given during the first week of testing. For the January and May administrations, Makeup Form 1 was offered during the second week. For the May administration only, Makeup Form 2 was administered in the third week of testing.

For the online versions in all administrations, the primary and makeup forms were spiraled equally throughout the testing window. In October, only one form was administered. In January, the two primary forms and one makeup form were spiraled over the two-week testing window. In May, the eight primary and two makeup forms were spiraled over the three-week testing window. In the Summer administration, the two primary forms were spiraled over the two-week testing window. All forms administered without extended time accommodations had timing limits indicated in Table 2.9.

Table 2.9 Test Timing Schedule in Minutes by MD HSA Content Area

Content Area	Session One	Break	Session Two	Break	Session Three
Biology	45	5	45	5	45
Government	45	5	45	5	45

## **Section 3. Validity**

Validity is one of the most important attributes of assessment quality and is a fundamental consideration when tests are developed and evaluated (AERA, APA, & NCME, 2014; Messick, 1989). Validity refers to the degree to which logical, empirical, and judgmental evidence supports each proposed interpretation or use of a set of scores. Validity is not based on a single study or type of study but is an ongoing process of gathering evidence to support the interpretation or use of the resulting test scores. The process begins with the test design and continues throughout the entire assessment process, including content specifications, item development, psychometric quality analyses, and inferences made from the test results.

Students' scores on an MD HSA are assumed to reflect students' level of knowledge and skills in a content area. The scores are used to classify students in terms of their level of proficiency using cut scores established by the state.

### **Evidence Based on Analyses of Test Content**

The MD HSAs are referred to as end-of-course tests because students take each test as they complete the appropriate coursework. Consequently, items are developed to measure the knowledge and skills expected of students following completion of coursework. As discussed in Section 2, the development of test content for each MD HSA is overseen by a content expert who has a depth of knowledge and teaching experience related to the course in which the MD HSA is to be administered. Appropriate content leads who have similar qualifications review the test development work of these individuals.

Evidence based on analyses of test content includes logical analyses that determine the degree to which the items in a test represent the content domain that the test is intended to measure (AERA, APA, & NCME, 2014, p. 14). The test development process for the MD HSAs provides numerous opportunities for the MSDE to review test content and make changes to ensure that the items measure the knowledge and skills of Maryland students according to course standards. Every item that is created is referenced to a particular instructional standard (i.e., goal, expectation, or indicator). During the internal ETS development process, the specific reference is confirmed or changed to reflect changes to the item. When the item is sent to a committee of Maryland educators for a content review, the members of the committee make independent judgments about the match of the item content to the standard it is intended to measure and evaluate the appropriateness for the age of students being tested. These judgments are tabulated and reviewed by the content experts, who use the information to decide which items will advance to the field test stage of development.

### **Evidence Based on Analyses of Internal Test Structure**

Analyses of the internal structure of a test typically involve studies of the relationship among test items and/or test components in the interest of establishing the degree to which the items or components appear to reflect the construct on which a test score interpretation is based (AERA, APA & NCME, 2014, p. 16). The term construct is used here to refer to the characteristic that a

test is intended to measure; in the case of the MD HSAs, the characteristic of interest is the knowledge and skills defined by the test blueprint for each content area.

These test blueprints are derived from Maryland’s Core Learning Goals for each course. The test blueprints are presented in Section 2 (see Tables 2.2 and 2.3); the CLGs can be found on the MSDE website at <http://www.mdk12.org/assessments/standards/9-12.html> or [http://www.mdk12.org/assessments/high\\_school/#/01](http://www.mdk12.org/assessments/high_school/#/01).

High total group internal consistencies as well as similar reliabilities between subgroups with roughly the same sample size provide additional evidence of validity. High reliability over items within a test implies that the test items within a domain are measuring the intended construct. Cronbach’s alpha results for each administration for the overall population, as well as for subgroups can be found in Section 6 of this report, in Tables 6.6 through 6.13.

Another way to assess the internal structure of the test is through the evaluation of Pearson correlation matrices between the individual MD HSA subscores. If subscores within a content area are strongly related to each other, this is another indicator of validity. Tables 3.1 and 3.2 highlight the Pearson correlations found between subscores within each content area of the MD May HSA tests since the May tests had the largest sample sizes of all the 2016 administrations. Results indicate that each subscore is positively correlated with the total Scale Score in both content areas, especially Government. It is also noted that the Government subscore correlations are higher compared to those in Biology and this pattern was observed in 2015 as well.

Table 3.1 Correlations between Subscores by MD HSA Content Area –Biology

		Biology ( <i>N</i> = 88,981)					
	SS	1	2	3	4	5	6
Overall SS	1						
Subscore 1	.80	1					
Subscore 2	.69	.54	1				
Subscore 3	.73	.56	.53	1			
Subscore 4	.74	.57	.52	.56	1		
Subscore 5	.67	.54	.49	.51	.53	1	
Subscore 6	.72	.57	.51	.54	.54	.50	1

Table 3.2 Correlations between Subscores by MD HSA Content Area –Government

		Government ( <i>N</i> = 42,687)				
	SS	1	2	3	4	5
Overall SS	1					
Subscore 1	.91	1				
Subscore 2	.88	.78	1			
Subscore 3	.83	.74	.71	1		
Subscore 4	.81	.70	.67	.65	1	
Subscore 5	.84	.74	.72	.70	.66	1

Finally, the internal structure of the MD HSA tests can be assessed in relation to the degree to which these tests meet the requirements of the statistical models used to estimate item parameters and student scores. Confirmatory factor analyses (CFAs) for each test by content area can be conducted to examine the underlying domain structure of the MD HSA test. CFA is a useful statistical methodology as it can be used to evaluate whether performance on items in each test reflects a single underlying characteristic or a set of distinct characteristics defined by the reporting categories for each content area. The findings from this type of analysis are helpful as they can provide evidence as to whether the unidimensional model-based IRT used to calibrate the MD HSA items is appropriate.

#### *Confirmatory Factor Analyses of the May 2016 Administration Data*

To assess the dimensionality of the MD HSA tests, CFAs for each content area were conducted using test data from the primary forms of the May 2016 administration. The May administration was chosen for analysis because it is the largest and most representative administration of the MD HSAs. The May administration consisted of eight primary forms; data from operational items were combined across forms within the content areas of Biology and Government.

Mplus (Muthén & Muthén, 2007) was used to calculate matrices consisting of polychoric correlations between the items included in each analysis. Mplus was also used to fit specified factor models to the data. In the analysis, the input polychoric correlation matrix was used to estimate the factor loadings between the indicators (items).

Parameter estimation for CFAs was accomplished using a weighted least-square method with mean and variance adjustment (Muthén, DuToit, & Spisic, 1997). This method leads to a consistent estimator of the model parameters, and provides standard errors that are robust under model misspecification. For ordinal data, weighted least squares estimation offers an alternative to full-information maximum likelihood techniques. The latter becomes computationally too demanding for models with more than a few dimensions. Model fit can be assessed through the use of a scaled chi-square statistic. However, the degrees of freedom for the reference distribution of this statistic cannot be computed in the standard way. The correct degrees of freedom are in part determined by the data, and hence different degrees of freedom may be obtained when applying the same model to different data (Muthén, 1998-2004, p. 19-20).

Overall model fit for each CFA model by content area was examined using the scaled chi-square ( $\chi^2$ ) test of model fit in combination with supplemental fit indices. The Tucker-Lewis Index (TLI) compares the chi-square for the hypothesized model with that of the null or “independence” model, in which all correlations or covariances are zero. TLI values range from zero to 1.0, and values greater than 0.94 signify good fit (Hu & Bentler, 1999). The comparative fit index (CFI) and root mean square error of approximation (RMSEA) index both are based on noncentrality parameters. The CFI compares the covariance matrix predicted by the model with the observed covariance matrix, and the covariance matrix of the null model with the observed covariance matrix. A CFI value greater than 0.90 indicates acceptable model fit (Hu & Bentler, 1999). The RMSEA assesses the error in the hypothesized model predictions; values less than or equal to 0.06 indicate good fit (Hu & Bentler, 1999).

Table 3.3 shows the results of the analyses. None of the  $\chi^2$  results indicated good fit, given the criterion of  $p > .05$ ; this was expected because sample sizes were very large. The TLI, CFI, and RMSEA fit statistics indicated that the one-factor solutions generally fit the data well in both content areas. These findings provide evidence that the tests for each content area measure a single dimension. This is a positive finding, given that IRT models assume unidimensionality.

Table 3.3 MD HSA Confirmatory Factor Analyses Fit Statistics

Content	Admin	Forms	# of Factors	# of Items	<i>N</i>	<i>df</i>	$\chi^2$ *	TLI	CFI	RMSEA
Biology	May	D-L	1	76	52,961	2,774	41,385	<b>0.99</b>	<b>0.99</b>	<b>0.016</b>
Government	May	D-L	1	67	50,779	2,144	55,406	<b>0.98</b>	<b>0.98</b>	<b>0.022</b>

Note: Table entries that meet or exceed the criterion are in bold.

\* $p < .0005$  for all  $\chi^2$

### Speededness

If more than five percent of students omitted an SR or more than 15 percent of students omitted a CR item, the item was flagged as having a high omit rate. Table 3.4 shows omit rates for each content area by administration and item type. Only one CR item was flagged for having high omit rate. None of the SR items was flagged.

Table 3.4 Number of MD HSA Operational Items Flagged for High Omit Rate

Content	October		January		May		Summer	
	Item Types		Item Types		Item Types		Item Types	
	SR	CR	SR	CR	SR	CR	SR	CR
Biology	0	--	0	--	0	--	0	--
Government	0	1	0	0	0	0	0	1

The percentage of students who respond to the last items in a test can also be used to assess the degree to which a test is speeded. When speededness occurs, a test is measuring not only students' knowledge and skills as defined by the construct of interest but also the speed at which the knowledge and skills are demonstrated, which is a second construct. In tests of achievement, it is desirable to find that speededness is not present in a test, which provides evidence that student scores on the test reflect only the intended construct. Evidence of speededness is provided by the finding that the omit rates at the end of a test are notably higher than those observed elsewhere in the test.



Appendix A presents the percentages of students who omitted items on the MD HSA operational forms. Across all content areas and administrations, the percentage of students who did not respond to the last ten SR items of a test were less than 3 percent per item. Omit rates for CR items on the Government tests were fairly low, ranging from 4 percent to 11 percent for the January administration, ranging from 3 percent to 7 percent for the May administration, and ranging from 8 percent to 17 percent for the October 2015 administration. The exception was the Summer 2016 administration, with the omit rates ranging from 12 percent to 23 percent, probably due to a very limited sample consisting of low performing students. For all item types the percentage of students who omitted items located within the last ten positions on an MD HSA test form was not greater than omit rates throughout the test.

In addition to the factor analyses and the information regarding speededness presented here and the validation documentation gathered and maintained by MSDE, other information in support of the uses and interpretations of MD HSA scores appears in the following sections:

- Section 4 provides detailed information concerning the scores that were reported for the MD HSAs and the cut scores for each content area.
- Section 5 provides information concerning the test characteristics based on classical test theory for the administrations of the MD HSAs.
- Section 6 presents information regarding student characteristics for the administrations of the MD HSAs.
- Section 7 includes documentation regarding the field test analyses. Descriptions of classical item analyses, differential item functioning, item response theory calibration, and scaling are included. In addition, summary tables of item  $p$ -value and item-total correlation distributions are provided.

## Section 4. Scoring Procedures

### Scale Scores

The MD HSA reporting scale ranges from 240 to 650. For Biology and Government, the scale was established in 2003 and defined so that the scale scores had a mean of 400 and a standard deviation of 40.

These scores represent ability estimates obtained using Item Response Theory (IRT, Yen & Fitzpatrick, 2006). (See IRT Calibration and Scaling in Section 7 for details about the three-parameter logistic model [3PL] and generalized partial credit model - Government test only-used for the MD HSAs.) Students' total test scores and subscores are scale scores derived using the 3PL and generalized partial credit models and item-pattern scoring procedures. There are essentially two ways of scoring a test: number-correct (NC) or item-pattern (IP) scoring. NC scoring considers how many test items a student answered correctly in determining that student's total raw score. In contrast, the IP scoring method is based on an IRT model. IP scoring takes into account not only a student's total raw score, but also *which* test items the student answered correctly, as well as the psychometric characteristics of these items.

Test items are not equal in their characteristics. For example, some items are better at discriminating between students that know the tested content and those who do not; some items are more difficult; and low-ability students are more likely to guess correctly on some test items than on others.

Two students with exactly the same total raw score will get the same test score in NC scoring. It is very possible, however, that even though they have the same total raw score, the actual items they answered correctly were different, and their different sets of correctly answered items could have different item characteristics. In such a case, the students will very likely get different reported test scores in IP scoring even though they have the same total raw score. With IP scoring, a student who correctly answers a number of more difficult items will get a higher score than one who answers the same number of easier items. This would be applicable to both total test scores and subscore category scores reported using IP scoring.

Item-pattern scoring has been found to produce smaller standard errors of measurement (SEM) than number-correct scoring. The smaller the SEM, the more confidence we have about the precision of the test results. In addition, test reliability is higher with IP scoring than with NC scoring (Yen & Candell, 1991), which means that fewer questions are needed in IP scoring than NC scoring for equivalent scoring accuracy. For these reasons, both the HSA total test scores and test subscores are reported using IP scoring.

### Conditional Standard Errors of Measurement

Corresponding conditional standard errors of measurement (CSEM) were produced and are equal to the inverse of the square root of the test information function. CSEMs are standard errors at individual score points, defined as

$$CSEM(\hat{\theta}) = \frac{1}{\sqrt{I(\hat{\theta})}}$$

where  $\hat{\theta}$  refers to the individual score point (location on the scale),  $CSEM(\hat{\theta})$  refers to the conditional standard error of measurement at the score point, and  $I(\hat{\theta})$  refers to the test information function value at that score point  $\hat{\theta}$ . The test information function is the sum of corresponding information functions of the test items when optimal item weights are used. Item information functions depend on the item difficulty, discrimination, and guessing parameter.

### Lowest and Highest Obtainable Test Scores

The maximum likelihood procedure under the 3PL model does not produce reasonable scale score estimates for students with perfect scores or zero scores. In order for all examinees to receive scale scores, scores can be established for extreme values by following a procedure as described in Appendix 3.C of the 2004 Technical Report. This procedure is not maximum likelihood estimation but produces rational values called the lowest obtainable scale score (LOSS) and the highest obtainable scale score (HOSS).

### Cut Scores

MSDE established the cut scores associated with each of the performance levels in Biology and Government in 2003.<sup>6</sup> One cut score was established for Biology and one was established for Government in 2005. To comply with NCLB requirements for secondary science, an Advanced cut score for Biology was established in 2008. These values are given in Table 4.1.

Table 4.1 MD HSA Cut Scores by Content Area

Content Area	Cut Score	
	Proficient	Advanced
Biology	400	452
Government	394	

<sup>6</sup> Technical documentation on the standard-setting method used to establish the MD HSA cut scores is available on the Maryland State Department of Education website at <http://archives.marylandpublicschools.org/MsDE/divisions/planningresultstest/Maryland+Standard+Setting+Technical+Reports.htm>.

## Year-to-Year Scale Maintenance

The MD HSAs for Biology and Government have been preequated since 2004. In the preequated design, a pool of IRT-calibrated items expressed on the reporting scale exists for test form construction. The item parameter estimates for new forms are obtained from the bank and are used to build test forms that are parallel across administrations. Student scores are produced with the bank-obtained item parameter estimates, thereby linking scores from one administration to the other.

To increase the item pool, the MD HSA embeds field test items in the operational test forms. The field test data for the January and May administration are calibrated with the operational items at that time. The calibrations are linked to the reporting scale using all operational items as anchors and the Stocking and Lord procedure (Stocking & Lord, 1983). Having all operational items serve as linking items ensures that the linking set is large enough to provide stable and reliable results. Item bank parameter estimates are established at the time of the field test and are not updated following each administration.

To ensure that items behave the same way across administrations, construction of new forms follows guidelines defined by Kolen and Brennan (2014). These guidelines are:

1. Items should appear in the same contexts and positions as when the item parameter estimates were established. Operational items are placed as close as possible to the same position they were in when parameters were estimated and within the same third of the total test form.
2. Operational items should appear in similar positions on the test. It may be problematic if an item is positioned in very different locations on the two forms, such as at the beginning of the test on one form and at the end of the test on another form. Operational items that appear in more than one form occupy consistent positions across forms; MSDE must approve any deviations.
3. The text is exactly the same in the old and new forms. Minor editorial changes and rearranging answer choices are discouraged; otherwise the items may function differently. All requests for minor editorial changes must undergo psychometric review to evaluate the implications for the response process.

## Section 5. Test Characteristics

This section provides a discussion of the results of analyses of test reliability and decision consistency and accuracy for all MD HSA test forms administered.

### Reliability

The general concept of reliability concerns the precision of a test score. Of interest is quantifying the degree to which a score will vary from an average result obtained over many testing occasions due to random factors (Haertel, 2006). A variety of theories and methods can be used to estimate reliability.

Classical test theory defines reliability as the proportion of total score variance that is true-score variance. Several different ways of estimating this proportion exist. One estimate of reliability that is commonly used is Cronbach's alpha (Cronbach, 1951), an internal consistency measure. It is derived from analysis of the consistency of performance over items within a test and provides a lower-bound estimate of a test's reliability. Cronbach's alpha can be expressed as:

$$\alpha = \frac{n}{n-1} \left[ 1 - \frac{\sum_{i=1}^n \sigma_i^2}{\sigma_x^2} \right],$$

where  $n$  is the number of items,  $\sigma_i^2$  is the variance of scores on the  $i$ -th item, and  $\sigma_x^2$  is the variance of the total score (sum of scores on the individual items). Sample estimates are substituted for the population variances in this formula to provide reliability estimates.

The results for the reliability analyses (i.e., Cronbach's alpha) of the total test score are presented with the summary statistics in Tables 6.6 to 6.13. The tables show that the overall reliability of the MD HSAs administered during the January and May sessions ranged from 0.93 to 0.95 for the primary forms, and from 0.94 to 0.95 for the makeup forms. The overall reliability results for the October forms ranged from 0.80 to 0.84. The overall reliability results for the Summer forms ranged from 0.83 to 0.91.

Lower reliability coefficients are sometimes seen for the smaller administrations typically taken by repeat test takers (October and Summer). All forms are constructed to meet the same target specifications, one of which is to include only items that have point-biserials of at least 0.10. However, when items are administered to nonrepresentative samples of students, such as repeat test takers, the point-biserials of some items may be lower in those samples, which leads to lower reliability coefficients when calculated for those administrations.

## Decision Accuracy and Decision Consistency

The accuracy of decisions based on specified cut scores was assessed for reliability of classification using a computer program called *RELCLASS* (ETS proprietary software). *RELCLASS* provides two statistics that describe the reliability of classifications based on test scores (Livingston & Lewis, 1995). Specifically, information from an administration of one form is used to estimate the following:

***Decision accuracy***, or the extent to which test takers are classified in the same way as they would be on the basis of the average of all possible forms of a test. Decision accuracy addresses the question: How does the actual classification of test takers, based on their single-form scores, agree with the classification that would be made on the basis of their true scores, if their true scores were somehow known?

***Decision consistency***, or the extent to which test takers are classified in the same way as they would be on the basis of a single form of a test *other* than the one for which data are available. Decision consistency addresses the question: What is the agreement between the classifications based on two nonoverlapping, equally difficult forms of the test?

*RELCLASS* estimates decision accuracy using an estimated joint distribution of reported performance-level classifications on the current form of the exam and the performance-level classifications based on an all-forms average (true score). *RELCLASS* estimates decision consistency using an estimated joint distribution of reported performance-level classifications on the current form of the exam and performance-level classifications on the alternate (parallel) form. In each case, the proportion of performance-level classifications with exact agreement is the sum of the entries in the diagonal of the contingency table representing the joint distribution.

The results are provided in Tables 5.1 to 5.8 by content area for the October 2015, January, May, and Summer 2016 forms. The tables show that decision accuracy values, which estimate the agreement between classifications based on an observable variable (scores on one form of a test) and classifications based on an unobservable variable (the test takers' true scores), ranged from 0.83 to 0.89 across all performance levels and from 0.88 to 0.93 for the Proficient and Above classifications in Biology. Decision consistency values, which estimate the agreement between classifications based on two variables (scores on the form students have taken and a parallel form of the same test that is not administered to the students), ranged from 0.78 to 0.85 across all performance levels and from 0.83 to 0.91 for the Proficient and Above classifications in Biology. In Government (October, January, May, and Summer forms), decision accuracy and consistency were calculated across all performance levels; decision accuracy values ranged from 0.90 to 0.94, decision consistency values ranged from 0.85 to 0.91.

Note that in all cases the decision accuracy indices are somewhat larger than the decision consistency indices. This is due to differences in the estimation procedures. The estimation procedure for decision accuracy includes a random component on one of the two variables, whereas in estimating decision consistency each variable includes a random component (Livingston & Lewis, 1995).

Table 5.1 Decision Accuracy and Consistency: MD HSA Biology October 2015 Form

	Placement Scores	Advanced	Proficient	Basic	Category Total*
Decision Accuracy	452–650	.01	.00	.00	.01
	400–451	.02	.14	.06	.21
	240–399	.01	.06	.72	.79
Estimated Proportion Correctly Classified*: Total = 0.86, Proficient & Above = 0.88					
Decision Consistency	452–650	.01	.00	.00	.01
	400–451	.03	.11	.07	.21
	240–399	.01	.09	.68	.79
Estimated Proportion Consistently Classified*: Total = 0.80, Proficient & Above = 0.83					

\* Inconsistencies between cell entries and totals are due to rounding.

Table 5.2 Decision Accuracy and Consistency: MD HSA Biology January 2016 Forms

	Placement Scores	Advanced	Proficient	Basic	Category Total*
January Primary					
Decision Accuracy	452–650	.07	.01	.00	.08
	400–451	.02	.17	.04	.24
	240–399	.00	.04	.64	.68
Estimated Proportion Correctly Classified*: Total = 0.89, Proficient & Above = 0.92					
Decision Consistency	452–650	.07	.01	.00	.08
	400–451	.03	.15	.05	.24
	240–399	.00	.06	.63	.68
Estimated Proportion Consistently Classified*: Total = 0.85, Proficient & Above = 0.89					
January Form C					
Decision Accuracy	452–650	.08	.01	.00	.09
	400–451	.02	.19	.04	.25
	240–399	.00	.04	.61	.66
Estimated Proportion Correctly Classified*: Total = 0.89, Proficient & Above = 0.92					
Decision Consistency	452–650	.08	.01	.00	.09
	400–451	.03	.17	.05	.25
	240–399	.00	.06	.60	.66
Estimated Proportion Consistently Classified*: Total = 0.85, Proficient & Above = 0.89					

\* Inconsistencies between cell entries and totals are due to rounding.

Table 5.3 Decision Accuracy and Consistency: MD HSA Biology May 2016 Forms

	Placement Scores	Advanced	Proficient	Basic	Category Total*
<b>May Primary</b>					
	452–650	.17	.02	.00	.19
Decision Accuracy	400–451	.04	.41	.06	.50
	240–399	.00	.01	.29	.30
Estimated Proportion Correctly Classified*: Total = 0.87, Proficient & Above = 0.93					
	452–650	.16	.03	.00	.19
Decision Consistency	400–451	.05	.38	.08	.50
	240–399	.00	.02	.28	.30
Estimated Proportion Consistently Classified*: Total = 0.82, Proficient & Above = 0.91					
<b>May Form X</b>					
	452–650	.15	.02	.00	.17
Decision Accuracy	400–451	.04	.40	.06	.50
	240–399	.00	.02	.31	.33
Estimated Proportion Correctly Classified*: Total = 0.87, Proficient & Above = 0.93					
	452–650	.14	.03	.00	.17
Decision Consistency	400–451	.05	.37	.07	.50
	240–399	.00	.03	.30	.33
Estimated Proportion Consistently Classified*: Total = 0.82, Proficient & Above = 0.90					
<b>May Form Y</b>					
	452–650	.16	.02	.00	.18
Decision Accuracy	400–451	.04	.41	.06	.51
	240–399	.00	.01	.30	.31
Estimated Proportion Correctly Classified*: Total = 0.87, Proficient & Above = 0.93					
	452–650	.15	.03	.00	.18
Decision Consistency	400–451	.05	.38	.08	.51
	240–399	.00	.02	.29	.31
Estimated Proportion Consistently Classified*: Total = 0.82, Proficient & Above = 0.90					

\* Inconsistencies between cell entries and totals are due to rounding.



Table 5.4 Decision Accuracy and Consistency: MD HSA Biology Summer 2016 Forms

	Placement Scores	Advanced	Proficient	Basic	Category Total*
<b>Summer Form P</b>					
Decision Accuracy	452–650	.02	.00	.00	.02
	400–451	.04	.16	.06	.26
	240–399	.00	.05	.67	.72
Estimated Proportion Correctly Classified*: Total = 0.85, Proficient & Above = 0.89					
Decision Consistency	452–650	.02	.00	.00	.02
	400–451	.05	.13	.07	.26
	240–399	.00	.07	.65	.72
Estimated Proportion Consistently Classified*: Total = 0.80, Proficient & Above = 0.85					
<b>Summer Form Q</b>					
Decision Accuracy	452–650	.00	.00	.00	.00
	400–451	.06	.13	.08	.27
	240–399	.00	.03	.70	.73
Estimated Proportion Correctly Classified*: Total = 0.83, Proficient & Above = 0.89					
Decision Consistency	452–650	.00	.00	.00	.00
	400–451	.07	.11	.09	.27
	240–399	.01	.06	.67	.73
Estimated Proportion Consistently Classified*: Total = 0.78, Proficient & Above = 0.85					

\* Inconsistencies between cell entries and totals are due to rounding.

Table 5.5 Decision Accuracy and Consistency: MD HSA Government October 2015 Forms

	Placement Scores	Proficient	Basic	Category Total*
Decision Accuracy	394–650	.21	.04	.25
	240–393	.06	.69	.75
	Estimated Proportion Correctly Classified*: Total = 0.90			
Decision Consistency	394–650	.19	.06	.25
	240–393	.09	.66	.75
	Estimated Proportion Consistently Classified*: Total = 0.85			

\* Inconsistencies between cell entries and totals are due to rounding.

Table 5.6 Decision Accuracy and Consistency: MD HSA Government January 2016 Forms

	Placement Scores	Proficient	Basic	Category Total*
<b>January Form A</b>				
Decision Accuracy	394–650	.36	.04	.40
	240–393	.04	.56	.60
	Estimated Proportion Correctly Classified*: Total = 0.92			
Decision Consistency	394–650	.35	.05	.40
	240–393	.05	.54	.60
	Estimated Proportion Consistently Classified*: Total = 0.89			
<b>January Form C</b>				
Decision Accuracy	394–650	.41	.04	.46
	240–395	.04	.51	.55
	Estimated Proportion Correctly Classified*: Total = 0.92			
Decision Consistency	394–650	.40	.06	.46
	240–393	.05	.49	.55
	Estimated Proportion Consistently Classified*: Total = 0.89			

\* Inconsistencies between cell entries and totals are due to rounding.

Table 5.7 Decision Accuracy and Consistency: MD HSA Government May 2016 Forms

	Placement Scores	Proficient	Basic	Category Total*
<b>May Form D</b>				
Decision Accuracy	394–650	.67	.05	.72
	240–393	.01	.27	.28
	Estimated Proportion Correctly Classified*: Total = 0.94			
Decision Consistency	394–650	.65	.07	.72
	240–393	.02	.26	.28
	Estimated Proportion Consistently Classified*: Total = 0.91			
<b>May Form X</b>				
Decision Accuracy	394–650	.64	.06	.70
	240–395	.01	.29	.30
	Estimated Proportion Correctly Classified*: Total = 0.93			
Decision Consistency	394–650	.63	.07	.70
	240–393	.02	.28	.30
	Estimated Proportion Consistently Classified*: Total = 0.90			
<b>May Form Y</b>				
Decision Accuracy	394–650	.66	.05	.71
	240–393	.01	.28	.29
	Estimated Proportion Correctly Classified*: Total=0.93			
Decision Consistency	394–650	.64	.07	.71
	240–393	.02	.26	.29
	Estimated Proportion Consistently Classified*:Total=0.91			

\* Inconsistencies between cell entries and totals are due to rounding.

Table 5.8 Decision Accuracy and Consistency: MD HSA Government Summer 2016 Forms

	Placement Scores	Proficient	Basic	Category Total*
<b>Summer Form P</b>				
Decision Accuracy	394–650	.24	.05	.28
	240–393	.03	.68	.72
	Estimated Proportion Correctly Classified*: Total = 0.92			
Decision Consistency	394–650	.23	.06	.28
	240–393	.05	.66	.72
	Estimated Proportion Consistently Classified*: Total = 0.89			
<b>Summer Form Q</b>				
Decision Accuracy	394–650	.28	.08	.36
	240–395	.03	.62	.64
	Estimated Proportion Correctly Classified*: Total = 0.90			
Decision Consistency	394–650	.26	.09	.36
	240–393	.05	.60	.64
	Estimated Proportion Consistently Classified*: Total = 0.86			

\* Inconsistencies between cell entries and totals are due to rounding.

## Section 6. Student Characteristics

### Summary Statistics

The results presented in Tables 6.1 and 6.2 are based on the combined results for students who took the tests in October 2015 and January, May, and Summer 2016. All results are based on the final Research files sent to MSDE. Summary statistics (count, mean and standard deviation) of scale scores in Table 6.1 are reported for all students and by content and grade. Table 6.2 reports the summary statistics of scores for content areas by the October 2015, January, May, and Summer 2016 administrations.

Table 6.1 MD HSA Means and Standard Deviations for 2015-2016 Overall and by Grade

		<i>N</i>	Mean	<i>SD</i>
Biology	Overall Grade	91,924	402.8	50.5
	4	2	*	*
	6	3	*	*
	8	238	443.9	25.8
	9	28,559	426.4	43.6
	10	37,784	407.5	45.3
	11	17,998	372.9	45.5
	12	7,340	358.5	48.8
Government	Overall Grade	80,690	405.5	46.5
	4	2	*	*
	8	2	*	*
	9	23,774	412.5	43.0
	10	40,095	411.9	44.6
	11	14,845	381.2	45.9
	12	1,972	372.6	53.5

\* Statistics not reported for sample size less than 50 ( $N < 50$ ).

Table 6.2 MD HSA Mean Scale Scores by Administration

Content Area	October			January			May			Summer		
	<i>N</i>	Mean	<i>SD</i>	<i>N</i>	Mean	<i>SD</i>	<i>N</i>	Mean	<i>SD</i>	<i>N</i>	Mean	<i>SD</i>
Biology	12,994	368.9	46.2	14,564	376.6	57.1	63,579	416.2	43.3	855	366.1	56.0
Government	8,065	371.6	39.9	11,368	385.3	47.6	60,757	414.1	43.5	672	366.6	50.4

The mean scale scores are presented for the years 2003 to 2016 by content area in Table 6.3. Table 6.4 presents the passing rates for these years.

Table 6.3 MD HSA Mean Scale Scores over Test Years

Content Area	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Biology	400.8	406.2	404.7	415.0	414.5	414.7	409.0	408.7	406.9	410.7	409.2	409.5	407.0	402.8
Government	403.5	406.5	409.3	418.5	417.1	417.1	406.3	408.6	405.6	--	414.7	417.6	412.2	405.4

*Note.* The current English test was not administered prior to 2006. The Government test was not administered after the May 2011 administration. Starting in January 2013, Government was reintroduced into the HSAs.

Table 6.4 MD HSA Percentage Passing Rates (Proficient + Advanced) over Test Years

Content Area	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Biology	54.3	62.0	58.4	67.8	70.1	68.4	60.0	59.1	57.9	60.9	60.0	61.4	58.2	56.4
Government	39.8	54.6	67.1	74.1	73.3	71.5	61.1	61.7	62.1	--	72.4	76.5	71.8	62.7

*Note.* The Government test was not administered after the May 2011 administration. Starting in January 2013, Government was reintroduced into the HSAs.

Beginning with the January 2008 administration, Biology has been used for the NCLB science component. Table 6.5 presents the percentages of Biology students classified as Basic, Proficient, and Advanced, and the percentages of students classified as Basic and Proficient for Government, in 2016.

Table 6.5 MD HSA Performance Classification Rates in 2015-2016 for Biology and Government

Content Area	Basic	Proficient	Advanced
Biology	43.6	41.8	14.6
Government	37.3	62.7	--

*Note.* Government data are based on October 2015, January, May, and Summer 2016 administrations only.

Summary statistics for all students and for subgroups based on gender, special education programs, ethnicity, and English language proficiency are presented in Tables 6.6 through 6.13. The tables include the numbers of students tested for whom valid scores were available, mean scale scores, and standard deviations of scale scores. In addition, raw score reliabilities are provided for the overall group of test takers and for subgroups. Figures 6.1 through 6.2 show the distributions of total scale scores for each content area for the May 2016 administration.

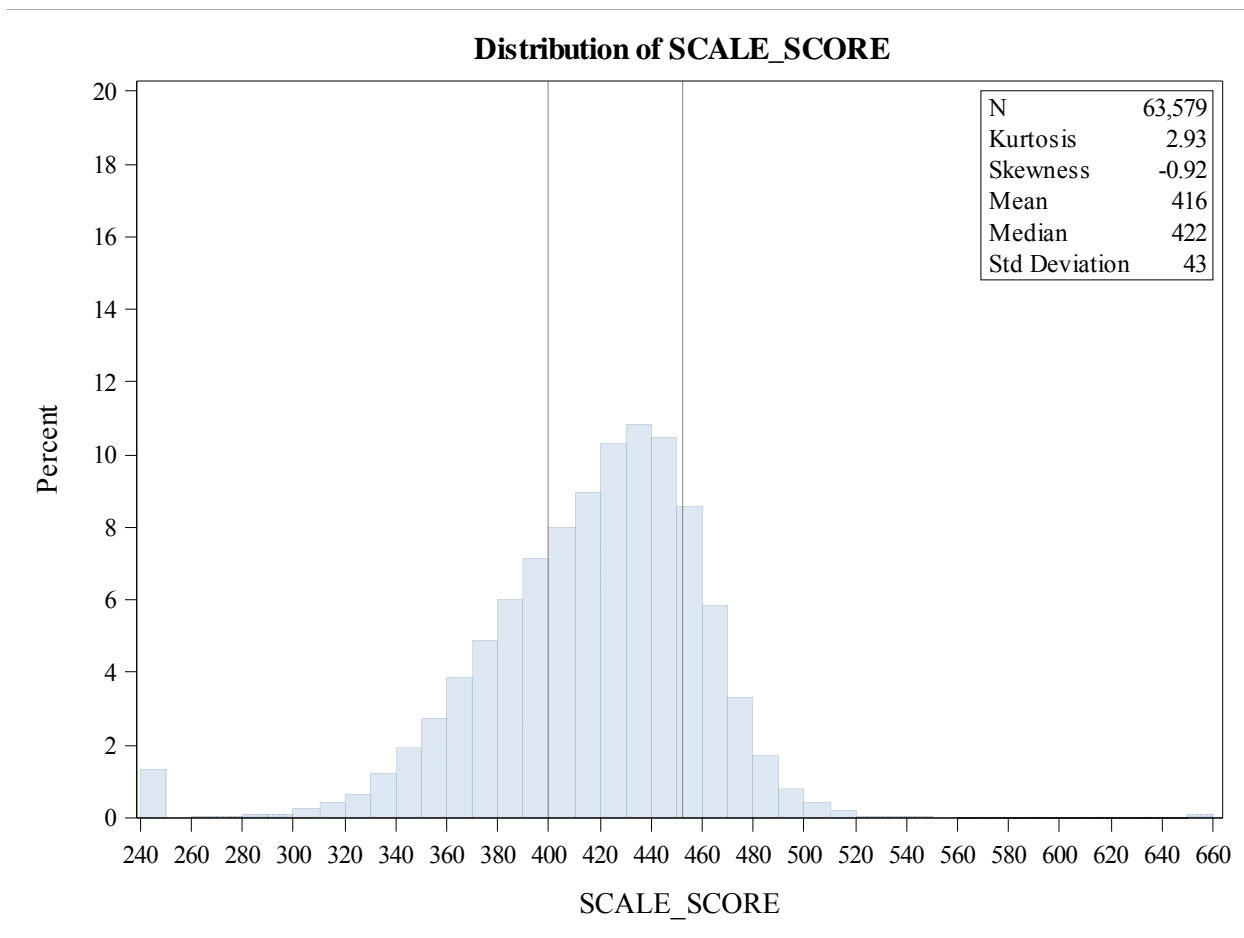


Figure 6.1 Histogram of Total Scale Scores for MD HSA May 2016 Biology

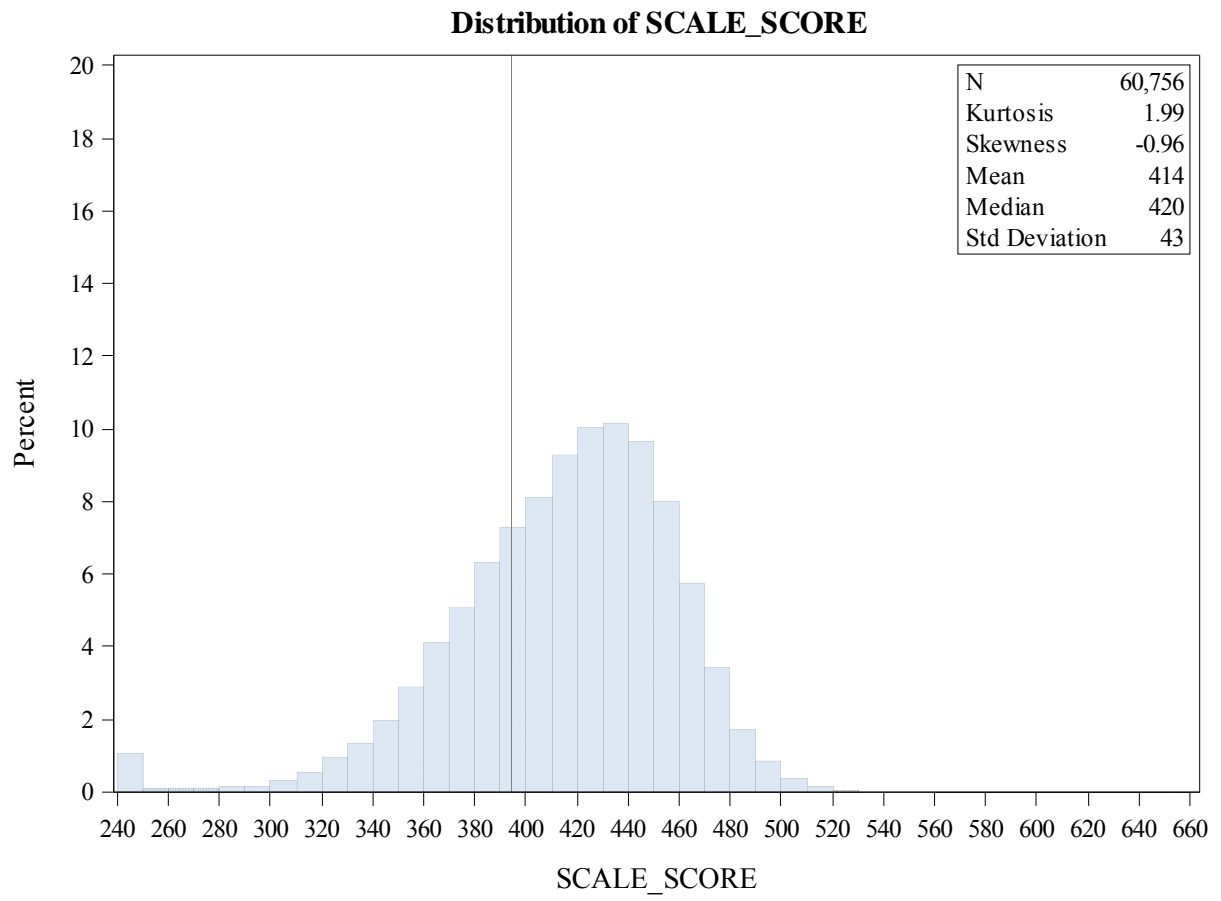


Figure 6.2 Histogram of Total Scale Scores for MD HSA May 2016 Government

Table 6.6 Summary Statistics for MD HSA Biology: October 2015 Form

		Primary Form R				
		Mean	<i>SD</i>	<i>N</i>	%	Alpha
Overall		368.9	46.2	12,994	100.0	0.80
Gender	Male	366.0	49.1	7,005	53.9	0.82
	Female	372.3	42.2	5,979	46.0	0.78
	Missing	*	*	10	0.1	*
Grade	6	*	*	0	0.0	*
	7	*	*	0	0.0	*
	8	*	*	0	0.0	*
	9	355.5	53.2	267	2.1	0.78
	10	374.5	48.3	2,783	21.4	0.86
	11	370.2	44.1	5,816	44.8	0.76
	12	364.2	46.5	4,111	31.6	0.77
	Missing	*	*	17	0.1	*
Special Education	Yes	351.3	50.9	3,126	24.1	0.71
	No	374.6	43.1	9,341	71.9	0.81
	Exited	358.7	54.0	58	0.4	0.80
	Exited and placed in 504 <sup>a</sup>	*	*	20	0.2	*
	504	372.8	43.6	449	3.5	0.79
Ethnicity	American Indian	*	*	35	0.3	*
	Asian	375.3	44.4	321	2.5	0.85
	African American	365.1	46.4	8,062	62.0	0.75
	Hawaiian/ Pacific Islander	*	*	13	0.1	*
	White	380.6	43.8	2,359	18.2	0.87
	Hispanic	368.4	45.8	1,847	14.2	0.78
	Missing	373.1	47.2	357	2.7	0.85
Limited English Proficient	Yes	352.7	49.0	812	6.2	0.64
	No	369.8	46.1	11994	92.3	0.81
	Exited <sup>b</sup>	381.2	27.2	188	1.4	0.61



\*Statistics not reported for sample size less than 50 ( $N < 50$ ).

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

Table 6.7 Summary Statistics for MD HSA Biology: January 2016 Forms

		Primary Forms A-B					Makeup Form C				
		Mean	SD	N	%	Alpha	Mean	SD	N	%	Alpha
Overall		375.1	57.3	10,377	100.0	0.93	380.1	56.6	4,187	100.0	0.94
Gender	Male	371.1	59.5	5,545	53.4	0.93	379.6	57.9	2,155	51.5	0.94
	Female	379.7	54.3	4,829	46.5	0.93	380.7	55.2	2,031	48.5	0.94
	Missing	*	*	3	0.0	*	*	*	1	0	*
Grade	6	*	*	0	0.0	*	*	*	0	0.0	*
	7	*	*	0	0.0	*	*	*	0	0.0	*
	8	*	*	0	0.0	*	*	*	0	0.0	*
	9	393.9	63.5	848	8.2	0.95	387.7	59.5	345	8.2	0.95
	10	398.0	57.4	3,830	36.9	0.95	405.2	57.2	1,573	37.6	0.96
	11	361.7	48.0	3,702	35.7	0.81	367.1	45.0	1,468	35.1	0.83
	12	348.2	50.3	1,985	19.1	0.76	351.6	52.3	785	18.7	0.78
	Missing	*	*	12	0.1	*	*	*	16	0.4	*
Special Education	Yes	340.3	53.9	2,366	22.8	0.78	345.9	54.2	673	16.1	0.81
	No	385.5	54.0	7,553	72.8	0.94	386.9	54.6	3,316	79.2	0.94
	Exited	370.6	49.3	62	0.6	0.88	*	*	34	0.8	*
	Exited and placed in 504 <sup>a</sup>	*	*	7	0.1	*	*	*	5	0.1	*
	504	386.1	55.0	389	3.7	0.94	382.9	56.5	159	3.8	0.94
Ethnicity	American Indian	*	*	29	0.3	*	*	*	25	0.6	*
	Asian	399.4	61.4	253	2.4	0.96	406.2	57.5	119	2.8	0.96
	African American	355.0	50.3	5,397	52.0	0.81	358.7	48.1	2,165	51.7	0.78
	Hawaiian/ Pacific Islander	*	*	19	0.2	*	*	*	9	0.2	*
	White	411.6	51.4	3,096	29.8	0.95	417.6	49.5	1,292	30.9	0.95
	Hispanic	366.3	52.0	1,299	12.5	0.89	367.7	56.5	468	11.2	0.90
	Missing	377.9	60.6	284	2.7	0.94	391.2	47.1	109	2.6	0.94
Limited English Proficient	Yes	343.0	46.6	609	5.9	0.61	342.3	52.8	233	5.6	0.61
	No	377.1	57.5	9661	93.1	0.93	382.5	56.2	3903	93.2	0.94
	Exited <sup>b</sup>	379.7	35.3	107	1.0	0.86	369.4	35.6	51	1.2	0.68

\*Statistics not reported for sample size less than 50 ( $N < 50$ ).

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

Table 6.8 Summary Statistics for MD HSA Biology: May 2016 Forms

		Primary Forms D-H					Makeup 1 Form X					Makeup 2 Form Y				
		Mean	SD	N	%	Alpha	Mean	SD	N	%	Alpha	Mean	SD	N	%	Alpha
Overall		416.5	43.4	52,961	100.0	0.95	414.3	42.3	5,477	100.0	0.94	415.7	43.3	5,141	100.0	0.95
Gender	Male	414.4	45.7	26,866	50.7	0.95	412.9	44.3	2,800	51.1	0.95	414.9	45.7	2,603	50.6	0.95
	Female	418.6	40.8	26,079	49.2	0.95	415.7	40.0	2,673	48.8	0.94	416.6	40.7	2,532	49.3	0.94
	Missing	*	*	16	0.0	*	*	*	4	0.1	*	*	*	6	0.1	*
Grade	6	*	*	2	0.0	*	*	*	0	0.0	*	*	*	0	0.0	*
	7	*	*	0	0.0	*	*	*	0	0.0	*	*	*	0	0.0	*
	8	445.2	26.6	191	0.4	0.89	*	*	24	0.4	*	*	*	23	0.4	*
	9	429.1	40.7	22,675	42.8	0.95	428.1	39.4	2,175	39.7	0.95	430.0	42.3	2,042	39.7	0.95
	10	412.7	40.6	24,297	45.9	0.94	409.9	40.1	2,595	47.4	0.93	412.1	38.5	2438	47.4	0.93
	11	382.5	43.2	5,530	10.4	0.91	386.3	41.4	660	12.1	0.91	382.4	44.1	608	11.8	0.91
	12	364.8	41.3	250	0.5	0.86	*	*	19	0.3	*	*	*	25	0.5	*
	Missing	*	*	14	0.0	*	*	*	4	0.1	*	*	*	5	0.1	*
	Special Education	Yes	375.2	46.7	5,963	11.3	0.91	372.7	45.7	503	9.2	0.89	377.7	47.4	436	8.5
No		422.0	40.0	44,505	84.0	0.94	418.7	39.7	4,711	86.0	0.94	419.7	40.8	4,470	86.9	0.94
Exited		408.8	39.0	266	0.5	0.93	*	*	32	0.6	*	*	*	27	0.5	*
Exited and placed in 504 <sup>a</sup>		415.9	33.9	70	0.1	0.93	*	*	14	0.3	*	*	*	5	0.1	*
504		417.2	40.7	2,157	4.1	0.94	414.3	37.7	217	4.0	0.94	410.3	46.5	203	3.9	0.95
Ethnicity	American Indian	413.1	35.4	156	0.3	0.92	*	*	13	0.2	*	*	*	15	0.3	*
	Asian	445.1	35.9	3,546	6.7	0.94	441.1	38.2	317	5.8	0.95	443.1	35.3	317	6.2	0.93
	African American	396.5	43.1	20,169	38.1	0.93	397.1	40.9	2,345	42.8	0.92	396.4	42.7	2184	42.5	0.92
	Hawaiian/ Pacific Islander	403.2	38.4	71	0.1	0.93	*	*	4	0.1	*	*	*	7	0.1	*
	White	434.4	34.8	19,760	37.3	0.94	433.6	34.4	1,873	34.2	0.94	436.1	35.1	1756	34.2	0.94
	Hispanic	406.1	40.9	7,212	13.6	0.93	404.0	40.5	731	13.3	0.93	408.2	38.2	697	13.6	0.93
	Missing	428.1	38.1	2,047	3.9	0.94	429.8	34.0	194	3.5	0.94	431.6	35.8	165	3.2	0.94
	Limited English Proficient	Yes	383.5	44.0	2,455	4.6	0.92	383.2	50.0	286	5.2	0.93	391.3	42.6	218	4.2
No	418.2	42.8	49,809	94	0.95	416.0	41.3	5,139	93.8	0.94	416.8	43.2	4868	94.7	0.95	
Exited <sup>b</sup>	410.1	32.4	697	1.3	0.92	413.6	30.1	52	0.9	0.92	413.4	30.7	55	1.1	0.92	

\*Statistics not reported for sample size less than 50 ( $N < 50$ ).

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

Table 6.9 Summary Statistics for MD HSA Biology: Summer 2016 Forms

		Primary 1 Form P					Primary 2 Form Q				
		Mean	SD	N	%	Alpha	Mean	SD	N	%	Alpha
Overall		369.3	54.0	599	100.0	0.86	358.7	59.9	256	100.0	0.83
Gender	Male	361.7	57.2	348	58.1	0.85	349.1	63.6	146	57.0	0.81
	Female	379.8	47.2	251	41.9	0.88	371.6	52	110	43.0	0.84
	Missing	*	*	*	*	*	*	*	0	0.0	*
Grade	6	*	*	0	0.0	*	*	*	1	0.4	*
	7	*	*	0	0.0	*	*	*	0	0.0	*
	8	*	*	0	0.0	*	*	*	0	0.0	*
	9	377.5	61.8	114	19.0	0.94	364.9	56.4	93	36.3	0.84
	10	367.5	55.6	184	30.7	0.85	359.0	59.7	84	32.8	0.83
	11	367.4	49.4	166	27.7	0.78	*	*	48	18.8	*
	12	367.1	49.7	135	22.5	0.73	*	*	30	11.7	*
	Missing	*	*	0	0.0	*	*	*	0	0.0	*
Special Education	Yes	351.8	60.2	120	20.0	0.85	*	*	45	17.6	*
	No	373.8	51.1	460	76.8	0.87	363.9	59.2	202	78.9	0.83
	Exited	*	*	2	0.3	*	*	*	0	0.0	*
	Exited and placed in 504 <sup>a</sup>	*	*	0	0.0	*	*	*	0	0.0	*
	504	*	*	17	2.8	*	*	*	9	3.5	*
Ethnicity	American Indian	*	*	5	0.8	*	*	*	*	*	*
	Asian	*	*	17	2.8	*	*	*	2	0.8	*
	African American	362.0	54.2	352	58.8	0.82	357.4	60.3	213	83.2	0.83
	Hawaiian/ Pacific Islander	*	*	0	0.0	*	*	*	*	*	*
	White	380.4	50.4	117	19.5	0.88	*	*	21	8.2	*
	Hispanic	375.5	48.5	87	14.5	0.85	*	*	15	5.9	*
	Missing	*	*	21	3.5	*	*	*	5	2.0	*
Limited English Proficient	Yes	*	*	12	2.0	*	*	*	*	*	*
	No	369.1	54.3	586	97.8	0.86	358.7	59.9	256	100.0	0.83
	Exited <sup>b</sup>	*	*	1	0.2	*	*	*	*	*	*

\*Statistics not reported for sample size less than 50 ( $N < 50$ ).

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

Table 6.10 Summary Statistics for MD HSA Government: October 2015 Forms

		Primary Form R			%	Alpha
		Mean	SD	N		
Overall		371.6	39.9	8,065	100.0	0.84
Gender	Male	368.4	42.8	4,386	54.4	0.85
	Female	375.5	35.7	3,663	45.4	0.83
	Missing	*	*	16	0.2	*
Grade	6	*	*	0	0.0	*
	7	*	*	0	0.0	*
	8	*	*	1	0.0	*
	9	356.5	43.3	317	3.9	0.74
	10	370.1	35.6	2,758	34.2	0.77
	11	372.6	38.8	3,875	48.0	0.84
	12	376.5	50.4	1,094	13.6	0.91
	Missing	*	*	21	0.3	*
Special Education	Yes	357.8	39.2	2,068	25.6	0.73
	No	376.5	39.2	5,598	69.4	0.85
	Exited	*	*	45	0.6	*
	Exited and placed in 504 <sup>a</sup>	*	*	20	0.2	*
	504	374.2	36.6	334	4.1	0.84
Ethnicity	American Indian	*	*	26	0.3	*
	Asian	382.3	38.7	234	2.9	0.89
	African American	368.1	38.3	4,263	52.9	0.80
	Hawaiian/ Pacific Islander	*	*	15	0.2	*
	White	378.0	41.3	2,261	28.0	0.88
	Hispanic	369.2	40.5	997	12.4	0.82
	Missing	373.4	45.3	269	3.3	0.88
Limited English Proficient	Yes	356.6	39.2	372	4.6	0.69
	No	372.2	40.0	7,570	93.9	0.85
	Exited <sup>b</sup>	380.6	26.1	123	1.5	0.71



\*Statistics not reported for sample size less than 50 ( $N < 50$ ).

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

Table 6.11 Summary Statistics for MD HSA Government: January 2016 Forms

		Primary Form A					Makeup Form C				
		Mean	<i>SD</i>	<i>N</i>	%	Alpha	Mean	<i>SD</i>	<i>N</i>	%	Alpha
Overall		383.7	47.6	8,346	100.0	0.94	389.7	47.4	3,022	100.0	0.94
Gender	Male	380.9	50.6	4,500	53.9	0.94	386.7	50.2	1,542	51.0	0.94
	Female	387	43.6	3,835	46.0	0.93	392.8	44.1	1,473	48.7	0.94
	Missing	*	*	11	0.1	*	*	*	7	0.2	*
Grade	6	*	*	0	0.0	*	*	*	0	0.0	*
	7	*	*	0	0.0	*	*	*	0	0.0	*
	8	*	*	2	0.0	*	*	*	0	0.0	*
	9	413.7	43.9	2,317	27.8	0.95	421.4	40.7	935	30.9	0.95
	10	379.5	45.3	2,898	34.7	0.92	381.2	44.4	940	31.1	0.92
	11	365.2	38.5	2,658	31.8	0.83	371.2	37.2	973	32.2	0.84
	12	362.1	56.6	376	4.5	0.93	365.5	63.0	151	5.0	0.95
	Missing	384.3	36.3	95	1.1	0.86	*	*	23	0.8	*
Special Education	Yes	354.3	42.1	1,855	22.2	0.84	361.2	44.1	476	15.8	0.85
	No	392.4	45.9	6,117	73.3	0.94	395.3	46.4	2,378	78.7	0.94
	Exited	384.5	45.9	56	0.7	0.94	*	*	17	0.6	*
	Exited and placed in 504 <sup>a</sup>	*	*	15	0.2	*	*	*	3	0.1	*
	504	387.9	42.6	303	3.6	0.93	389.7	40.9	148	4.9	0.92
Ethnicity	American Indian	*	*	26	0.3	*	*	*	8	0.3	*
	Asian	397.3	50.6	174	2.1	0.95	419.3	43.3	79	2.6	0.95
	African American	366.4	41.2	3,897	46.7	0.85	369.3	42.4	1,354	44.8	0.87
	Hawaiian/ Pacific Islander	*	*	14	0.2	*	*	*	4	0.1	*
	White	406.8	45.4	3,059	36.7	0.95	412.3	43.2	1,165	38.6	0.95
	Hispanic	374.5	47.7	851	10.2	0.92	383	44.1	273	9.0	0.92
	Missing	391.4	43.8	325	3.9	0.94	394.9	41.3	139	4.6	0.93
Limited English Proficient	Yes	345.4	47.1	338	4.0	0.81	353.9	42.1	102	3.4	0.77
	No	385.3	47.1	7,932	95	0.94	390.9	47.3	2,884	95.4	0.94
	Exited <sup>b</sup>	388.6	26.3	76	0.9	0.86	*	*	36	1.2	*

\*Statistics not reported for sample size less than 50 ( $N < 50$ ).

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

Table 6.12 Summary Statistics for MD HSA Government: May 2016 Forms

		Primary Form D					Makeup 1 Form X					Makeup 2 Form Y				
		Mean	SD	N	%	Alpha	Mean	SD	N	%	Alpha	Mean	SD	N	%	Alpha
Overall		414.5	43.5	50,780	100	0.94	411.5	43.7	5,066	100	0.94	413.3	42.7	4,911	100	0.95
Gender	Male	412.2	46.1	25,848	50.9	0.95	410.7	46.7	2,578	50.9	0.95	411.1	45.5	2,449	49.9	0.95
	Female	416.8	40.5	24,915	49.1	0.94	412.3	40.4	2,486	49.1	0.94	415.5	39.7	2,459	50.1	0.94
	Missing	*	*	17	0.0	*	*	*	2	0.0	*	*	*	3	0.1	*
Grade	6	*	*	0	0.0	*	*	*	0	0.0	*	*	*	0	0.0	*
	7	*	*	0	0.0	*	*	*	0	0.0	*	*	*	0	0.0	*
	8	*	*	0	0.0	*	*	*	0	0.0	*	*	*	0	0.0	*
	9	413.6	42.1	16,744	33.0	0.94	409.9	42.1	1,668	32.9	0.94	412.9	41.0	1,643	33.5	0.94
	10	419.6	41.2	27,882	54.9	0.94	417.2	42.0	2,752	54.3	0.94	418.7	40.8	2,667	54.3	0.94
	11	393.6	50.1	5,965	11.7	0.95	392.2	48.9	613	12.1	0.95	390.7	47.0	572	11.6	0.94
	12	380.6	56.7	167	0.3	0.95	*	*	28	0.6	*	*	*	23	0.5	*
	Missing	*	*	20	0.0	*	*	*	5	0.1	*	*	*	6	0.1	*
Special Education	Yes	371.7	46.3	5,782	11.4	0.92	368.5	46.8	500	9.9	0.91	371.7	44.5	457	9.3	0.92
	No	420.3	39.9	42,582	83.9	0.94	416.5	40.9	4,320	85.3	0.94	418	40.1	4,215	85.8	0.94
	Exited	406.2	34.4	298	0.6	0.93	*	*	29	0.6	*	*	*	22	0.4	*
	Exited and placed in 504 <sup>a</sup>	408.1	47.6	73	0.1	0.94	*	*	7	0.1	*	*	*	5	0.1	*
	504	414.5	39.4	2,045	4.0	0.94	414.1	36.8	210	4.1	0.93	410.7	42.4	212	4.3	0.95
Ethnicity	American Indian	411.3	36.0	151	0.3	0.92	*	*	16	0.3	*	*	*	11	0.2	*
	Asian	439.3	36.0	3,265	6.4	0.93	437	31.8	296	5.8	0.91	437.3	37.9	304	6.2	0.94
	African American	395.6	43.1	19,217	37.8	0.93	393.1	44.8	2,066	40.8	0.93	395.2	42.1	2,003	40.8	0.93
	Hawaiian/ Pacific Islander	405.2	43.9	69	0.1	0.94	*	*	5	0.1	*	*	*	4	0.1	*
	White	431.3	36.1	19,588	38.6	0.94	429.3	36	1,820	35.9	0.94	432.2	34.9	1,708	34.8	0.94
	Hispanic	403.9	42.8	6,521	12.8	0.93	405.2	39.8	679	13.4	0.93	405.8	39.9	698	14.2	0.94
	Missing	424.5	38.8	1,969	3.9	0.94	424.7	35.6	184	3.6	0.93	425	38.8	183	3.7	0.94
	Limited English Proficient	Yes	372.5	47.8	2,065	4.1	0.92	376.5	48.2	232	4.6	0.92	378.0	47.4	195	4.0
No		416.3	42.6	48,064	94.7	0.94	413.2	43.0	4,767	94.1	0.94	414.8	42.1	4,658	94.8	0.95
Exited <sup>b</sup>		411.4	27.2	651	1.3	0.89	411.3	26.2	67	1.3	0.88	412.5	27.9	58	1.2	0.90

\*Statistics not reported for sample size less than 50 ( $N < 50$ ).

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

Table 6.13 Summary Statistics for MD HSA Government: Summer 2016 Forms

		Primary 1 Form P					Primary 2 Form Q				
		Mean	<i>SD</i>	<i>N</i>	%	Alpha	Mean	<i>SD</i>	<i>N</i>	%	Alpha
Overall		364.8	51.8	515	100.0	0.91	372.6	45.2	157	100.0	0.88
Gender	Male	358.8	55	312	60.6	0.90	370.9	45.7	92	58.6	0.88
	Female	374.1	45.2	202	39.2	0.92	375.0	44.7	65	41.4	0.88
	Missing	*	*	1	0.2	*	*	*	0	0.0	*
Grade	6	*	*	0	0.0	*	*	*	0	0.0	*
	7	*	*	0	0.0	*	*	*	0	0.0	*
	8	*	*	0	0.0	*	*	*	0	0.0	*
	9	360.7	51.4	118	22.9	0.91	*	*	32	20.4	*
	10	358.8	59.4	140	27.2	0.92	372.7	43.6	58	36.9	0.90
	11	373.1	48.2	137	26.6	0.92	383.5	39.5	52	33.1	0.86
	12	366.3	45.7	119	23.1	0.86	*	*	14	8.9	*
	Missing	*	*	1	0.2	*	*	*	1	0.6	*
Special Education	Yes	344.6	51.2	128	24.9	0.84	*	*	28	17.8	*
	No	372.0	50.5	368	71.5	0.92	379.1	43.1	123	78.3	0.88
	Exited	*	*	0	0.0	*	*	*	0	0.0	*
	Exited and placed in 504 <sup>a</sup>	*	*	3	0.6	*	*	*	0	0.0	*
	504	*	*	16	3.1	*	*	*	6	3.8	*
Ethnicity	American Indian	*	*	1	0.2	*	*	*	0	0.0	*
	Asian	*	*	13	2.5	*	*	*	0	0.0	*
	African American	359.6	52.0	291	56.5	0.89	375.2	41.8	111	70.7	0.88
	Hawaiian/ Pacific Islander	*	*	3	0.6	*	*	*	2	1.3	*
	White	371.2	52.6	126	24.5	0.93	*	*	19	12.1	*
	Hispanic	374.3	46.1	66	12.8	0.92	*	*	21	13.4	*
	Missing	*	*	15	2.9	*	*	*	4	2.5	*
Limited English Proficient	Yes	*	*	7	1.4	*	*	*	7	4.5	*
	No	365.0	51.9	507	98.4	0.91	373.7	44.4	150	95.5	0.88
	Exited <sup>b</sup>	*	*	1	0.2	*	*	*	7	4.5	*

\*Statistics not reported for sample size less than 50 ( $N < 50$ ).

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

## **Demographic Characteristics**

Demographic characteristics of the students who took the October, January, May, and Summer MD HSAs are described in Tables 6.14 and 6.15. All demographic results are based on the final Research files delivered to MSDE.

The number of students participating in the May administration was greater than the number of students participating in the January administration. As a result, only two field test versions were included in the January administration to ensure sufficient sample sizes for the analyses of the field test items.

Due to the small numbers of students participating in the October and Summer administrations, those forms did not contain new field test items. Instead, previously administered field test sections were embedded in these forms to ensure that the test length was comparable to the January and May test forms.



Table 6.14 Demographic Information for 2016 MD HSA Biology

		October Form		January Primary Forms		January Makeup Form		May Primary Forms		May Makeup Forms		Summer Forms	
		<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Overall		12,994	100.0	10,377	100.0	4,187	100.0	52,961	100.0	10,618	100.0	855	100.0
Gender	Male	7,005	53.9	5,545	53.4	2,155	51.5	26,866	50.7	5,403	50.9	494	57.6
	Female	5,979	46	4,829	46.5	2,031	48.5	26,079	49.2	5,205	49.1	361	42.5
	Missing	10	0.1	3	0	1	0	16	0.0	10	0.1	0.0	0.0
Special Education	Yes	3,126	24.1	2,366	22.8	673	16.1	5,963	11.3	939	8.9	165	18.8
	No	9,341	71.9	7,553	72.8	3,316	79.2	44,505	84	9,181	86.5	662	77.9
	Exited	58	0.4	62	0.6	34	0.8	266	0.5	59	0.6	2	0.3
	Exited and placed in 504 <sup>a</sup>	20	0.2	7	0.1	5	0.1	70	0.1	19	0.2	0	0.0
	504	449	3.5	389	3.7	159	3.8	2,157	4.1	420	4.0	26	3.2
Ethnicity	American Indian	35	0.3	29	0.3	25	0.6	156	0.3	28	0.3	5	0.8
	Asian	321	2.5	253	2.4	119	2.8	3,546	6.7	634	6.1	19	1.8
	African American	8,062	62	5,397	52	2,165	51.7	20,169	38.1	4,529	42.7	565	71.0
	Hawaiian/Pacific Islander	13	0.1	19	0.2	9	0.2	71	0.1	11	0.1	0	0.0
	White	2,359	18.2	3,096	29.8	1,292	30.9	19,760	37.3	3,629	34.2	138	13.9
	Hispanic	1,847	14.2	1,299	12.5	468	11.2	7,212	13.6	1,428	13.5	102	10.2
	Missing	357	2.7	284	2.7	109	2.6	2,047	3.9	359	3.4	26	2.8
Limited English Proficient	Yes	812	6.2	609	5.9	233	5.6	2,455	4.6	504	4.7	12	2.0
	No	11,994	92.3	9,661	93.1	3,903	93.2	49,809	94.3	10,007	94.3	842	98.9
	Exited <sup>b</sup>	188	1.4	107	1	51	1.2	697	1.3	107	1.0	1	0.2

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

Table 6.15 Demographic Information for 2016 MD HSA Government

		October Form		January Primary Forms		January Makeup Form		May Primary Forms		May Makeup Forms		Summer Forms	
		N	%	N	%	N	%	N	%	N	%	N	%
Overall		8,065	100.0	8,346	100.0	3,022	100.0	50,780	100.0	9,977	100.0	672	100.0
Gender	Male	4,386	54.4	4,500	53.9	1,542	51.0	25,848	50.9	5,027	50.4	404	59.6
	Female	3,663	45.4	3,835	46.0	1,473	48.7	24,915	49.1	4,945	49.6	267	40.3
	Missing	16	0.2	11	0.1	7	0.2	17	0.0	5	0.1	1	0.2
Special Education	Yes	2,068	25.6	1,855	22.2	476	15.8	5,782	11.4	957	9.6	156	21.4
	No	5,598	69.4	6,117	73.3	2,378	78.7	42,582	83.9	8,535	85.5	491	74.9
	Exited	45	0.6	56	0.7	17	0.6	298	0.6	51	0.5	0	0.0
	Exited and placed in 504 <sup>a</sup>	20	0.2	15	0.2	3	0.1	73	0.1	12	0.1	3	0.6
	504	334	4.1	303	3.6	148	4.9	2,045	4.0	422	4.2	22	3.5
Ethnicity	American Indian	26	0.3	26	0.3	8	0.3	151	0.3	27	0.3	1	0.2
	Asian	234	2.9	174	2.1	79	2.6	3,265	6.4	600	6.0	13	2.5
	African American	4,263	52.9	3,897	46.7	1,354	44.8	19,217	37.8	4,069	40.8	402	63.6
	Hawaiian/ Pacific Islander	15	0.2	14	0.2	4	0.1	69	0.1	9	0.1	5	0.95
	White	2,261	28	3,059	36.7	1,165	38.6	19,588	38.6	3,528	35.4	145	18.3
	Hispanic	997	12.4	851	10.2	273	9.0	6,521	12.8	1,377	13.8	87	13.1
	Missing	269	3.3	325	3.9	139	4.6	1,969	3.9	367	3.7	19	2.7
Limited English Proficient	Yes	372	4.6	338	4.0	102	3.4	2,065	4.1	427	4.3	14	3.0
	No	7,570	93.9	7,932	95.0	2,884	95.4	48,064	94.7	9,425	94.5	657	97.0
	Exited <sup>b</sup>	123	1.5	76	0.9	36	1.2	651	1.3	125	1.3	1	0.2

<sup>a</sup> A 504 plan is a legal document falling under the provisions of the Rehabilitation Act of 1973 that provides a program of instructional services to assist students with special needs who are in a regular education setting.

<sup>b</sup> LEP Exited indicates students who have exited English language acquisition services.

## Section 7. Field Test Analyses

Following the receipt of the final score file from Pearson for the January and May administrations, the field test analyses for SR items were completed. The analyses consisted of four components: classical item analyses, differential item functioning (DIF), item response theory (IRT) calibration, and scaling. All the analyses were completed using *GENASY*S, an ETS proprietary software program. The analysis procedures for each component are described in detail below. All valid records available were used as samples for the analyses, including English language learners, students with IEP or 504 plans, and students receiving accommodations. To ensure the analysis results were obtained from a motivated sample, records invalidated by the test administrator and records with no item responses to the first five items were excluded from the analysis sample.

### Classical Item Analyses

Classical item analyses involve computing a set of statistics based on classical test theory for every item in each form. The statistics provide key information about the quality of the items from an empirical perspective. The statistics estimated for the MD HSA field test items, and associated criteria used to flag items for the content specialists' review, are described below.

***Classical item difficulty*** (“*p*-value”): This statistic indicates the mean item score expressed as a proportion of the maximum obtainable item score. For SR items, it is equivalent to the proportion of test takers in the sample that answered the item correctly. For CR items, divide the average item score by maximum score points to obtain the *p*-value. Desired *p*-values generally fall within the range of 0.25 to 0.90. Occasionally, items that fall outside this range can be justified for inclusion in an item bank based upon the quality and educational importance of the item content or the ability to measure students with very high or low achievement, especially if the students have not yet received instruction in the content.

***Item-total correlation of the correct response option*** for SR items or the CR item score with the total raw score: This statistic describes the relationship between performance on the specific item and performance on the total test, including the item under study. It is sometimes referred to as a discrimination index. For SR items, the item-total correlation is the point-biserial correlation. For CR items, the item-total correlation is the polyserial correlation. Values less than 0.20 are generally considered to have a weaker than desired relationship, therefore these items receive careful consideration by ETS and MSDE staff before including them on future forms. Items with negative correlations can indicate there are serious problems with the item content (e.g., multiple correct answers, unusually complex content), there is an incorrect key, or students have not been taught the content.

***Proportion of students choosing each response option*** (SR items): This statistic indicates the proportion of test takers selecting each answer choice, or option. Options not selected by any students or selected by a very low proportion of students indicate

problems with plausibility of the option. Items that do not have all answer options functioning may be discarded or revised and field tested again.

***Point-biserial correlation of incorrect response option (SR items) with the total raw score:*** These statistics describe the relationship between selecting an incorrect response option for a specific item and performance on the total test, including the item under study. Typically, the correlation between an incorrect answer and total test performance is weak or negative. Values are typically compared and contrasted with the discrimination index. When the magnitude of a point-biserial correlation for an incorrect answer is strong relative to the correct answer, the item is carefully reviewed for content-related problems. Alternatively, positive point-biserial correlations on incorrect options may indicate that students have not had sufficient opportunity to learn the material.

***Percentage of students omitting an item:*** This statistic is useful for identifying problems with test features, such as testing time and item/test layout. Typically, it is assumed that if students have an adequate amount of testing time, at least 95 percent of them should attempt to answer each question. When a pattern of omit percentages exceeds 5 percent for a series of SR items or 15 percent for CR items at the end of a timed section, this may indicate that there was insufficient time for students to complete all items. For individual items, if the omit percentage is greater than 5 percent for a single SR item or 15 percent for a CR item, this could be an indication of an item/test layout problem. For example, students might accidentally skip an item that follows a lengthy stem.

***Frequency distribution of CR score points:*** Observation of the distribution of scores is useful to identify how well the item is functioning. If no students are assigned the top score point, this may indicate that the item is not functioning with respect to the scoring rubric, there are problems with the item content, or students have not been taught the content.

In addition, a series of flags was created to identify items with extreme values. Flagged items were subject to additional scrutiny prior to the inclusion of the items in the final calibrations. The following flagging criteria were applied to all items tested in the 2016 assessments:

- *Difficulty flag:*  $p$ -values less than 0.10 or greater than 0.90.
- *Discrimination flag:* Item-total correlation less than 0.10.
- *Distractor flag:* SR point-biserial correlation positive for incorrect option.
- *Omit flag:* Percentage omitted is greater than 5% for SR items.
- For CR items, divide the average item score by maximum score points to obtain the  $p$ -value. If this is less than 0.10 or greater than 0.90, manually flag the item.
- CR items with omit rates greater than 15% are flagged.

Distributions of  $p$ -values and item-total correlations for the field test items administered in January 2016 are shown in Tables 7.1 and 7.2, respectively. Corresponding results for the field test items administered in May 2016 are shown in Tables 7.3 and 7.4, respectively.

Following the classical item analyses, items with poor item statistics and items that were not scored as per MSDE’s instructions were removed from further analyses (see Table 7.5). These items have been identified for revision and possible additional field testing. Table 7.6 presents the number of items that were retained for further analyses and evaluation after being flagged for statistical reasons, including extreme  $p$ -values, low item-total correlations, and/or high omit rates. Calibration results indicated the items were estimated reasonably well; therefore they were not removed from scaling. Please note the percentages in the tables may not sum up to 100 due to rounding.

Table 7.1 Distribution of  $p$  -Values for the MD HSA January 2016 Field Test Items

$p$ -Value	Percentage and Number of Items			
	Biology		Government <sup>a</sup>	
	%	$N$	%	$N$
$p < 0.25$	2	1	21	6
$0.25 \leq p < 0.35$	17	8	18	5
$0.35 \leq p < 0.45$	35	16	11	3
$0.45 \leq p < 0.55$	24	11	18	5
$0.55 \leq p < 0.65$	22	10	11	3
$0.65 \leq p < 0.75$	0	0	18	5
$0.75 \leq p < 0.85$	0	0	4	1
$p \geq 0.85$	0	0	0	0
Descriptive Statistics				
No. Items	46		28	
Mean	0.44		0.43	
$SD$	0.11		0.21	
Min	0.15		0.00	
Max	0.64		0.76	

<sup>a</sup> CR items included.

Table 7.2 Distribution of Item-Total Correlations for the MD HSA January 2016 Field Test Items

Correlation	Percentage and Number of Items			
	Biology		Government <sup>a</sup>	
	%	<i>N</i>	%	<i>N</i>
$r < 0.15^c$	2	1	4	1
$0.15 \leq r < 0.25$	7	3	4	1
$0.25 \leq r < 0.35$	22	10	25	7
$0.35 \leq r < 0.45$	33	15	36	10
$0.45 \leq r < 0.55$	37	17	21	6
$0.55 \leq r < 0.65$	0	0	0	0
$0.65 \leq r < 0.75$	0	0	7	2
$r \geq 0.75$	0	0	4	1
Descriptive Statistics				
No. Items	46		28	
Mean	0.41		0.41	
<i>SD</i>	0.10		0.16	
Min	0.13		0.00	
Max	0.55		0.78	

<sup>a</sup> CR items included.; <sup>c</sup>  $r < 0.10$ : 0 Biology, and 2 Government items.

Table 7.3 Distribution of *p* -Values for the MD HSA May 2016 Field Test Items

<i>p</i> -Value	Percentage and Number of Items			
	Biology		Government <sup>a</sup>	
	%	<i>N</i>	%	<i>N</i>
$p < 0.25$	1	1	5	6
$0.25 \leq p < 0.35$	3	5	13	15
$0.35 \leq p < 0.45$	11	21	13	15
$0.45 \leq p < 0.55$	18	33	20	22
$0.55 \leq p < 0.65$	30	56	16	18
$0.65 \leq p < 0.75$	24	45	19	21
$0.75 \leq p < 0.85$	9	17	12	13
$p \geq 0.85^b$	4	7	2	2
Descriptive Statistics				
No. Items	185		112	
Mean	0.60		0.53	
<i>SD</i>	0.13		0.18	
Min	0.22		0.00	
Max	0.90		0.85	

<sup>a</sup> CR items included.; <sup>b</sup>  $p$  -value  $> 0.90$ : 0 Biology, 0 Government item.

Table 7.4 Distribution of Item-Total Correlations for the MD HSA May 2016 Field Test Items

Correlation	Percentage and Number of Items			
	Biology		Government <sup>a</sup>	
	%	<i>N</i>	%	<i>N</i>
$r < 0.15$ <sup>c</sup>	2	4	4	4
$0.15 \leq r < 0.25$	5	9	8	9
$0.25 \leq r < 0.35$	16	29	27	30
$0.35 \leq r < 0.45$	32	60	26	29
$0.45 \leq r < 0.55$	38	70	21	23
$0.55 \leq r < 0.65$	7	13	4	4
$0.65 \leq r < 0.75$	0	0	5	6
$r \geq 0.75$	0	0	6	7
Descriptive Statistics				
No. Items	185		112	
Mean	0.42		0.41	
<i>SD</i>	0.10		0.17	
Min	0.10		-0.05	
Max	0.63		0.79	

<sup>a</sup>CR items included.; <sup>c</sup> *r*<sub>bis</sub> < 0.10: 1 Biology, and 1 Government item.

Table 7.5 MD HSA Field Test Items Excluded from Calibration

Administration	Content	ItemID	Form	Sequence	Response Type	Reason
January	Government	463527	A	46	CR	DNS per MSDE
May	Government	461512	D	35	CR	DNS per MSDE
	Government	451526	D	61	CR	no 4pt CR score
	Government	79696	E	61	CR	no 4pt CR score
	Government	459948	G	13	SR	<i>r</i> <sub>bis</sub> < 0.10
	Government	461523	J	61	CR	DNS per MSDE

Table 7.6 MD HSA Field Test Items with Statistical Flags Retained in Calibration

January	<i>p</i> -Value < 0.10	<i>p</i> -Value > 0.90	R_ITT < 0.10	Distractor <i>r</i> <sub>bis</sub> > 0	Omit Rate >5% <sup>c</sup>	C- Level DIF	Missing Response <sup>a</sup>	Total Flags	No. Items <sup>b</sup>
Biology	0	0	0	4	0	1	0	5	5
Government	0	0	0	1	0	1	0	2	2

May	<i>p</i> -Value < 0.10	<i>p</i> -Value > 0.90	R_ITT < 0.10	Distractor <i>r</i> <sub>bis</sub> > 0	Omit Rate >5% <sup>c</sup>	C- Level DIF	Missing Response <sup>a</sup>	Total Flags	No. Items <sup>b</sup>
Biology	0	0	0	10	0	1	0	11	11
Government	0	0	0	12	0	2	0	14	14

<sup>a</sup> SR/CR option with 0 students; <sup>b</sup> Represents total number of unique items; <sup>c</sup> 15% for CR items on Government.

### Differential Item Functioning

Following the classical item analyses, differential item functioning (DIF) analyses were completed. One goal of test development is to assemble a set of items that provides an estimate of student ability that is as fair and accurate as possible for all groups within the population. DIF statistics are used to identify items in which focal groups (e.g., Females, African Americans, Hispanics) of students with the same underlying level of ability have different probabilities than reference groups (e.g., Males, Whites) of answering correctly. If the item is more difficult for an identifiable focal subgroup, the item may be measuring something different from the intended construct. However, it is important to recognize that DIF-flagged items might be related to actual differences in relevant knowledge or skill (item impact) or statistical Type I error. A subsequent review by MSDE and ETS content experts is conducted to investigate the source and meaning of evident differences.

ETS used two DIF detection methods: the Mantel-Haenszel and standardization approaches. As part of the Mantel-Haenszel procedure, the statistic described by Holland & Thayer (1988), known as MH D-DIF, was used.<sup>7</sup> This statistic is expressed as the difference between the focal

<sup>7</sup> The formula for the estimate of constant odds ratio is

$$\hat{\alpha}_{MH} = \frac{\left( \frac{\sum_m R_{fm} W_{fm}}{N_m} \right)}{\left( \frac{\sum_m R_{rm} W_{rm}}{N_m} \right)},$$

where

- RB<sub>mmB</sub> = number in reference group at ability level *m* answering the item right,
- WB<sub>fmB</sub> = number in focal group at ability level *m* answering the item wrong,
- RB<sub>fmB</sub> = number in focal group at ability level *m* answering the item right,
- WB<sub>rmB</sub> = number in reference group at ability level *m* answering the item wrong,
- NB<sub>mmB</sub> = total group at ability level *m*.

This can then be used in the following formula (Holland & Thayer, 1988):



and reference group performance on an item after conditioning on total test score. Negative MH D-DIF statistics favor the reference group, and positive values favor the focal group. The classification logic used for flagging items is based on a combination of absolute differences and significance testing. Items that are not significantly different based on the MH D-DIF ( $p > 0.05$ ) are considered to have similar performance between the two studied groups and to be functioning appropriately. For items for which the statistical test indicates significant differences ( $p < 0.05$ ), the effect size is used to determine the direction and severity of the DIF. The male and white groups were treated as the reference groups for gender and ethnicity, respectively; the female and other race and ethnic groups were considered the focal groups.

Based on their DIF statistics, items are classified into one of three categories and assigned values of A, B, or C. Category A items contain negligible DIF, Category B items exhibit slight or moderate DIF, and Category C items have moderate to large DIF. Negative values imply that, conditional on the matching variable, the focal group has a lower mean item score than the reference group. In contrast, a positive value implies that, conditional on the matching variable, the reference group has a lower mean item score than the focal group.

For constructed response (CR) items, the MH D-DIF statistic is not calculated; instead the standardization procedure (Dorans & Kulick, 1986) is used in conjunction with the Mantel chi-square statistic. In the standardization method, the matching variable is the total score on all items and the differences in the item score between the two comparison groups are calculated for each item. The standardized mean difference for the item is the weighted average of these differences, where the relative frequency of the focal group at each CR score serves as the weighting function.

Analogous flagging rules have been developed that are used to classify the CR items into A, B, or C DIF categories. The flagging criteria for constructed response items are:

- A) If the Mantel Chi-square  $p$ -value  $> 0.05$  and/or the Mantel Chi-square  $p$ -value  $< 0.05$  and the Standardized Mean Difference  $|SMD/SD| \leq 0.17$ , the item is classified as A.
- B) If the Mantel Chi-square  $p$ -value  $< 0.05$  and  $|SMD/SD|$  is between 0.17 and 0.25 then the item is classified as B.
- C) If the Mantel Chi-square  $p$ -value  $< 0.05$  and  $|SMD/SD| > 0.25$  then the item is classified as C.

Positive values favor the focal group and negative values favor the reference group.

Among the Biology and Government items field tested in January, none was flagged for C-level DIF. Among the items field tested in May, two Biology items were flagged for C-level DIF. None of the Government items was flagged for C-level DIF. Flagged items are reviewed by ETS and MSDE content specialists as well as by ETS senior staff to determine their availability for future use.

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$$MHD-DIF = -2.35n[\hat{\alpha}_{MH}].$$

## IRT Calibration and Scaling

One purpose of item calibration and scaling is to create a common scale for expressing the difficulty estimates of all the items across all versions of a test. The resulting scale has a mean score of 0 and a standard deviation of 1. This scale is often referred to as the “theta” metric and is not used for reporting purposes because the values typically range from –3 to +3, which may be difficult to interpret. Therefore, the scale is usually transformed to a reporting scale (also known as a scale score), which can be more meaningfully interpreted by students, teachers, and other stakeholders.

As noted previously, the IRT models used to calibrate the MD HSA test items are the 3-parameter logistic (3PL) model for SR items and the generalized partial credit model (GPCM) for CR items. Item response theory expresses the probability that a student will achieve a certain score on an item (such as correct or incorrect) as a function of the item’s statistical properties and the ability level (or proficiency level) of the student.

The 3PL model relates the probability that a person with ability  $\theta$  will respond correctly to item  $i$  as follows:

$$P_i(\theta) = c_i + \frac{1 - c_i}{1 + e^{-1.7a_i(\theta - b_i)}}$$

where

- $a_i$  is the slope parameter of item  $i$ , characterizing its discrimination;
- $b_i$  is the location parameter of item  $i$ , characterizing its difficulty; and
- $c_i$  is the lower asymptote parameter of item  $i$ , reflecting the chance that students with very low proficiency will select the correct answer, sometimes called the “pseudo-guessing” level.

The GPCM states that the probability that a person with ability  $\theta$  will obtain a score of  $k$  on an item  $i$  that has  $m$  score categories assigned score values ranging from 0 to  $m-1$  can be expressed as

$$P_{ik}(\theta) = \frac{e^{Z_{ik}}}{1 + \sum_{k=1}^{m-1} e^{Z_{ik}}}$$

where

$$Z_{ik}(\theta) = \sum_{v=0}^k 1.7a_i(\theta - b_i - d_{iv}) = \sum_{v=0}^k 1.7a_i(\theta - b_{ik})$$

$$b_{i0} = 0,$$

$P_{ik}$  is the probability of obtaining a score of  $k$  on item  $i$ , and

$d_{ik}$  is the parameter characterizing the relative difficulty of obtaining score  $k$ .

A proprietary version of the *PARSCALE* computer program (Muraki & Bock, 1995) was used for all item calibration work. The resulting calibrations were then scaled to the bank estimates using Stocking and Lord’s (1983) test characteristic curve (TCC) method and the operational items as the anchor set.

The calibration and equating process is outlined in the steps below.

1. For each test, all items were calibrated using a sparse matrix design that places all items on a common scale. Essentially, this means that the data were set up using the following format. In the diagram below, X’s represent items and spaces indicate missing data. For example, items included on version 2 but not on version 1, 3, 4, or 5 were treated as “not administered” for the purposes of the analyses and are denoted as “missing” in the diagram below.

Common	Unique 1	Unique 2	Unique 3	Unique 4	Unique 5
XXXXXXXX	XXXXXXXX				
XXXXXXXX		XXXXXXXX			
XXXXXXXX			XXXXXXXX		
XXXXXXXX				XXXXXXXX	
XXXXXXXX					XXXXXXXX

2. Once the items were calibrated, results were reviewed to determine if any items failed to calibrate appropriately.
3. After the final calibration, parameter estimates were obtained. The items were then linked to the bank scale using the TCC method. Specifically, the banked parameter estimates of the primary form operational items were used to place the field test items onto the operational reporting scale. Once the items were calibrated and placed onto the operational scale, they were loaded into the item bank. Items that were not calibrated were listed as unavailable (see Table 7.5).

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## Appendix A. MD HSA Classical Item Statistics: Operational Forms

Table A.1 Item Statistics, Operational Items: MD HSA Biology—October 2015 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
R	1	O	108519	SR	0.62	0.26	-0.16	0.26	-0.12	-0.10	0.0
R	2	O	133059	SR	0.39	0.23	-0.11	0.23	-0.15	-0.02	0.2
R	3	O	133419	SR	0.40	0.32	0.32	-0.14	-0.16	-0.09	0.1
R	4	O	133445	SR	0.31	0.23	-0.08	-0.08	-0.11	0.23	0.2
R	5	O	68216	SR	0.53	0.29	0.29	-0.19	-0.09	-0.12	0.1
R	6	O	349118	SR	0.36	0.26	-0.06	0.26	-0.13	-0.10	0.2
R	9	O	52593	SR	0.51	0.24	0.24	-0.18	-0.14	-0.01	0.3
R	10	O	52594	SR	0.45	0.21	-0.15	-0.11	0.21	0.03	0.3
R	11	O	323349	SR	0.41	0.23	-0.06	-0.12	-0.15	0.23	0.3
R	12	O	395769	SR	0.27	0.18	0.18	0.06	-0.14	-0.16	0.2
R	13	O	338790	SR	0.60	0.31	-0.15	0.31	-0.19	-0.12	0.2
R	14	O	338796	SR	0.57	0.30	-0.16	-0.10	-0.16	0.30	0.2
R	16	O	54995	SR	0.36	0.19	-0.09	0.19	-0.08	-0.05	0.4
R	17	O	57018	SR	0.39	0.22	-0.20	0.22	-0.07	0.00	0.4
R	18	O	363006	SR	0.27	0.15	-0.07	-0.07	0.15	-0.01	0.3
R	19	O	133015	SR	0.36	0.26	-0.04	-0.15	-0.14	0.26	0.4
R	20	O	133016	SR	0.25	0.20	-0.09	-0.07	-0.04	0.20	0.5
R	23	O	398165	SR	0.13	0.18	-0.10	-0.03	-0.01	0.18	0.6
R	24	O	398166	SR	0.55	0.26	-0.10	-0.13	0.26	-0.12	0.6
R	27	O	392471	SR	0.34	0.18	0.18	-0.16	-0.05	0.01	0.7
R	28	O	214535	SR	0.29	0.13	-0.04	-0.19	0.13	0.04	0.8
R	29	O	331336	SR	0.32	0.24	0.24	-0.20	-0.03	0.01	0.9
R	30	O	331338	SR	0.19	0.13	-0.07	0.02	-0.06	0.13	1.0
R	31	O	395754	SR	0.31	0.04	-0.02	0.04	-0.04	0.04	1.1
R	32	O	395752	SR	0.65	0.25	0.25	-0.16	-0.09	-0.10	1.1
R	33	O	67672	SR	0.43	0.32	0.32	-0.10	-0.18	-0.09	1.0
R	34	O	108599	SR	0.40	0.24	-0.06	-0.19	0.24	-0.03	0.4
R	35	O	79418	SR	0.58	0.31	0.31	-0.21	-0.12	-0.12	0.5
R	36	O	108637	SR	0.41	0.23	-0.06	0.23	-0.11	-0.10	0.5
R	37	O	108630	SR	0.31	0.26	-0.14	-0.16	-0.01	0.26	0.4
R	38	O	271097	SR	0.38	0.28	-0.01	-0.10	-0.19	0.28	0.5
R	39	O	271143	SR	0.36	0.15	-0.04	-0.10	0.15	-0.02	0.5
R	43	O	67660	SR	0.40	0.35	-0.16	-0.10	-0.17	0.35	0.5
R	45	O	214533	SR	0.32	0.34	-0.11	-0.16	-0.10	0.34	0.5
R	46	O	52683	SR	0.32	0.17	-0.11	0.17	-0.20	0.09	0.4
R	47	O	52684	SR	0.25	0.22	-0.06	-0.09	-0.04	0.22	0.5
R	48	O	94193	SR	0.28	0.12	-0.04	-0.01	0.12	-0.07	0.6
R	50	O	79429	SR	0.24	0.13	0.13	-0.09	-0.03	0.01	0.5
R	51	O	52687	SR	0.22	0.24	-0.08	0.24	-0.08	-0.06	0.5
R	52	O	55066	SR	0.28	0.25	0.05	-0.15	-0.15	0.25	0.5
R	53	O	296119	SR	0.35	0.36	0.36	-0.10	-0.21	-0.08	0.6

Table A.1 Item Statistics, Operational Items: MD HSA Biology—October 2015 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
R	54	O	296120	SR	0.55	0.32	-0.13	0.32	-0.14	-0.16	0.6
R	55	O	279652	SR	0.44	0.22	-0.03	0.22	-0.07	-0.14	0.6
R	57	O	286698	SR	0.21	-0.02	0.03	-0.08	-0.02	0.09	0.6
R	58	O	286699	SR	0.21	0.18	0.18	0.04	-0.17	-0.10	0.6
R	59	O	369425	SR	0.41	0.27	0.27	-0.17	-0.18	0.04	0.6
R	60	O	338761	SR	0.31	0.36	-0.05	-0.19	-0.16	0.36	0.7
R	63	O	64987	SR	0.21	0.20	-0.09	0.01	-0.09	0.20	0.7
R	64	O	57123	SR	0.54	0.14	-0.05	-0.10	0.14	-0.01	0.6
R	65	O	398053	SR	0.32	0.30	0.30	-0.14	-0.13	-0.04	0.8
R	66	O	398077	SR	0.40	0.35	0.35	-0.20	-0.17	-0.05	0.7
R	67	O	363170	SR	0.45	0.32	-0.13	-0.19	0.32	-0.07	0.5
R	68	O	68247	SR	0.61	0.26	0.26	-0.17	-0.14	-0.05	0.5
R	69	O	256517	SR	0.63	0.32	-0.10	0.32	-0.21	-0.13	0.6
R	70	O	256515	SR	0.25	0.25	-0.03	-0.05	-0.16	0.25	0.6
R	72	O	322198	SR	0.56	0.23	-0.10	0.23	-0.20	-0.03	0.6
R	73	O	394751	SR	0.31	0.29	0.29	-0.16	-0.17	0.04	0.6
R	74	O	394754	SR	0.38	0.21	-0.07	-0.09	0.21	-0.06	0.6
R	76	O	323338	SR	0.37	0.24	-0.03	-0.19	0.24	-0.07	0.7
R	77	O	65063	SR	0.36	0.28	0.28	-0.11	-0.10	-0.09	0.6
R	78	O	322143	SR	0.34	0.29	0.02	-0.15	-0.16	0.29	0.6
R	79	O	322141	SR	0.36	0.18	-0.03	0.18	-0.07	-0.10	0.7
R	80	O	392661	SR	0.37	0.28	0.28	-0.15	-0.13	-0.02	0.7
R	81	O	64992	SR	0.21	0.15	0.07	-0.11	0.15	-0.11	0.6
R	85	O	373090	SR	0.25	0.10	0.00	-0.10	0.10	0.03	0.7
R	86	O	373088	SR	0.14	0.13	0.03	-0.09	-0.03	0.13	0.7
R	87	O	395761	SR	0.40	0.22	-0.02	-0.11	0.22	-0.10	0.7
R	88	O	395893	SR	0.43	0.36	-0.14	-0.19	-0.11	0.36	0.7
R	89	O	57113	SR	0.43	0.25	0.25	-0.16	-0.10	-0.04	0.7
R	90	O	338782	SR	0.54	0.30	0.30	-0.04	-0.22	-0.16	0.6
R	92	O	392436	SR	0.34	0.13	0.06	0.13	-0.12	-0.05	0.7
R	95	O	263129	SR	0.36	0.31	-0.13	-0.10	-0.11	0.31	0.8
R	96	O	263130	SR	0.31	0.12	0.03	0.12	-0.08	-0.04	0.8
R	97	O	349142	SR	0.59	0.35	-0.17	-0.22	0.35	-0.08	0.8
R	98	O	394903	SR	0.60	0.34	-0.13	0.34	-0.21	-0.12	0.9
R	99	O	223404	SR	0.70	0.28	-0.11	-0.17	0.28	-0.11	0.8
<b>Mean</b>					0.38	0.24	0.02	-0.04	-0.05	0.03	0.6
<b>SD</b>					0.13	0.08	0.16	0.16	0.15	0.15	0.2

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT= item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses

Table A.2 Item Statistics, Operational Items: MD HSA Government—October 2015 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
R	12	O	135594	CR	1.00						9.9
R	22	O	137292	CR	1.02						9.5
R	31	O	52254	CR	0.89						8.4
R	39	O	51740	CR	1.03						8.2
R	63	O	64789	CR	0.49						17.4
<b>Mean (CR)</b>					0.89						10.7
<b>SD (CR)</b>					0.23						3.8
R	1	O	279839	SR	0.57	0.24	0.24	-0.19	-0.11	-0.04	0.1
R	2	O	51206	SR	0.45	0.39	0.39	-0.28	-0.13	-0.05	0.1
R	3	O	108433	SR	0.30	0.16	-0.02	0.16	-0.16	-0.01	0.1
R	4	O	132969	SR	0.19	0.19	-0.01	0.19	-0.08	-0.12	0.2
R	5	O	279802	SR	0.24	0.17	0.17	-0.03	-0.15	0.02	0.3
R	6	O	279832	SR	0.38	0.34	0.34	-0.17	-0.14	-0.09	0.2
R	7	O	68618	SR	0.59	0.34	-0.17	-0.16	-0.15	0.34	0.1
R	8	O	108447	SR	0.35	0.19	0.19	-0.14	-0.12	0.00	0.1
R	9	O	353530	SR	0.44	0.24	0.24	-0.08	-0.12	-0.10	0.3
R	10	O	324399	SR	0.50	0.38	-0.16	-0.19	-0.19	0.38	0.1
R	13	O	51245	SR	0.30	0.15	-0.06	0.15	-0.16	0.04	0.2
R	14	O	348514	SR	0.53	0.32	-0.19	-0.15	0.32	-0.12	0.2
R	15	O	296494	SR	0.34	0.13	-0.06	-0.09	0.00	0.13	0.3
R	16	O	296493	SR	0.46	0.19	-0.02	0.19	-0.19	-0.05	0.3
R	17	O	133469	SR	0.19	0.16	-0.14	0.16	-0.08	0.07	0.3
R	18	O	324701	SR	0.39	0.22	-0.09	-0.12	-0.05	0.22	0.3
R	20	O	223265	SR	0.45	0.34	0.34	-0.15	-0.13	-0.16	0.8
R	21	O	271833	SR	0.22	0.03	-0.13	0.03	0.07	0.09	1.0
R	24	O	55531	SR	0.30	0.16	0.16	-0.17	-0.12	0.11	1.3
R	25	O	324406	SR	0.69	0.35	0.35	-0.23	-0.19	-0.12	1.4
R	26	O	51168	SR	0.45	0.43	-0.14	-0.22	-0.18	0.43	0.4
R	27	O	283103	SR	0.67	0.42	-0.23	-0.22	0.42	-0.16	0.3
R	28	O	331431	SR	0.33	0.18	-0.11	-0.15	0.18	0.06	0.3
R	29	O	108437	SR	0.30	0.38	0.38	-0.22	-0.13	-0.10	0.5
R	30	O	283083	SR	0.58	0.31	-0.19	-0.12	0.31	-0.12	0.4
R	32	O	279811	SR	0.31	0.08	-0.11	0.05	0.08	-0.04	0.4
R	33	O	68739	SR	0.34	0.26	-0.03	-0.14	-0.12	0.26	0.4
R	34	O	364295	SR	0.24	0.34	-0.11	-0.04	-0.18	0.34	0.4
R	35	O	68753	SR	0.55	0.36	0.36	-0.13	-0.21	-0.16	0.5
R	37	O	283115	SR	0.49	0.35	-0.21	-0.19	0.35	-0.06	0.6
R	38	O	257016	SR	0.33	0.17	0.17	-0.14	-0.11	0.07	0.6
R	40	O	279745	SR	0.43	0.26	-0.05	0.26	-0.21	-0.04	0.6
R	41	O	256411	SR	0.24	0.15	0.07	-0.13	0.15	-0.09	0.6
R	43	O	331398	SR	0.46	0.26	-0.11	0.26	-0.15	-0.05	0.6
R	44	O	331397	SR	0.27	0.25	0.25	-0.05	-0.11	-0.10	0.6



Table A.2 Item Statistics, Operational Items: MD HSA Government—October 2015 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
R	45	O	381710	SR	0.18	0.15	-0.10	0.00	-0.04	0.15	0.7
R	47	O	282265	SR	0.57	0.37	-0.24	0.37	-0.21	-0.06	0.8
R	48	O	52202	SR	0.40	0.39	-0.15	-0.18	0.39	-0.13	0.7
R	50	O	370282	SR	0.37	0.29	-0.07	-0.17	0.29	-0.09	0.7
R	51	O	51183	SR	0.29	0.16	0.16	0.03	-0.13	-0.04	0.8
R	53	O	261601	SR	0.42	0.27	-0.10	-0.15	0.27	-0.08	0.9
R	54	O	64814	SR	0.50	0.39	0.39	-0.24	-0.19	-0.06	0.5
R	55	O	363239	SR	0.36	0.42	-0.12	-0.18	-0.17	0.42	0.6
R	56	O	51244	SR	0.56	0.34	-0.09	-0.22	0.34	-0.17	0.6
R	58	O	296472	SR	0.33	0.17	-0.03	-0.08	0.17	-0.06	0.6
R	59	O	296471	SR	0.46	0.26	-0.01	0.26	-0.18	-0.15	0.6
R	60	O	257018	SR	0.49	0.36	-0.15	-0.19	0.36	-0.17	0.6
R	61	O	321084	SR	0.31	0.31	-0.16	-0.09	-0.09	0.31	0.6
R	62	O	79579	SR	0.32	0.20	-0.05	-0.04	0.20	-0.13	0.7
R	64	O	283117	SR	0.25	0.19	-0.02	-0.13	-0.02	0.19	0.6
R	65	O	296500	SR	0.38	0.28	0.28	-0.19	-0.15	-0.01	0.6
R	67	O	271798	SR	0.35	0.20	-0.10	-0.08	0.20	-0.04	0.6
R	68	O	55591	SR	0.50	0.47	-0.20	-0.19	-0.22	0.47	0.5
R	69	O	348537	SR	0.21	0.34	-0.09	-0.11	-0.10	0.34	0.7
R	71	O	282261	SR	0.27	0.40	-0.15	-0.12	-0.14	0.40	0.6
R	72	O	51029	SR	0.48	0.40	-0.16	-0.20	-0.15	0.40	0.6
R	74	O	296499	SR	0.44	0.22	0.22	-0.11	-0.15	-0.02	0.6
R	75	O	279842	SR	0.29	0.33	-0.01	-0.17	-0.17	0.33	0.7
R	77	O	256996	SR	0.39	0.30	0.30	-0.13	-0.10	-0.10	0.8
R	78	O	279843	SR	0.37	0.40	0.40	-0.21	-0.19	-0.04	0.9
R	80	O	51752	SR	0.26	0.29	-0.11	-0.06	-0.10	0.29	0.9
R	81	O	261592	SR	0.37	0.28	-0.20	0.28	0.00	-0.12	1.1
<b>Mean (SR)</b>					0.39	0.28	0.01	-0.08	-0.03	0.04	0.5
<b>SD (SR)</b>					0.12	0.10	0.20	0.15	0.19	0.19	0.3

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.3 Item Statistics, Operational Items: MD HSA Biology—January 2016 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
A-B	1	O	455132	SR	0.57	0.47	-0.17	-0.28	-0.22	0.47	0.1
A-B	2	L	369410	SR	0.68	0.41	0.41	-0.26	-0.23	-0.13	0.1
A-B	3	L	79442	SR	0.29	0.47	-0.24	-0.09	0.47	-0.16	0.1
A-B	4	L	421478	SR	0.52	0.51	-0.27	-0.20	-0.22	0.51	0.1
A-B	5	L	421482	SR	0.62	0.46	-0.21	0.46	-0.27	-0.19	0.1
A-B	6	L	270991	SR	0.48	0.38	-0.14	-0.18	-0.20	0.38	0.1
A-B	7	L	270992	SR	0.57	0.41	-0.23	-0.20	-0.15	0.41	0.1
A-B	11	O	373161	SR	0.47	0.45	-0.19	-0.19	-0.21	0.45	0.2
A-B	12	O	56982	SR	0.64	0.42	-0.20	-0.22	0.42	-0.20	0.2
A-B	13	L	400667	SR	0.42	0.34	-0.13	-0.24	0.34	-0.03	0.3
A-B	14	L	400665	SR	0.37	0.32	-0.14	0.32	-0.21	-0.09	0.2
A-B	17	O	52417	SR	0.58	0.48	0.48	-0.31	-0.22	-0.14	0.3
A-B	18	L	279655	SR	0.39	0.48	-0.21	-0.24	0.48	-0.12	0.3
A-B	19	O	215942	SR	0.35	0.29	-0.16	0.11	-0.30	0.29	0.4
A-B	20	L	215944	SR	0.39	0.48	0.48	-0.24	-0.18	-0.17	0.3
A-B	21	L	394780	SR	0.42	0.24	-0.05	0.24	-0.10	-0.17	0.5
A-B	22	L	394782	SR	0.44	0.37	-0.18	0.37	-0.25	-0.07	0.5
A-B	24	O	331358	SR	0.49	0.45	-0.18	-0.25	-0.15	0.45	0.5
A-B	25	L	364188	SR	0.44	0.52	-0.14	0.52	-0.25	-0.26	0.5
A-B	26	L	364184	SR	0.47	0.47	-0.19	-0.23	0.47	-0.19	0.6
A-B	27	L	415101	SR	0.54	0.37	0.37	-0.09	-0.25	-0.17	0.6
A-B	29	O	349089	SR	0.53	0.30	0.30	-0.15	-0.15	-0.13	0.7
A-B	30	O	214560	SR	0.56	0.37	0.37	-0.19	-0.19	-0.12	0.8
A-B	31	L	214559	SR	0.30	0.39	-0.15	-0.22	0.39	-0.05	0.9
A-B	32	O	68224	SR	0.30	0.32	-0.10	-0.15	0.32	-0.09	1.0
A-B	33	O	55208	SR	0.47	0.49	-0.25	0.49	-0.25	-0.14	1.0
A-B	34	L	349087	SR	0.72	0.36	-0.19	-0.19	-0.17	0.36	0.3
A-B	35	L	68130	SR	0.39	0.48	-0.12	-0.16	-0.29	0.48	0.4
A-B	37	L	52748	SR	0.40	0.46	0.46	-0.22	-0.14	-0.22	0.4
A-B	38	O	52750	SR	0.52	0.45	-0.24	0.45	-0.26	-0.12	0.3
A-B	39	O	52685	SR	0.66	0.45	-0.30	0.45	-0.19	-0.16	0.3
A-B	40	L	52757	SR	0.57	0.47	0.47	-0.24	-0.21	-0.20	0.4
A-B	43	L	421473	SR	0.35	0.44	0.44	-0.24	-0.14	-0.13	0.4
A-B	44	L	421552	SR	0.41	0.37	0.37	-0.19	-0.16	-0.10	0.4
A-B	45	L	55086	SR	0.26	0.16	0.01	0.16	-0.28	0.08	0.4
A-B	46	O	55083	SR	0.64	0.48	-0.22	-0.29	0.48	-0.19	0.3
A-B	47	O	270995	SR	0.28	0.36	-0.08	0.36	-0.20	-0.15	0.3
A-B	48	O	369450	SR	0.30	0.46	-0.19	-0.10	-0.22	0.46	0.4
A-B	49	L	68145	SR	0.33	0.44	0.44	-0.20	-0.06	-0.24	0.5
A-B	53	L	68195	SR	0.42	0.45	-0.24	-0.27	0.45	0.01	0.5
A-B	54	O	369413	SR	0.26	0.24	-0.05	-0.08	-0.10	0.24	0.5
A-B	55	O	369393	SR	0.29	0.25	-0.11	0.25	-0.13	-0.02	0.5
A-B	56	L	369391	SR	0.35	0.35	-0.17	-0.21	0.35	0.00	0.5

Table A.3 Item Statistics, Operational Items: MD HSA Biology—January 2016 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
A-B	57	O	60535	SR	0.28	0.37	0.02	0.37	-0.26	-0.12	0.5
A-B	58	L	64739	SR	0.49	0.41	-0.13	-0.25	0.41	-0.14	0.6
A-B	59	L	55100	SR	0.51	0.46	-0.15	0.46	-0.27	-0.19	0.5
A-B	60	L	55160	SR	0.61	0.43	0.43	-0.21	-0.21	-0.19	0.5
A-B	63	L	421464	SR	0.41	0.49	-0.13	-0.26	-0.19	0.49	0.7
A-B	64	L	421499	SR	0.53	0.41	-0.13	0.41	-0.24	-0.18	0.7
A-B	65	L	363171	SR	0.60	0.45	-0.24	-0.29	0.45	-0.12	0.7
A-B	66	O	338754	SR	0.38	0.49	-0.27	-0.15	0.49	-0.15	0.7
A-B	67	O	279649	SR	0.62	0.26	-0.08	0.26	-0.21	-0.13	0.6
A-B	68	O	79485	SR	0.47	0.35	-0.18	0.35	-0.11	-0.17	0.6
A-B	69	O	271001	SR	0.26	0.27	0.27	-0.17	-0.01	-0.13	0.5
A-B	70	L	270999	SR	0.32	0.51	0.51	-0.26	-0.23	-0.01	0.6
A-B	71	L	400661	SR	0.35	0.45	-0.13	-0.22	-0.15	0.45	0.6
A-B	72	O	400662	SR	0.64	0.46	-0.20	0.46	-0.26	-0.21	0.5
A-B	75	L	282451	SR	0.49	0.43	-0.11	0.43	-0.29	-0.17	0.7
A-B	76	O	65107	SR	0.45	0.40	-0.21	-0.20	0.40	-0.09	0.6
A-B	77	L	68150	SR	0.33	0.33	-0.17	-0.18	0.33	-0.04	0.6
A-B	78	L	323283	SR	0.21	0.23	-0.05	-0.19	0.04	0.23	0.8
A-B	79	O	323286	SR	0.53	0.45	-0.14	-0.26	0.45	-0.22	0.6
A-B	80	O	256491	SR	0.33	0.39	0.39	-0.09	-0.20	-0.15	0.6
A-B	81	L	256493	SR	0.35	0.43	-0.17	0.43	-0.20	-0.10	0.7
A-B	83	O	64734	SR	0.30	0.39	-0.03	-0.22	-0.14	0.39	0.7
A-B	85	O	214531	SR	0.20	0.37	0.10	-0.34	-0.06	0.37	0.6
A-B	86	O	67603	SR	0.55	0.37	0.37	-0.26	-0.10	-0.14	0.7
A-B	90	L	279630	SR	0.32	0.17	0.17	-0.13	-0.20	0.16	0.8
A-B	92	L	455122	SR	0.52	0.54	-0.24	-0.26	0.54	-0.21	0.8
A-B	93	L	392442	SR	0.35	0.10	-0.19	0.10	-0.11	0.14	0.8
A-B	94	L	279545	SR	0.34	0.51	0.51	-0.08	-0.25	-0.24	0.8
A-B	95	L	279547	SR	0.29	0.44	-0.17	-0.19	-0.11	0.44	0.8
A-B	96	L	392472	SR	0.33	0.41	-0.27	0.41	-0.11	-0.11	0.8
A-B	97	O	338767	SR	0.58	0.51	0.51	-0.25	-0.26	-0.18	0.8
A-B	98	L	136136	SR	0.41	0.48	-0.08	-0.25	-0.25	0.48	0.8
A-B	99	L	136138	SR	0.69	0.47	-0.22	-0.26	0.47	-0.20	0.8
<b>Mean</b>					0.44	0.40	-0.02	-0.05	-0.04	0.00	0.5
<b>SD</b>					0.13	0.09	0.26	0.27	0.27	0.24	0.2

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.4 Item Statistics, Operational Items: MD HSA Biology—January 2016 Makeup

Form	Pos_No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
C	1	O	455114	SR	0.64	0.44	-0.15	-0.27	-0.24	0.44	0.0
C	2	L	369410	SR	0.68	0.41	0.41	-0.26	-0.23	-0.13	0.1
C	3	L	79442	SR	0.29	0.47	-0.24	-0.09	0.47	-0.16	0.1
C	4	L	421478	SR	0.52	0.51	-0.27	-0.20	-0.22	0.51	0.1
C	5	L	421482	SR	0.62	0.46	-0.21	0.46	-0.27	-0.19	0.1
C	6	L	270991	SR	0.48	0.38	-0.14	-0.18	-0.20	0.38	0.1
C	7	L	270992	SR	0.57	0.41	-0.23	-0.20	-0.15	0.41	0.1
C	11	O	52405	SR	0.26	0.41	0.41	-0.09	-0.20	-0.13	0.1
C	12	O	349104	SR	0.37	0.36	-0.22	-0.15	-0.05	0.36	0.2
C	13	L	400667	SR	0.42	0.34	-0.13	-0.24	0.34	-0.03	0.3
C	14	L	400665	SR	0.37	0.32	-0.14	0.32	-0.21	-0.09	0.2
C	17	O	52404	SR	0.63	0.41	-0.21	0.41	-0.20	-0.20	0.2
C	18	L	279655	SR	0.39	0.48	-0.21	-0.24	0.48	-0.12	0.3
C	19	O	215956	SR	0.34	0.23	-0.12	0.00	0.23	-0.18	0.4
C	20	L	215944	SR	0.39	0.48	0.48	-0.24	-0.18	-0.17	0.3
C	21	L	394780	SR	0.42	0.24	-0.05	0.24	-0.10	-0.17	0.5
C	22	L	394782	SR	0.44	0.37	-0.18	0.37	-0.25	-0.07	0.5
C	24	O	279651	SR	0.53	0.45	-0.17	-0.24	0.45	-0.19	0.4
C	25	L	364188	SR	0.44	0.52	-0.14	0.52	-0.25	-0.26	0.5
C	26	L	364184	SR	0.47	0.47	-0.19	-0.23	0.47	-0.19	0.6
C	27	L	415101	SR	0.54	0.37	0.37	-0.09	-0.25	-0.17	0.6
C	29	O	349108	SR	0.34	0.36	-0.19	0.36	-0.12	-0.09	0.6
C	30	O	214556	SR	0.46	0.52	-0.26	-0.21	0.52	-0.19	0.9
C	31	L	214559	SR	0.30	0.39	-0.15	-0.22	0.39	-0.05	0.9
C	32	O	133060	SR	0.54	0.38	-0.25	-0.12	0.38	-0.14	0.9
C	33	O	68110	SR	0.70	0.41	0.41	-0.21	-0.25	-0.13	1.1
C	34	L	349087	SR	0.72	0.36	-0.19	-0.19	-0.17	0.36	0.3
C	35	L	68130	SR	0.39	0.48	-0.12	-0.16	-0.29	0.48	0.4
C	37	L	52748	SR	0.40	0.46	0.46	-0.22	-0.14	-0.22	0.4
C	38	O	52749	SR	0.61	0.49	0.49	-0.25	-0.24	-0.21	0.6
C	39	O	57173	SR	0.36	0.37	-0.14	-0.06	-0.23	0.37	0.4
C	40	L	52757	SR	0.57	0.47	0.47	-0.24	-0.21	-0.20	0.4
C	43	L	421473	SR	0.35	0.44	0.44	-0.24	-0.14	-0.13	0.4
C	44	L	421552	SR	0.41	0.37	0.37	-0.19	-0.16	-0.10	0.4
C	45	L	55086	SR	0.26	0.16	0.01	0.16	-0.28	0.08	0.4
C	46	O	55085	SR	0.38	0.40	0.40	-0.27	-0.04	-0.18	0.5
C	47	O	52705	SR	0.66	0.47	-0.20	-0.26	-0.22	0.47	0.6
C	48	O	52513	SR	0.35	0.48	-0.20	-0.15	-0.22	0.48	0.5
C	49	L	68145	SR	0.33	0.44	0.44	-0.20	-0.06	-0.24	0.5
C	53	L	68195	SR	0.42	0.45	-0.24	-0.27	0.45	0.01	0.5
C	54	O	108509	SR	0.33	0.28	0.13	-0.16	-0.28	0.28	0.6
C	55	O	369392	SR	0.33	0.42	0.42	-0.16	-0.15	-0.15	0.5

Table A.4 Item Statistics, Operational Items: MD HSA Biology—January 2016 Makeup

C	56	L	369391	SR	0.35	0.35	-0.17	-0.21	0.35	0.00	0.5
C	57	O	53511	SR	0.30	0.37	-0.11	0.37	-0.21	-0.06	0.5
C	58	L	64739	SR	0.49	0.41	-0.13	-0.25	0.41	-0.14	0.6
C	59	L	55100	SR	0.51	0.46	-0.15	0.46	-0.27	-0.19	0.5
C	60	L	55160	SR	0.61	0.43	0.43	-0.21	-0.21	-0.19	0.5
C	63	L	421464	SR	0.41	0.49	-0.13	-0.26	-0.19	0.49	0.7
C	64	L	421499	SR	0.53	0.41	-0.13	0.41	-0.24	-0.18	0.7
C	65	L	363171	SR	0.60	0.45	-0.24	-0.29	0.45	-0.12	0.7
C	66	O	57044	SR	0.31	0.60	-0.20	-0.22	-0.24	0.60	0.7
C	67	O	352586	SR	0.74	0.33	-0.26	0.33	-0.12	-0.06	0.7
C	68	O	392450	SR	0.34	0.42	-0.16	-0.28	0.42	0.05	0.8
C	69	O	271000	SR	0.50	0.43	-0.18	0.43	-0.27	-0.07	0.8
C	70	L	270999	SR	0.32	0.51	0.51	-0.26	-0.23	-0.01	0.6
C	71	L	400661	SR	0.35	0.45	-0.13	-0.22	-0.15	0.45	0.6
C	72	O	400663	SR	0.37	0.52	0.52	-0.22	-0.19	-0.19	0.8
C	75	L	282451	SR	0.49	0.43	-0.11	0.43	-0.29	-0.17	0.7
C	76	O	392459	SR	0.39	0.44	-0.22	-0.16	0.44	-0.13	0.8
C	77	L	68150	SR	0.33	0.33	-0.17	-0.18	0.33	-0.04	0.6
C	78	L	323283	SR	0.21	0.23	-0.05	-0.19	0.04	0.23	0.8
C	79	O	323284	SR	0.43	0.33	-0.01	0.33	-0.24	-0.16	0.8
C	80	O	256492	SR	0.50	0.47	-0.19	-0.22	0.47	-0.22	0.8
C	81	L	256493	SR	0.35	0.43	-0.17	0.43	-0.20	-0.10	0.7
C	83	O	417626	SR	0.60	0.46	-0.23	0.46	-0.22	-0.18	0.9
C	85	O	65126	SR	0.51	0.51	0.51	-0.25	-0.20	-0.21	0.8
C	86	O	392481	SR	0.52	0.50	-0.25	-0.18	-0.23	0.50	0.8
C	90	L	279630	SR	0.32	0.17	0.17	-0.13	-0.20	0.16	0.8
C	92	L	455122	SR	0.52	0.54	-0.24	-0.26	0.54	-0.21	0.8
C	93	L	392442	SR	0.35	0.10	-0.19	0.10	-0.11	0.14	0.8
C	94	L	279545	SR	0.34	0.51	0.51	-0.08	-0.25	-0.24	0.8
C	95	L	279547	SR	0.29	0.44	-0.17	-0.19	-0.11	0.44	0.8
C	96	L	392472	SR	0.33	0.41	-0.27	0.41	-0.11	-0.11	0.8
C	97	O	271053	SR	0.52	0.47	-0.23	0.47	-0.25	-0.13	0.9
C	98	L	136136	SR	0.41	0.48	-0.08	-0.25	-0.25	0.48	0.8
C	99	L	136138	SR	0.69	0.47	-0.22	-0.26	0.47	-0.20	0.8
<b>Mean</b>					0.45	0.41	-0.02	-0.05	-0.04	0.01	0.6
<b>SD</b>					0.13	0.09	0.27	0.27	0.28	0.25	0.2

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.5 Item Statistics, Operational Items: MD HSA Government—January 2016 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
A-B	6	L	60432	CR	0.33	0.73					4.8
A-B	17	L	68743	CR	0.23	0.78					7.2
A-B	44	L	108464	CR	0.22	0.71					8.1
A-B	66	L	64946	CR	0.20	0.78					9.8
A-B	76	L	50980	CR	0.28	0.77					10.1
<b>Mean (CR)</b>					0.25	0.75					8.0
<b>SD (CR)</b>					0.05	0.03					2.1
A-B	1	L	363253	SR	0.56	0.49	-0.18	-0.26	-0.24	0.49	0.1
A-B	2	O	68103	SR	0.30	0.33	0.33	-0.16	-0.22	-0.04	0.1
A-B	4	L	55572	SR	0.35	0.31	-0.04	0.31	-0.22	-0.11	0.1
A-B	5	O	339086	SR	0.44	0.40	-0.22	-0.23	-0.11	0.40	0.2
A-B	7	O	214483	SR	0.29	0.36	-0.13	-0.12	0.36	-0.14	0.3
A-B	8	L	296497	SR	0.61	0.48	-0.24	-0.22	-0.23	0.48	0.2
A-B	9	L	296498	SR	0.76	0.44	0.44	-0.29	-0.17	-0.22	0.2
A-B	10	O	324395	SR	0.72	0.39	-0.19	-0.23	0.39	-0.18	0.3
A-B	11	L	52191	SR	0.65	0.49	-0.24	-0.26	-0.23	0.49	0.3
A-B	12	L	51210	SR	0.82	0.41	0.41	-0.23	-0.24	-0.17	0.3
A-B	14	O	68754	SR	0.58	0.48	-0.23	-0.22	-0.24	0.48	0.4
A-B	15	O	50868	SR	0.62	0.42	-0.18	0.42	-0.22	-0.20	0.5
A-B	16	O	256352	SR	0.63	0.46	-0.21	-0.26	-0.23	0.46	0.6
A-B	19	O	261569	SR	0.46	0.31	-0.12	0.31	-0.19	-0.07	0.8
A-B	20	O	132972	SR	0.31	0.30	-0.21	-0.09	0.30	-0.01	0.7
A-B	21	L	271811	SR	0.49	0.38	-0.19	0.38	-0.25	-0.09	0.8
A-B	22	O	51125	SR	0.40	0.30	-0.16	-0.16	0.30	-0.03	1.0
A-B	24	L	79721	SR	0.29	0.25	0.02	-0.18	0.25	-0.10	1.1
A-B	25	L	348540	SR	0.41	0.47	0.47	-0.19	-0.22	-0.17	1.2
A-B	27	O	51765	SR	0.40	0.53	-0.20	0.53	-0.22	-0.20	1.5
A-B	28	O	282260	SR	0.69	0.44	0.44	-0.23	-0.24	-0.16	1.5
A-B	29	O	68617	SR	0.59	0.38	-0.18	-0.24	0.38	-0.12	0.5
A-B	30	L	348480	SR	0.47	0.45	-0.20	0.45	-0.18	-0.20	0.5
A-B	31	O	348506	SR	0.37	0.30	-0.03	-0.20	0.30	-0.12	0.6
A-B	32	L	264004	SR	0.49	0.46	-0.23	0.46	-0.21	-0.16	0.5
A-B	33	L	79603	SR	0.32	0.35	-0.09	0.35	-0.19	-0.09	0.6
A-B	36	L	108473	SR	0.52	0.42	-0.20	-0.14	0.42	-0.23	0.5
A-B	37	L	108435	SR	0.60	0.47	-0.25	-0.16	-0.25	0.47	0.6
A-B	38	L	263982	SR	0.24	0.18	0.25	-0.29	-0.17	0.18	0.6
A-B	39	O	108350	SR	0.33	0.43	-0.17	-0.18	-0.14	0.43	0.7
A-B	41	L	51764	SR	0.52	0.42	-0.26	0.42	-0.15	-0.17	0.6
A-B	42	L	381728	SR	0.68	0.34	-0.17	0.34	-0.17	-0.16	0.6
A-B	43	L	297151	SR	0.66	0.51	0.51	-0.28	-0.27	-0.17	0.7

Table A.5 Item Statistics, Operational Items: MD HSA Government—January 2016 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
A-B	47	L	64968	SR	0.49	0.39	0.39	-0.24	-0.10	-0.16	0.7
A-B	48	L	296514	SR	0.42	0.46	-0.06	0.46	-0.32	-0.21	0.8
A-B	49	L	296515	SR	0.36	0.27	-0.08	-0.01	-0.22	0.27	0.8
A-B	50	L	257004	SR	0.31	0.40	-0.17	-0.04	0.40	-0.22	0.9
A-B	52	O	52270	SR	0.39	0.41	0.41	-0.25	-0.09	-0.14	0.9
A-B	53	L	297126	SR	0.24	0.20	-0.01	0.20	-0.08	-0.08	1.0
A-B	54	L	297125	SR	0.29	0.24	0.24	-0.07	-0.15	-0.03	1.0
A-B	55	O	60461	SR	0.36	0.26	0.26	-0.20	-0.18	0.07	1.1
A-B	56	O	79672	SR	0.36	0.41	-0.07	-0.14	-0.24	0.41	1.1
A-B	57	L	64803	SR	0.38	0.44	0.44	-0.30	-0.17	-0.01	0.7
A-B	58	L	297429	SR	0.59	0.39	-0.30	-0.07	0.39	-0.18	0.7
A-B	59	L	296523	SR	0.29	0.38	0.01	-0.17	-0.22	0.38	0.8
A-B	60	L	296581	SR	0.67	0.39	-0.16	0.39	-0.26	-0.12	0.7
A-B	63	O	257173	SR	0.55	0.43	-0.14	-0.27	0.43	-0.20	0.7
A-B	64	O	321097	SR	0.66	0.52	-0.23	0.52	-0.30	-0.21	0.7
A-B	65	L	64818	SR	0.42	0.45	-0.12	-0.23	0.45	-0.20	0.8
A-B	67	L	52280	SR	0.58	0.36	-0.16	0.36	-0.25	-0.09	0.7
A-B	68	O	79656	SR	0.26	0.34	-0.24	0.34	-0.19	0.04	0.8
A-B	69	O	132975	SR	0.31	0.38	0.38	-0.08	-0.16	-0.19	0.7
A-B	70	L	339047	SR	0.51	0.44	-0.21	-0.17	0.44	-0.18	0.7
A-B	71	L	133463	SR	0.43	0.30	-0.04	0.30	-0.20	-0.13	0.8
A-B	72	O	283284	SR	0.28	0.19	0.03	-0.14	0.19	-0.06	0.8
A-B	73	L	79545	SR	0.43	0.51	-0.23	-0.24	-0.15	0.51	0.8
A-B	74	O	108441	SR	0.58	0.53	0.53	-0.29	-0.21	-0.23	0.9
A-B	75	L	79736	SR	0.51	0.46	-0.24	0.46	-0.23	-0.13	0.9
A-B	78	L	51202	SR	0.25	0.43	-0.10	-0.11	-0.20	0.43	0.9
A-B	79	L	297439	SR	0.42	0.32	-0.19	-0.17	0.32	-0.02	0.9
A-B	80	O	50978	SR	0.63	0.51	-0.30	-0.23	0.51	-0.19	1.0
A-B	81	O	108446	SR	0.48	0.53	-0.19	-0.24	0.53	-0.26	1.0
<b>Mean (SR)</b>					0.47	0.40	-0.04	-0.02	-0.04	-0.01	0.7
<b>SD (SR)</b>					0.15	0.09	0.25	0.28	0.27	0.25	0.3

Note: Tabled item position number is based on Form A and varies somewhat on Form B.

Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.6 Item Statistics, Operational Items: MD HSA Government—January 2016 Makeup 1

Form	Pos_No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
C	6	L	60432	CR	0.33	0.73					4.8
C	17	L	68743	CR	0.23	0.78					7.2
C	44	L	108464	CR	0.22	0.71					8.1
C	66	L	64946	CR	0.20	0.78					9.8
C	76	L	50980	CR	0.28	0.77					10.1
<b>Mean (CR)</b>					0.25	0.75					8.0
<b>SD (CR)</b>					0.05	0.03					2.1
C	1	L	363253	SR	0.56	0.49	-0.18	-0.26	-0.24	0.49	0.1
C	2	O	331402	SR	0.72	0.37	-0.19	-0.21	0.37	-0.18	0.1
C	4	L	55572	SR	0.35	0.31	-0.04	0.31	-0.22	-0.11	0.1
C	5	O	256350	SR	0.77	0.44	0.44	-0.24	-0.24	-0.21	0.0
C	7	O	51766	SR	0.44	0.38	-0.12	-0.28	0.38	-0.07	0.2
C	8	L	296497	SR	0.61	0.48	-0.24	-0.22	-0.23	0.48	0.2
C	9	L	296498	SR	0.76	0.44	0.44	-0.29	-0.17	-0.22	0.2
C	10	O	256993	SR	0.70	0.45	0.45	-0.26	-0.26	-0.17	0.2
C	11	L	52191	SR	0.65	0.49	-0.24	-0.26	-0.23	0.49	0.3
C	12	L	51210	SR	0.82	0.41	0.41	-0.23	-0.24	-0.17	0.3
C	14	O	214491	SR	0.64	0.48	-0.27	0.48	-0.25	-0.16	0.3
C	15	O	79734	SR	0.46	0.38	-0.23	-0.18	0.38	-0.10	0.3
C	16	O	108355	SR	0.69	0.52	0.52	-0.30	-0.26	-0.23	0.2
C	19	O	68504	SR	0.73	0.46	0.46	-0.27	-0.24	-0.20	0.5
C	20	O	133474	SR	0.34	0.27	-0.08	-0.18	0.27	-0.16	0.4
C	21	L	271811	SR	0.49	0.38	-0.19	0.38	-0.25	-0.09	0.8
C	22	O	348539	SR	0.24	0.36	-0.15	-0.09	-0.12	0.36	0.6
C	24	L	79721	SR	0.29	0.25	0.02	-0.18	0.25	-0.10	1.1
C	25	L	348540	SR	0.41	0.47	0.47	-0.19	-0.22	-0.17	1.2
C	27	O	51134	SR	0.38	0.53	-0.28	-0.16	-0.18	0.53	0.9
C	28	O	68760	SR	0.21	0.37	0.37	-0.22	-0.04	-0.12	0.8
C	29	O	108422	SR	0.44	0.44	-0.25	0.44	-0.18	-0.11	0.4
C	30	L	348480	SR	0.47	0.45	-0.20	0.45	-0.18	-0.20	0.5
C	31	O	279775	SR	0.51	0.28	-0.21	-0.07	0.28	-0.10	0.5
C	32	L	264004	SR	0.49	0.46	-0.23	0.46	-0.21	-0.16	0.5
C	33	L	79603	SR	0.32	0.35	-0.09	0.35	-0.19	-0.09	0.6
C	36	L	108473	SR	0.52	0.42	-0.20	-0.14	0.42	-0.23	0.5
C	37	L	108435	SR	0.60	0.47	-0.25	-0.16	-0.25	0.47	0.6
C	38	L	263982	SR	0.24	0.18	0.25	-0.29	-0.17	0.18	0.6
C	39	O	214581	SR	0.38	0.51	-0.21	-0.22	0.51	-0.17	0.6
C	41	L	51764	SR	0.52	0.42	-0.26	0.42	-0.15	-0.17	0.6



Table A.6 Item Statistics, Operational Items: MD HSA Government—January 2016 Makeup 1

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
C	42	L	381728	SR	0.68	0.34	-0.17	0.34	-0.17	-0.16	0.6
C	43	L	297151	SR	0.66	0.51	0.51	-0.28	-0.27	-0.17	0.7
C	47	L	64968	SR	0.49	0.39	0.39	-0.24	-0.10	-0.16	0.7
C	48	L	296514	SR	0.42	0.46	-0.06	0.46	-0.32	-0.21	0.8
C	49	L	296515	SR	0.36	0.27	-0.08	-0.01	-0.22	0.27	0.8
C	50	L	257004	SR	0.31	0.40	-0.17	-0.04	0.40	-0.22	0.9
C	52	O	261606	SR	0.76	0.48	0.48	-0.24	-0.28	-0.21	0.8
C	53	L	297126	SR	0.24	0.20	-0.01	0.20	-0.08	-0.08	1.0
C	54	L	297125	SR	0.29	0.24	0.24	-0.07	-0.15	-0.03	1.0
C	55	O	58409	SR	0.32	0.34	-0.23	-0.06	-0.07	0.34	0.9
C	56	O	79569	SR	0.41	0.42	-0.23	0.42	-0.17	-0.13	0.9
C	57	L	64803	SR	0.38	0.44	0.44	-0.30	-0.17	-0.01	0.7
C	58	L	297429	SR	0.59	0.39	-0.30	-0.07	0.39	-0.18	0.7
C	59	L	296523	SR	0.29	0.38	0.01	-0.17	-0.22	0.38	0.8
C	60	L	296581	SR	0.67	0.39	-0.16	0.39	-0.26	-0.12	0.7
C	63	O	348484	SR	0.72	0.53	-0.23	-0.29	-0.27	0.53	0.8
C	64	O	214492	SR	0.34	0.27	-0.24	-0.20	0.27	0.11	0.8
C	65	L	64818	SR	0.42	0.45	-0.12	-0.23	0.45	-0.20	0.8
C	67	L	52280	SR	0.58	0.36	-0.16	0.36	-0.25	-0.09	0.7
C	68	O	50910	SR	0.41	0.44	0.44	-0.10	-0.28	-0.16	0.8
C	69	O	79703	SR	0.64	0.52	-0.21	-0.24	-0.29	0.52	0.7
C	70	L	339047	SR	0.51	0.44	-0.21	-0.17	0.44	-0.18	0.7
C	71	L	133463	SR	0.43	0.30	-0.04	0.30	-0.20	-0.13	0.8
C	72	O	60460	SR	0.33	0.42	-0.11	-0.20	0.42	-0.15	0.8
C	73	L	79545	SR	0.43	0.51	-0.23	-0.24	-0.15	0.51	0.8
C	74	O	339080	SR	0.44	0.43	-0.07	-0.19	0.43	-0.24	0.7
C	75	L	79736	SR	0.51	0.46	-0.24	0.46	-0.23	-0.13	0.9
C	78	L	51202	SR	0.25	0.43	-0.10	-0.11	-0.20	0.43	0.9
C	79	L	297439	SR	0.42	0.32	-0.19	-0.17	0.32	-0.02	0.9
C	80	O	339084	SR	0.45	0.39	-0.11	-0.28	0.39	-0.09	0.8
C	81	O	256354	SR	0.47	0.48	-0.15	-0.20	-0.26	0.48	0.9
<b>Mean (SR)</b>					0.48	0.41	-0.03	-0.04	-0.05	0.00	0.6
<b>SD (SR)</b>					0.16	0.08	0.27	0.27	0.27	0.26	0.3

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.7 Item Statistics, Operational Items: MD HSA Biology—May 2016 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
D-L	1	L	192081	SR	0.83	0.43	-0.18	0.43	-0.22	-0.30	0.0
D-L	2	O	392441	SR	0.60	0.49	0.49	-0.28	-0.25	-0.18	0.1
D-L	3	O	57054	SR	0.57	0.51	-0.22	-0.16	0.51	-0.38	0.0
D-L	5	L	414805	SR	0.79	0.41	-0.15	-0.28	-0.23	0.41	0.1
D-L	6	L	414807	SR	0.80	0.45	0.45	-0.21	-0.30	-0.21	0.1
D-L	7	L	332049	SR	0.69	0.47	-0.20	0.47	-0.28	-0.24	0.1
D-L	8	L	332048	SR	0.67	0.48	-0.25	-0.27	-0.22	0.48	0.1
D-L	9	O	263105	SR	0.59	0.43	0.43	-0.25	-0.22	-0.17	0.1
D-L	10	O	320466	SR	0.67	0.31	0.31	-0.08	-0.27	-0.10	0.1
D-L	13	L	349137	SR	0.60	0.57	0.57	-0.28	-0.33	-0.22	0.2
D-L	14	L	349136	SR	0.25	0.34	0.06	-0.31	-0.15	0.34	0.2
D-L	15	L	338789	SR	0.61	0.44	-0.31	0.44	-0.19	-0.21	0.1
D-L	16	O	271115	SR	0.64	0.47	-0.25	-0.26	0.47	-0.23	0.2
D-L	19	L	394901	SR	0.44	0.30	0.30	-0.17	-0.23	0.01	0.3
D-L	20	L	394898	SR	0.45	0.37	-0.19	-0.11	0.37	-0.25	0.2
D-L	21	O	352583	SR	0.69	0.52	-0.29	-0.30	-0.20	0.52	0.2
D-L	23	L	332083	SR	0.64	0.51	-0.27	-0.33	0.51	-0.13	0.3
D-L	24	O	332082	SR	0.47	0.56	0.56	-0.28	-0.25	-0.20	0.4
D-L	25	L	133027	SR	0.51	0.41	-0.15	0.41	-0.14	-0.25	0.4
D-L	26	L	133026	SR	0.62	0.46	-0.27	0.46	-0.27	-0.11	0.5
D-L	27	O	393882	SR	0.54	0.59	-0.23	-0.29	-0.31	0.59	0.5
D-L	28	L	108513	SR	0.74	0.53	-0.23	-0.28	-0.30	0.53	0.5
D-L	30	L	136107	SR	0.63	0.30	-0.21	0.30	-0.13	-0.12	0.6
D-L	31	L	136108	SR	0.39	0.40	0.40	-0.03	-0.26	-0.27	0.7
D-L	32	L	364194	SR	0.44	0.43	-0.16	-0.07	0.43	-0.32	0.7
D-L	33	O	68220	SR	0.72	0.53	0.53	-0.35	-0.22	-0.23	0.7
D-L	34	L	271116	SR	0.91	0.33	0.33	-0.17	-0.24	-0.12	0.1
D-L	35	O	415111	SR	0.50	0.40	0.40	-0.35	0.02	-0.13	0.2
D-L	36	L	363012	SR	0.78	0.61	-0.27	-0.42	-0.24	0.61	0.1
D-L	37	O	323299	SR	0.64	0.48	-0.19	0.48	-0.30	-0.23	0.2
D-L	38	L	323300	SR	0.79	0.52	-0.29	-0.32	0.52	-0.20	0.2
D-L	39	O	65064	SR	0.48	0.50	0.50	-0.36	-0.11	-0.16	0.2
D-L	41	L	364216	SR	0.50	0.42	0.00	0.42	-0.30	-0.26	0.2
D-L	42	L	364215	SR	0.56	0.55	-0.25	-0.24	-0.31	0.55	0.2
D-L	43	O	52557	SR	0.59	0.50	-0.18	-0.18	-0.34	0.50	0.2
D-L	44	L	279612	SR	0.59	0.53	-0.30	-0.24	0.53	-0.23	0.2
D-L	48	L	79475	SR	0.32	0.35	-0.17	-0.16	-0.05	0.35	0.2
D-L	49	L	393880	SR	0.31	0.26	-0.21	-0.29	0.26	0.08	0.2
D-L	50	L	79424	SR	0.77	0.43	-0.13	0.43	-0.32	-0.22	0.2
D-L	52	L	271075	SR	0.51	0.58	-0.27	-0.35	0.58	-0.20	0.2
D-L	53	O	271076	SR	0.41	0.33	0.33	0.01	-0.20	-0.27	0.2
D-L	56	O	416420	SR	0.38	0.22	-0.14	-0.13	0.22	0.02	0.2
D-L	57	O	65061	SR	0.58	0.46	0.46	-0.20	-0.30	-0.24	0.2

Table A.7 Item Statistics, Operational Items: MD HSA Biology—May 2016 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
D-L	58	O	331318	SR	0.47	0.37	-0.01	-0.30	-0.19	0.37	0.3
D-L	59	L	331315	SR	0.47	0.44	-0.15	-0.27	0.44	-0.15	0.3
D-L	60	O	423683	SR	0.74	0.54	-0.22	-0.31	0.54	-0.29	0.3
D-L	61	L	444362	SR	0.71	0.55	-0.21	-0.33	-0.29	0.55	0.3
D-L	63	L	271135	SR	0.48	0.48	-0.24	-0.26	-0.13	0.48	0.4
D-L	64	O	271137	SR	0.51	0.48	-0.13	0.48	-0.30	-0.24	0.4
D-L	65	O	67692	SR	0.58	0.51	-0.23	0.51	-0.28	-0.22	0.4
D-L	66	L	279640	SR	0.73	0.52	0.52	-0.29	-0.31	-0.17	0.4
D-L	67	L	67562	SR	0.61	0.32	-0.21	-0.09	0.32	-0.17	0.3
D-L	68	O	366630	SR	0.70	0.44	-0.32	-0.20	-0.15	0.44	0.3
D-L	70	O	260079	SR	0.55	0.59	-0.31	-0.21	-0.30	0.59	0.3
D-L	71	L	349067	SR	0.43	0.27	-0.26	0.02	0.27	-0.22	0.3
D-L	72	L	349068	SR	0.70	0.45	-0.22	0.45	-0.27	-0.21	0.3
D-L	73	L	364136	SR	0.42	0.39	-0.09	-0.20	-0.18	0.39	0.4
D-L	74	O	364228	SR	0.61	0.53	-0.31	-0.29	0.53	-0.16	0.3
D-L	75	L	79407	SR	0.78	0.59	0.59	-0.28	-0.40	-0.23	0.3
D-L	76	O	65062	SR	0.83	0.38	-0.28	-0.22	0.38	-0.13	0.3
D-L	80	L	352876	SR	0.52	0.34	-0.15	-0.13	0.34	-0.21	0.3
D-L	82	L	64743	SR	0.84	0.41	0.41	-0.30	-0.18	-0.13	0.3
D-L	83	L	64745	SR	0.72	0.51	-0.34	0.51	-0.29	-0.13	0.4
D-L	84	O	332028	SR	0.74	0.47	-0.26	0.47	-0.25	-0.25	0.3
D-L	85	L	332030	SR	0.66	0.49	0.49	-0.26	-0.33	-0.10	0.4
D-L	87	L	364153	SR	0.51	0.47	-0.10	-0.30	-0.34	0.47	0.4
D-L	88	O	79480	SR	0.72	0.39	-0.22	0.39	-0.26	-0.13	0.4
D-L	89	O	400671	SR	0.51	0.45	-0.20	0.45	-0.25	-0.15	0.4
D-L	90	L	400673	SR	0.68	0.54	-0.27	-0.30	0.54	-0.23	0.4
D-L	91	L	65089	SR	0.47	0.38	-0.12	0.38	-0.17	-0.18	0.4
D-L	92	L	65123	SR	0.75	0.27	-0.14	0.27	-0.19	-0.17	0.4
D-L	95	L	449650	SR	0.35	0.35	0.02	-0.19	-0.23	0.35	0.4
D-L	96	O	449648	SR	0.71	0.57	-0.29	0.57	-0.28	-0.31	0.4
D-L	97	L	214538	SR	0.69	0.54	-0.28	-0.33	0.54	-0.22	0.4
D-L	98	O	392461	SR	0.64	0.56	0.56	-0.24	-0.27	-0.35	0.4
D-L	99	L	414811	SR	0.70	0.45	-0.22	-0.32	-0.17	0.45	0.5
<b>Mean</b>					0.60	0.45	-0.04	-0.07	-0.07	-0.03	0.3
<b>SD</b>					0.14	0.09	0.30	0.31	0.31	0.30	0.1

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.8 Item Statistics, Operational Items: MD HSA Biology—May 2016 Makeup 1

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
X	1	L	192081	SR	0.83	0.43	-0.18	0.43	-0.22	-0.30	0.0
X	2	O	392441	SR	0.60	0.49	0.49	-0.28	-0.25	-0.18	0.1
X	3	O	279641	SR	0.73	0.28	-0.18	0.28	-0.15	-0.13	0.1
X	5	L	414805	SR	0.79	0.41	-0.15	-0.28	-0.23	0.41	0.1
X	6	L	414807	SR	0.80	0.45	0.45	-0.21	-0.30	-0.21	0.1
X	7	L	332049	SR	0.69	0.47	-0.20	0.47	-0.28	-0.24	0.1
X	8	L	332048	SR	0.67	0.48	-0.25	-0.27	-0.22	0.48	0.1
X	9	O	263105	SR	0.59	0.43	0.43	-0.25	-0.22	-0.17	0.1
X	10	O	271127	SR	0.73	0.38	-0.20	0.38	-0.14	-0.25	0.1
X	13	L	349137	SR	0.60	0.57	0.57	-0.28	-0.33	-0.22	0.2
X	14	L	349136	SR	0.25	0.34	0.06	-0.31	-0.15	0.34	0.2
X	15	L	338789	SR	0.61	0.44	-0.31	0.44	-0.19	-0.21	0.1
X	16	O	271115	SR	0.64	0.47	-0.25	-0.26	0.47	-0.23	0.2
X	19	L	394901	SR	0.44	0.30	0.30	-0.17	-0.23	0.01	0.3
X	20	L	394898	SR	0.45	0.37	-0.19	-0.11	0.37	-0.25	0.2
X	21	O	288201	SR	0.63	0.50	-0.24	0.50	-0.22	-0.27	0.3
X	23	L	332083	SR	0.64	0.51	-0.27	-0.33	0.51	-0.13	0.3
X	24	O	332081	SR	0.51	0.41	-0.13	0.41	-0.20	-0.21	0.5
X	25	L	133027	SR	0.51	0.41	-0.15	0.41	-0.14	-0.25	0.4
X	26	L	133026	SR	0.62	0.46	-0.27	0.46	-0.27	-0.11	0.5
X	27	O	393882	SR	0.54	0.59	-0.23	-0.29	-0.31	0.59	0.5
X	28	L	108513	SR	0.74	0.53	-0.23	-0.28	-0.30	0.53	0.5
X	30	L	136107	SR	0.63	0.30	-0.21	0.30	-0.13	-0.12	0.6
X	31	L	136108	SR	0.39	0.40	0.40	-0.03	-0.26	-0.27	0.7
X	32	L	364194	SR	0.44	0.43	-0.16	-0.07	0.43	-0.32	0.7
X	33	O	223409	SR	0.72	0.36	0.36	-0.23	-0.16	-0.15	0.8
X	34	L	271116	SR	0.91	0.33	0.33	-0.17	-0.24	-0.12	0.1
X	35	O	415111	SR	0.50	0.40	0.40	-0.35	0.02	-0.13	0.2
X	36	L	363012	SR	0.78	0.61	-0.27	-0.42	-0.24	0.61	0.1
X	37	O	323298	SR	0.56	0.39	0.39	-0.09	-0.25	-0.21	0.1
X	38	L	323300	SR	0.79	0.52	-0.29	-0.32	0.52	-0.20	0.2
X	39	O	392449	SR	0.37	0.64	-0.20	-0.32	-0.25	0.64	0.2
X	41	L	364216	SR	0.50	0.42	0.00	0.42	-0.30	-0.26	0.2
X	42	L	364215	SR	0.56	0.55	-0.25	-0.24	-0.31	0.55	0.2
X	43	O	68295	SR	0.55	0.48	-0.19	-0.26	-0.24	0.48	0.1
X	44	L	279612	SR	0.59	0.53	-0.30	-0.24	0.53	-0.23	0.2
X	48	L	79475	SR	0.32	0.35	-0.17	-0.16	-0.05	0.35	0.2
X	49	L	393880	SR	0.31	0.26	-0.21	-0.29	0.26	0.08	0.2
X	50	L	79424	SR	0.77	0.43	-0.13	0.43	-0.32	-0.22	0.2
X	52	L	271075	SR	0.51	0.58	-0.27	-0.35	0.58	-0.20	0.2
X	53	O	271076	SR	0.41	0.33	0.33	0.01	-0.20	-0.27	0.2
X	56	O	416420	SR	0.38	0.22	-0.14	-0.13	0.22	0.02	0.2

Table A.8 Item Statistics, Operational Items: MD HSA Biology—May 2016 Makeup 1

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
X	57	O	65061	SR	0.58	0.46	0.46	-0.20	-0.30	-0.24	0.2
X	58	O	331318	SR	0.47	0.37	-0.01	-0.30	-0.19	0.37	0.3
X	59	L	331315	SR	0.47	0.44	-0.15	-0.27	0.44	-0.15	0.3
X	60	O	423681	SR	0.70	0.51	-0.24	-0.30	0.51	-0.23	0.5
X	61	L	444362	SR	0.71	0.55	-0.21	-0.33	-0.29	0.55	0.3
X	63	L	271135	SR	0.48	0.48	-0.24	-0.26	-0.13	0.48	0.4
X	64	O	271136	SR	0.53	0.38	-0.16	-0.20	0.38	-0.14	0.5
X	65	O	271099	SR	0.58	0.51	-0.27	-0.24	-0.27	0.51	0.5
X	66	L	279640	SR	0.73	0.52	0.52	-0.29	-0.31	-0.17	0.4
X	67	L	67562	SR	0.61	0.32	-0.21	-0.09	0.32	-0.17	0.3
X	68	O	364150	SR	0.65	0.36	-0.19	0.36	-0.19	-0.24	0.3
X	70	O	260079	SR	0.55	0.59	-0.31	-0.21	-0.30	0.59	0.3
X	71	L	349067	SR	0.43	0.27	-0.26	0.02	0.27	-0.22	0.3
X	72	L	349068	SR	0.70	0.45	-0.22	0.45	-0.27	-0.21	0.3
X	73	L	364136	SR	0.42	0.39	-0.09	-0.20	-0.18	0.39	0.4
X	74	O	364228	SR	0.61	0.53	-0.31	-0.29	0.53	-0.16	0.3
X	75	L	79407	SR	0.78	0.59	0.59	-0.28	-0.40	-0.23	0.3
X	76	O	65062	SR	0.83	0.38	-0.28	-0.22	0.38	-0.13	0.3
X	80	L	352876	SR	0.52	0.34	-0.15	-0.13	0.34	-0.21	0.3
X	82	L	64743	SR	0.84	0.41	0.41	-0.30	-0.18	-0.13	0.3
X	83	L	64745	SR	0.72	0.51	-0.34	0.51	-0.29	-0.13	0.4
X	84	O	332028	SR	0.74	0.47	-0.26	0.47	-0.25	-0.25	0.3
X	85	L	332030	SR	0.66	0.49	0.49	-0.26	-0.33	-0.10	0.4
X	87	L	364153	SR	0.51	0.47	-0.10	-0.30	-0.34	0.47	0.4
X	88	O	67860	SR	0.80	0.45	-0.22	0.45	-0.28	-0.18	0.5
X	89	O	400670	SR	0.70	0.58	0.58	-0.36	-0.31	-0.18	0.5
X	90	L	400673	SR	0.68	0.54	-0.27	-0.30	0.54	-0.23	0.4
X	91	L	65089	SR	0.47	0.38	-0.12	0.38	-0.17	-0.18	0.4
X	92	L	65123	SR	0.75	0.27	-0.14	0.27	-0.19	-0.17	0.4
X	95	L	449650	SR	0.35	0.35	0.02	-0.19	-0.23	0.35	0.4
X	96	O	449648	SR	0.71	0.57	-0.29	0.57	-0.28	-0.31	0.4
X	97	L	214538	SR	0.69	0.54	-0.28	-0.33	0.54	-0.22	0.4
X	98	O	279584	SR	0.63	0.54	0.54	-0.23	-0.29	-0.28	0.5
X	99	L	414811	SR	0.70	0.45	-0.22	-0.32	-0.17	0.45	0.5
<b>Mean</b>					0.60	0.44	-0.05	-0.07	-0.07	-0.02	0.3
<b>SD</b>					0.14	0.09	0.29	0.31	0.30	0.30	0.2

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.9 Item Statistics, Operational Items: MD HSA Biology—May 2016 Makeup 2

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
Y	1	L	192081	SR	0.83	0.43	-0.18	0.43	-0.22	-0.30	0.0
Y	2	O	393868	SR	0.74	0.42	-0.19	-0.31	0.42	-0.17	0.1
Y	3	O	57054	SR	0.57	0.51	-0.22	-0.16	0.51	-0.38	0.0
Y	5	L	414805	SR	0.79	0.41	-0.15	-0.28	-0.23	0.41	0.1
Y	6	L	414807	SR	0.80	0.45	0.45	-0.21	-0.30	-0.21	0.1
Y	7	L	332049	SR	0.69	0.47	-0.20	0.47	-0.28	-0.24	0.1
Y	8	L	332048	SR	0.67	0.48	-0.25	-0.27	-0.22	0.48	0.1
Y	9	O	353194	SR	0.57	0.46	0.46	-0.30	-0.23	-0.15	0.1
Y	10	O	320466	SR	0.67	0.31	0.31	-0.08	-0.27	-0.10	0.1
Y	13	L	349137	SR	0.60	0.57	0.57	-0.28	-0.33	-0.22	0.2
Y	14	L	349136	SR	0.25	0.34	0.06	-0.31	-0.15	0.34	0.2
Y	15	L	338789	SR	0.61	0.44	-0.31	0.44	-0.19	-0.21	0.1
Y	16	O	271101	SR	0.76	0.39	-0.24	-0.14	0.39	-0.22	0.2
Y	19	L	394901	SR	0.44	0.30	0.30	-0.17	-0.23	0.01	0.3
Y	20	L	394898	SR	0.45	0.37	-0.19	-0.11	0.37	-0.25	0.2
Y	21	O	352583	SR	0.69	0.52	-0.29	-0.30	-0.20	0.52	0.2
Y	23	L	332083	SR	0.64	0.51	-0.27	-0.33	0.51	-0.13	0.3
Y	24	O	332082	SR	0.47	0.56	0.56	-0.28	-0.25	-0.20	0.4
Y	25	L	133027	SR	0.51	0.41	-0.15	0.41	-0.14	-0.25	0.4
Y	26	L	133026	SR	0.62	0.46	-0.27	0.46	-0.27	-0.11	0.5
Y	27	O	108552	SR	0.41	0.44	0.44	-0.30	-0.15	-0.06	0.9
Y	28	L	108513	SR	0.74	0.53	-0.23	-0.28	-0.30	0.53	0.5
Y	30	L	136107	SR	0.63	0.30	-0.21	0.30	-0.13	-0.12	0.6
Y	31	L	136108	SR	0.39	0.40	0.40	-0.03	-0.26	-0.27	0.7
Y	32	L	364194	SR	0.44	0.43	-0.16	-0.07	0.43	-0.32	0.7
Y	33	O	68220	SR	0.72	0.53	0.53	-0.35	-0.22	-0.23	0.7
Y	34	L	271116	SR	0.91	0.33	0.33	-0.17	-0.24	-0.12	0.1
Y	35	O	322177	SR	0.34	0.47	-0.17	-0.32	-0.11	0.47	0.3
Y	36	L	363012	SR	0.78	0.61	-0.27	-0.42	-0.24	0.61	0.1
Y	37	O	323299	SR	0.64	0.48	-0.19	0.48	-0.30	-0.23	0.2
Y	38	L	323300	SR	0.79	0.52	-0.29	-0.32	0.52	-0.20	0.2
Y	39	O	65064	SR	0.48	0.50	0.50	-0.36	-0.11	-0.16	0.2
Y	41	O	364213	SR	0.31	0.44	-0.01	-0.32	0.44	-0.12	0.4
Y	42	L	364215	SR	0.56	0.55	-0.25	-0.24	-0.31	0.55	0.2
Y	43	O	52557	SR	0.59	0.50	-0.18	-0.18	-0.34	0.50	0.2
Y	44	L	279612	SR	0.59	0.53	-0.30	-0.24	0.53	-0.23	0.2
Y	48	L	79475	SR	0.32	0.35	-0.17	-0.16	-0.05	0.35	0.2
Y	49	L	393880	SR	0.31	0.26	-0.21	-0.29	0.26	0.08	0.2
Y	50	L	79424	SR	0.77	0.43	-0.13	0.43	-0.32	-0.22	0.2
Y	52	L	271075	SR	0.51	0.58	-0.27	-0.35	0.58	-0.20	0.2
Y	53	O	271073	SR	0.44	0.44	0.44	-0.14	-0.33	-0.11	0.4
Y	56	O	241127	SR	0.43	0.28	-0.16	0.28	-0.05	-0.14	0.4

Table A.9 Item Statistics, Operational Items: MD HSA Biology—May 2016 Makeup 2

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
Y	57	O	57103	SR	0.55	0.50	-0.18	-0.31	-0.28	0.50	0.4
Y	58	O	331317	SR	0.56	0.45	-0.14	0.45	-0.26	-0.20	0.5
Y	59	L	331315	SR	0.47	0.44	-0.15	-0.27	0.44	-0.15	0.3
Y	60	O	423683	SR	0.74	0.54	-0.22	-0.31	0.54	-0.29	0.3
Y	61	L	444362	SR	0.71	0.55	-0.21	-0.33	-0.29	0.55	0.3
Y	63	L	271135	SR	0.48	0.48	-0.24	-0.26	-0.13	0.48	0.4
Y	64	O	271137	SR	0.51	0.48	-0.13	0.48	-0.30	-0.24	0.4
Y	65	O	67692	SR	0.58	0.51	-0.23	0.51	-0.28	-0.22	0.4
Y	66	L	279640	SR	0.73	0.52	0.52	-0.29	-0.31	-0.17	0.4
Y	67	L	67562	SR	0.61	0.32	-0.21	-0.09	0.32	-0.17	0.3
Y	68	O	366630	SR	0.70	0.44	-0.32	-0.20	-0.15	0.44	0.3
Y	70	O	67611	SR	0.56	0.56	-0.27	-0.22	-0.29	0.56	0.4
Y	71	L	349067	SR	0.43	0.27	-0.26	0.02	0.27	-0.22	0.3
Y	72	L	349068	SR	0.70	0.45	-0.22	0.45	-0.27	-0.21	0.3
Y	73	L	364136	SR	0.42	0.39	-0.09	-0.20	-0.18	0.39	0.4
Y	74	O	364135	SR	0.53	0.34	0.34	-0.12	-0.21	-0.13	0.6
Y	75	L	79407	SR	0.78	0.59	0.59	-0.28	-0.40	-0.23	0.3
Y	76	O	65054	SR	0.85	0.49	-0.25	0.49	-0.31	-0.21	0.4
Y	80	L	352876	SR	0.52	0.34	-0.15	-0.13	0.34	-0.21	0.3
Y	82	L	64743	SR	0.84	0.41	0.41	-0.30	-0.18	-0.13	0.3
Y	83	L	64745	SR	0.72	0.51	-0.34	0.51	-0.29	-0.13	0.4
Y	84	O	332031	SR	0.72	0.55	-0.25	-0.32	0.55	-0.26	0.5
Y	85	L	332030	SR	0.66	0.49	0.49	-0.26	-0.33	-0.10	0.4
Y	87	L	364153	SR	0.51	0.47	-0.10	-0.30	-0.34	0.47	0.4
Y	88	O	79480	SR	0.72	0.39	-0.22	0.39	-0.26	-0.13	0.4
Y	89	O	400671	SR	0.51	0.45	-0.20	0.45	-0.25	-0.15	0.4
Y	90	L	400673	SR	0.68	0.54	-0.27	-0.30	0.54	-0.23	0.4
Y	91	L	65089	SR	0.47	0.38	-0.12	0.38	-0.17	-0.18	0.4
Y	92	L	65123	SR	0.75	0.27	-0.14	0.27	-0.19	-0.17	0.4
Y	95	L	449650	SR	0.35	0.35	0.02	-0.19	-0.23	0.35	0.4
Y	96	O	449649	SR	0.70	0.46	-0.16	-0.29	0.46	-0.21	0.6
Y	97	L	214538	SR	0.69	0.54	-0.28	-0.33	0.54	-0.22	0.4
Y	98	O	392461	SR	0.64	0.56	0.56	-0.24	-0.27	-0.35	0.4
Y	99	L	414811	SR	0.70	0.45	-0.22	-0.32	-0.17	0.45	0.5
<b>Mean</b>					0.60	0.45	-0.04	-0.08	-0.06	-0.02	0.3
<b>SD</b>					0.15	0.09	0.29	0.30	0.31	0.30	0.2

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.10 Item Statistics, Operational Items: MD HSA Government—May 2016 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
D-L	6	L	65163	CR	0.43	0.70					2.0
D-L	17	L	51141	CR	0.41	0.79					4.6
D-L	44	L	79613	CR	0.34	0.84					5.6
D-L	66	L	51254	CR	0.36	0.77					5.3
D-L	76	L	51031	CR	0.42	0.79					5.5
<b>Mean (CR)</b>					0.39	0.78					4.6
<b>SD (CR)</b>					0.04	0.05					1.5
D-L	1	O	348508	SR	0.70	0.49	0.49	-0.28	-0.19	-0.28	0.1
D-L	2	L	79617	SR	0.38	0.29	0.29	-0.27	0.06	-0.24	0.1
D-L	4	L	51130	SR	0.49	0.19	-0.12	0.01	0.19	-0.22	0.1
D-L	5	L	68734	SR	0.74	0.49	-0.26	0.49	-0.28	-0.23	0.1
D-L	7	O	68552	SR	0.55	0.43	0.43	-0.16	-0.11	-0.31	0.1
D-L	8	O	79669	SR	0.60	0.51	0.51	-0.32	-0.24	-0.20	0.1
D-L	9	L	55632	SR	0.83	0.45	-0.22	-0.34	0.45	-0.16	0.1
D-L	10	L	256341	SR	0.64	0.37	-0.25	-0.23	0.37	-0.09	0.1
D-L	11	O	279792	SR	0.55	0.23	-0.08	-0.14	-0.13	0.23	0.2
D-L	12	O	108482	SR	0.61	0.33	0.33	-0.14	-0.20	-0.14	0.2
D-L	14	L	324388	SR	0.75	0.49	-0.29	0.49	-0.24	-0.24	0.1
D-L	15	L	348449	SR	0.71	0.40	-0.21	0.40	-0.21	-0.19	0.1
D-L	16	O	51139	SR	0.73	0.34	-0.14	-0.23	0.34	-0.17	0.1
D-L	19	L	79743	SR	0.61	0.30	0.30	-0.15	-0.19	-0.07	0.3
D-L	20	O	79654	SR	0.40	0.19	-0.01	0.19	-0.22	-0.07	0.4
D-L	21	O	279785	SR	0.51	0.30	-0.24	-0.25	0.30	-0.01	0.4
D-L	22	L	68620	SR	0.72	0.54	-0.32	-0.24	0.54	-0.25	0.4
D-L	24	L	68555	SR	0.80	0.53	0.53	-0.32	-0.28	-0.22	0.6
D-L	25	O	257168	SR	0.46	0.41	-0.05	-0.33	0.41	-0.17	0.6
D-L	27	L	51802	SR	0.24	0.12	0.12	-0.17	0.06	0.01	0.8
D-L	28	O	256360	SR	0.49	0.38	-0.26	-0.14	0.38	-0.08	0.8
D-L	29	L	58098	SR	0.75	0.49	-0.22	-0.31	-0.25	0.49	0.2
D-L	30	L	68769	SR	0.60	0.23	0.06	-0.28	0.23	-0.23	0.2
D-L	31	O	68701	SR	0.77	0.49	-0.28	-0.24	-0.26	0.49	0.2
D-L	32	O	51115	SR	0.73	0.54	-0.23	-0.26	-0.33	0.54	0.2
D-L	33	O	79646	SR	0.53	0.41	-0.23	0.41	-0.29	-0.01	0.2
D-L	36	O	55686	SR	0.60	0.52	-0.26	-0.20	-0.29	0.52	0.2
D-L	37	L	51171	SR	0.64	0.44	-0.25	-0.20	-0.28	0.44	0.2
D-L	38	L	51170	SR	0.87	0.44	-0.21	0.44	-0.27	-0.22	0.2
D-L	39	L	51721	SR	0.33	0.15	-0.04	0.15	-0.07	-0.07	0.3
D-L	41	L	283273	SR	0.65	0.57	-0.34	-0.29	-0.26	0.57	0.2
D-L	42	O	51723	SR	0.53	0.41	0.41	-0.22	-0.23	-0.09	0.2
D-L	43	O	214482	SR	0.69	0.53	-0.12	-0.33	-0.32	0.53	0.3
D-L	45	L	321094	SR	0.87	0.43	-0.27	0.43	-0.25	-0.17	0.3
D-L	48	O	363261	SR	0.78	0.60	-0.28	-0.34	-0.32	0.60	0.3



Table A.10 Item Statistics, Operational Items: MD HSA Government—May 2016 Primary

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
D-L	49	L	52249	SR	0.39	0.21	-0.22	0.21	-0.05	-0.09	0.4
D-L	50	L	52250	SR	0.53	0.50	-0.21	0.50	-0.26	-0.22	0.4
D-L	52	L	133485	SR	0.75	0.58	-0.26	-0.29	-0.35	0.58	0.4
D-L	53	L	64807	SR	0.65	0.40	-0.21	-0.30	0.40	-0.10	0.5
D-L	54	L	79547	SR	0.65	0.57	-0.19	-0.29	-0.36	0.57	0.5
D-L	55	O	108348	SR	0.37	0.45	-0.20	-0.30	-0.13	0.45	0.5
D-L	56	L	68778	SR	0.50	0.48	0.48	-0.20	-0.24	-0.21	0.6
D-L	57	L	368636	SR	0.58	0.44	-0.22	0.44	-0.21	-0.18	0.3
D-L	58	O	331390	SR	0.32	0.32	-0.02	0.32	-0.21	-0.28	0.3
D-L	59	O	348487	SR	0.72	0.54	0.54	-0.27	-0.31	-0.27	0.3
D-L	60	L	68790	SR	0.36	0.31	-0.01	-0.19	0.31	-0.24	0.4
D-L	63	L	68089	SR	0.59	0.41	-0.28	-0.18	0.41	-0.19	0.3
D-L	64	O	370206	SR	0.75	0.58	-0.28	0.58	-0.37	-0.23	0.3
D-L	65	O	283282	SR	0.53	0.18	-0.06	0.18	-0.08	-0.10	0.3
D-L	67	L	65210	SR	0.41	0.28	-0.05	-0.08	-0.22	0.28	0.3
D-L	68	L	51200	SR	0.73	0.54	-0.31	0.54	-0.27	-0.25	0.3
D-L	69	L	108406	SR	0.76	0.41	-0.23	0.41	-0.27	-0.12	0.3
D-L	70	L	214509	SR	0.54	0.52	0.52	-0.20	-0.26	-0.26	0.3
D-L	71	O	79570	SR	0.77	0.56	-0.31	-0.30	0.56	-0.26	0.4
D-L	72	O	50840	SR	0.54	0.52	-0.28	0.52	-0.23	-0.22	0.4
D-L	73	O	68086	SR	0.41	0.41	-0.16	-0.15	-0.19	0.41	0.3
D-L	74	L	296489	SR	0.82	0.44	-0.25	-0.28	0.44	-0.18	0.4
D-L	75	L	296488	SR	0.88	0.46	-0.26	-0.27	0.46	-0.21	0.4
D-L	78	L	339036	SR	0.71	0.57	0.57	-0.32	-0.28	-0.27	0.4
D-L	79	O	215825	SR	0.64	0.56	0.56	-0.23	-0.31	-0.28	0.5
D-L	80	L	261568	SR	0.66	0.47	-0.28	0.47	-0.25	-0.15	0.5
D-L	81	L	108368	SR	0.44	0.48	0.48	-0.21	-0.28	-0.13	0.6
<b>Mean (SR)</b>					0.61	0.42	-0.05	-0.05	-0.08	-0.03	0.3
<b>SD (SR)</b>					0.15	0.12	0.29	0.31	0.28	0.29	0.2

Note: Tabled item position number is based on Form D and varies somewhat on Forms E-N.

Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.11 Item Statistics, Operational Items: MD HSA Government—May 2016 Makeup 1

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
X	6	L	65163	CR	0.43	0.70					2.0
X	17	L	51141	CR	0.41	0.79					4.6
X	44	L	79613	CR	0.34	0.84					5.6
X	66	L	51254	CR	0.36	0.77					5.3
X	76	L	51031	CR	0.42	0.79					5.5
<b>Mean (CR)</b>					0.39	0.78					4.6
<b>SD (CR)</b>					0.04	0.05					1.5
X	1	O	58423	SR	0.56	0.39	0.39	-0.20	-0.24	-0.14	0.0
X	2	L	79617	SR	0.38	0.29	0.29	-0.27	0.06	-0.24	0.1
X	4	L	51130	SR	0.49	0.19	-0.12	0.01	0.19	-0.22	0.1
X	5	L	68734	SR	0.74	0.49	-0.26	0.49	-0.28	-0.23	0.1
X	7	O	58147	SR	0.60	0.56	0.56	-0.21	-0.32	-0.27	0.1
X	8	O	79669	SR	0.60	0.51	0.51	-0.32	-0.24	-0.20	0.1
X	9	L	55632	SR	0.83	0.45	-0.22	-0.34	0.45	-0.16	0.1
X	10	L	256341	SR	0.64	0.37	-0.25	-0.23	0.37	-0.09	0.1
X	11	O	279792	SR	0.55	0.23	-0.08	-0.14	-0.13	0.23	0.2
X	12	O	214515	SR	0.45	0.25	-0.08	0.25	-0.22	-0.06	0.1
X	14	L	324388	SR	0.75	0.49	-0.29	0.49	-0.24	-0.24	0.1
X	15	L	348449	SR	0.71	0.40	-0.21	0.40	-0.21	-0.19	0.1
X	16	O	51139	SR	0.73	0.34	-0.14	-0.23	0.34	-0.17	0.1
X	19	L	79743	SR	0.61	0.30	0.30	-0.15	-0.19	-0.07	0.3
X	20	O	79654	SR	0.40	0.19	-0.01	0.19	-0.22	-0.07	0.4
X	21	O	321080	SR	0.47	0.50	-0.14	-0.33	0.50	-0.16	0.2
X	22	L	68620	SR	0.72	0.54	-0.32	-0.24	0.54	-0.25	0.4
X	24	L	68555	SR	0.80	0.53	0.53	-0.32	-0.28	-0.22	0.6
X	25	O	257168	SR	0.46	0.41	-0.05	-0.33	0.41	-0.17	0.6
X	27	L	51802	SR	0.24	0.12	0.12	-0.17	0.06	0.01	0.8
X	28	O	133476	SR	0.73	0.51	0.51	-0.20	-0.32	-0.26	0.5
X	29	L	58098	SR	0.75	0.49	-0.22	-0.31	-0.25	0.49	0.2
X	30	L	68769	SR	0.60	0.23	0.06	-0.28	0.23	-0.23	0.2
X	31	O	68750	SR	0.53	0.36	-0.04	-0.29	-0.22	0.36	0.3
X	32	O	51115	SR	0.73	0.54	-0.23	-0.26	-0.33	0.54	0.2
X	33	O	256342	SR	0.43	0.30	0.30	-0.07	-0.23	-0.08	0.3
X	36	O	55686	SR	0.60	0.52	-0.26	-0.20	-0.29	0.52	0.2
X	37	L	51171	SR	0.64	0.44	-0.25	-0.20	-0.28	0.44	0.2
X	38	L	51170	SR	0.87	0.44	-0.21	0.44	-0.27	-0.22	0.2
X	39	L	51721	SR	0.33	0.15	-0.04	0.15	-0.07	-0.07	0.3
X	41	L	283273	SR	0.65	0.57	-0.34	-0.29	-0.26	0.57	0.2
X	42	O	68638	SR	0.47	0.27	0.27	-0.24	-0.08	-0.02	0.3
X	43	O	214482	SR	0.69	0.53	-0.12	-0.33	-0.32	0.53	0.3
X	45	L	321094	SR	0.87	0.43	-0.27	0.43	-0.25	-0.17	0.3
X	48	O	64813	SR	0.58	0.47	0.47	-0.31	-0.14	-0.23	0.4

Table A.11 Item Statistics, Operational Items: MD HSA Government—May 2016 Makeup 1

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
X	49	L	52249	SR	0.39	0.21	-0.22	0.21	-0.05	-0.09	0.4
X	50	L	52250	SR	0.53	0.50	-0.21	0.50	-0.26	-0.22	0.4
X	52	L	133485	SR	0.75	0.58	-0.26	-0.29	-0.35	0.58	0.4
X	53	L	64807	SR	0.65	0.40	-0.21	-0.30	0.40	-0.10	0.5
X	54	L	79547	SR	0.65	0.57	-0.19	-0.29	-0.36	0.57	0.5
X	55	O	51042	SR	0.44	0.40	-0.16	-0.11	-0.23	0.40	0.6
X	56	L	68778	SR	0.50	0.48	0.48	-0.20	-0.24	-0.21	0.6
X	57	L	368636	SR	0.58	0.44	-0.22	0.44	-0.21	-0.18	0.3
X	58	O	79662	SR	0.59	0.45	-0.22	-0.18	-0.27	0.45	0.3
X	59	O	348487	SR	0.72	0.54	0.54	-0.27	-0.31	-0.27	0.3
X	60	L	68790	SR	0.36	0.31	-0.01	-0.19	0.31	-0.24	0.4
X	63	L	68089	SR	0.59	0.41	-0.28	-0.18	0.41	-0.19	0.3
X	64	O	370206	SR	0.75	0.58	-0.28	0.58	-0.37	-0.23	0.3
X	65	O	283282	SR	0.53	0.18	-0.06	0.18	-0.08	-0.10	0.3
X	67	L	65210	SR	0.41	0.28	-0.05	-0.08	-0.22	0.28	0.3
X	68	L	51200	SR	0.73	0.54	-0.31	0.54	-0.27	-0.25	0.3
X	69	L	108406	SR	0.76	0.41	-0.23	0.41	-0.27	-0.12	0.3
X	70	L	214509	SR	0.54	0.52	0.52	-0.20	-0.26	-0.26	0.3
X	71	O	79570	SR	0.77	0.56	-0.31	-0.30	0.56	-0.26	0.4
X	72	O	214481	SR	0.51	0.50	-0.28	0.50	-0.25	-0.20	0.5
X	73	O	271834	SR	0.43	0.42	-0.18	-0.11	-0.24	0.42	0.5
X	74	L	296489	SR	0.82	0.44	-0.25	-0.28	0.44	-0.18	0.4
X	75	L	296488	SR	0.88	0.46	-0.26	-0.27	0.46	-0.21	0.4
X	78	L	339036	SR	0.71	0.57	0.57	-0.32	-0.28	-0.27	0.4
X	79	O	215825	SR	0.64	0.56	0.56	-0.23	-0.31	-0.28	0.5
X	80	L	261568	SR	0.66	0.47	-0.28	0.47	-0.25	-0.15	0.5
X	81	L	108368	SR	0.44	0.48	0.48	-0.21	-0.28	-0.13	0.6
<b>Mean (SR)</b>					0.61	0.42	-0.02	-0.06	-0.09	-0.04	0.3
<b>SD (SR)</b>					0.15	0.12	0.30	0.30	0.28	0.28	0.2

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.12 Item Statistics, Operational Items: MD HSA Government—May 2016 Makeup 2

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
Y	6	L	65163	CR	0.43	0.70					2.0
Y	17	L	51141	CR	0.41	0.79					4.6
Y	44	L	79613	CR	0.34	0.84					5.6
Y	66	L	51254	CR	0.36	0.77					5.3
Y	76	L	51031	CR	0.42	0.79					5.5
<b>Mean (CR)</b>					0.39	0.78					4.6
<b>SD (CR)</b>					0.04	0.05					1.5
Y	1	O	348508	SR	0.70	0.49	0.49	-0.28	-0.19	-0.28	0.1
Y	2	L	79617	SR	0.38	0.29	0.29	-0.27	0.06	-0.24	0.1
Y	4	L	51130	SR	0.49	0.19	-0.12	0.01	0.19	-0.22	0.1
Y	5	L	68734	SR	0.74	0.49	-0.26	0.49	-0.28	-0.23	0.1
Y	7	O	68552	SR	0.55	0.43	0.43	-0.16	-0.11	-0.31	0.1
Y	8	O	79668	SR	0.55	0.43	-0.16	-0.13	-0.30	0.43	0.0
Y	9	L	55632	SR	0.83	0.45	-0.22	-0.34	0.45	-0.16	0.1
Y	10	L	256341	SR	0.64	0.37	-0.25	-0.23	0.37	-0.09	0.1
Y	11	O	68558	SR	0.60	0.49	-0.25	-0.24	-0.22	0.49	0.1
Y	12	O	108482	SR	0.61	0.33	0.33	-0.14	-0.20	-0.14	0.2
Y	14	L	324388	SR	0.75	0.49	-0.29	0.49	-0.24	-0.24	0.1
Y	15	L	348449	SR	0.71	0.40	-0.21	0.40	-0.21	-0.19	0.1
Y	16	O	296476	SR	0.86	0.39	-0.20	-0.23	0.39	-0.21	0.1
Y	19	L	79743	SR	0.61	0.30	0.30	-0.15	-0.19	-0.07	0.3
Y	20	O	241960	SR	0.52	0.39	-0.17	-0.18	-0.18	0.39	0.4
Y	21	O	279785	SR	0.51	0.30	-0.24	-0.25	0.30	-0.01	0.4
Y	22	L	68620	SR	0.72	0.54	-0.32	-0.24	0.54	-0.25	0.4
Y	24	L	68555	SR	0.80	0.53	0.53	-0.32	-0.28	-0.22	0.6
Y	25	O	302857	SR	0.35	0.39	-0.19	-0.06	-0.23	0.39	0.7
Y	27	L	51802	SR	0.24	0.12	0.12	-0.17	0.06	0.01	0.8
Y	28	O	256360	SR	0.49	0.38	-0.26	-0.14	0.38	-0.08	0.8
Y	29	L	58098	SR	0.75	0.49	-0.22	-0.31	-0.25	0.49	0.2
Y	30	L	68769	SR	0.60	0.23	0.06	-0.28	0.23	-0.23	0.2
Y	31	O	68701	SR	0.77	0.49	-0.28	-0.24	-0.26	0.49	0.2
Y	32	O	55666	SR	0.62	0.54	-0.27	-0.33	-0.22	0.54	0.1
Y	33	O	79646	SR	0.53	0.41	-0.23	0.41	-0.29	-0.01	0.2
Y	36	O	58396	SR	0.60	0.51	-0.29	0.51	-0.24	-0.22	0.2
Y	37	L	51171	SR	0.64	0.44	-0.25	-0.20	-0.28	0.44	0.2
Y	38	L	51170	SR	0.87	0.44	-0.21	0.44	-0.27	-0.22	0.2
Y	39	L	51721	SR	0.33	0.15	-0.04	0.15	-0.07	-0.07	0.3
Y	41	L	283273	SR	0.65	0.57	-0.34	-0.29	-0.26	0.57	0.2
Y	42	O	51723	SR	0.53	0.41	0.41	-0.22	-0.23	-0.09	0.2
Y	43	O	215822	SR	0.89	0.50	0.50	-0.29	-0.31	-0.20	0.2
Y	45	L	321094	SR	0.87	0.43	-0.27	0.43	-0.25	-0.17	0.3

Table A.12 Item Statistics, Operational Items: MD HSA Government—May 2016 Makeup 2

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
Y	48	O	363261	SR	0.78	0.60	-0.28	-0.34	-0.32	0.60	0.3
Y	49	L	52249	SR	0.39	0.21	-0.22	0.21	-0.05	-0.09	0.4
Y	50	L	52250	SR	0.53	0.50	-0.21	0.50	-0.26	-0.22	0.4
Y	52	L	133485	SR	0.75	0.58	-0.26	-0.29	-0.35	0.58	0.4
Y	53	L	64807	SR	0.65	0.40	-0.21	-0.30	0.40	-0.10	0.5
Y	54	L	79547	SR	0.65	0.57	-0.19	-0.29	-0.36	0.57	0.5
Y	55	O	108348	SR	0.37	0.45	-0.20	-0.30	-0.13	0.45	0.5
Y	56	L	68778	SR	0.50	0.48	0.48	-0.20	-0.24	-0.21	0.6
Y	57	L	368636	SR	0.58	0.44	-0.22	0.44	-0.21	-0.18	0.3
Y	58	O	331390	SR	0.32	0.32	-0.02	0.32	-0.21	-0.28	0.3
Y	59	O	370239	SR	0.52	0.46	-0.27	0.46	-0.21	-0.17	0.3
Y	60	L	68790	SR	0.36	0.31	-0.01	-0.19	0.31	-0.24	0.4
Y	63	L	68089	SR	0.59	0.41	-0.28	-0.18	0.41	-0.19	0.3
Y	64	O	60448	SR	0.66	0.59	-0.29	-0.28	-0.31	0.59	0.3
Y	65	O	283281	SR	0.43	0.35	-0.13	0.35	-0.21	-0.09	0.3
Y	67	L	65210	SR	0.41	0.28	-0.05	-0.08	-0.22	0.28	0.3
Y	68	L	51200	SR	0.73	0.54	-0.31	0.54	-0.27	-0.25	0.3
Y	69	L	108406	SR	0.76	0.41	-0.23	0.41	-0.27	-0.12	0.3
Y	70	L	214509	SR	0.54	0.52	0.52	-0.20	-0.26	-0.26	0.3
Y	71	O	108347	SR	0.76	0.48	-0.27	0.48	-0.21	-0.28	0.3
Y	72	O	50840	SR	0.54	0.52	-0.28	0.52	-0.23	-0.22	0.4
Y	73	O	68086	SR	0.41	0.41	-0.16	-0.15	-0.19	0.41	0.3
Y	74	L	296489	SR	0.82	0.44	-0.25	-0.28	0.44	-0.18	0.4
Y	75	L	296488	SR	0.88	0.46	-0.26	-0.27	0.46	-0.21	0.4
Y	78	L	339036	SR	0.71	0.57	0.57	-0.32	-0.28	-0.27	0.4
Y	79	O	214582	SR	0.59	0.52	0.52	-0.35	-0.21	-0.17	0.5
Y	80	L	261568	SR	0.66	0.47	-0.28	0.47	-0.25	-0.15	0.5
Y	81	L	108368	SR	0.44	0.48	0.48	-0.21	-0.28	-0.13	0.6
<b>Mean (SR)</b>					0.61	0.43	-0.07	-0.03	-0.10	-0.01	0.3
<b>SD (SR)</b>					0.16	0.11	0.29	0.32	0.26	0.30	0.2

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.13 Item Statistics, Operational Items: MD HSA Biology—Summer 2016 Primary 1

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
P	1	O	108519	SR	0.62	0.27	-0.16	0.27	-0.14	-0.10	0.0
P	2	L	133059	SR	0.45	0.28	-0.10	0.28	-0.20	-0.07	0.1
P	3	O	133419	SR	0.44	0.34	0.34	-0.13	-0.20	-0.11	0.3
P	4	L	133445	SR	0.35	0.30	-0.16	-0.05	-0.12	0.30	0.2
P	5	O	68216	SR	0.58	0.37	0.37	-0.28	-0.11	-0.14	0.0
P	6	L	349118	SR	0.42	0.33	-0.03	0.33	-0.17	-0.19	0.1
P	9	L	52593	SR	0.47	0.26	0.26	-0.22	-0.17	0.02	0.0
P	10	L	52594	SR	0.45	0.21	-0.09	-0.17	0.21	0.01	0.1
P	11	O	323349	SR	0.46	0.27	-0.17	-0.04	-0.20	0.27	0.0
P	12	O	395769	SR	0.30	0.34	0.34	-0.10	-0.16	-0.18	0.0
P	13	L	338790	SR	0.54	0.36	-0.17	0.36	-0.20	-0.15	0.1
P	14	L	338796	SR	0.55	0.33	-0.16	-0.13	-0.17	0.33	0.2
P	16	L	54995	SR	0.36	0.22	-0.09	0.22	-0.14	0.00	0.5
P	17	L	57018	SR	0.44	0.30	-0.20	0.30	-0.13	-0.04	0.4
P	18	L	363006	SR	0.34	0.19	-0.11	-0.09	0.19	-0.01	0.5
P	19	L	133015	SR	0.36	0.27	0.01	-0.18	-0.19	0.27	0.5
P	20	L	133016	SR	0.28	0.22	-0.09	-0.09	-0.05	0.22	0.5
P	23	O	398165	SR	0.15	0.31	-0.14	-0.11	-0.02	0.31	0.5
P	24	L	398166	SR	0.54	0.35	-0.14	-0.19	0.35	-0.14	0.4
P	27	O	392471	SR	0.37	0.24	0.24	-0.20	-0.06	-0.01	0.7
P	28	O	214535	SR	0.34	0.24	-0.04	-0.22	0.24	-0.04	1.0
P	29	O	331336	SR	0.32	0.34	0.34	-0.23	-0.09	-0.02	1.3
P	30	L	331338	SR	0.17	0.24	-0.03	-0.01	-0.17	0.24	1.2
P	31	O	395754	SR	0.37	0.12	-0.05	0.12	-0.08	0.01	1.7
P	32	L	395752	SR	0.62	0.28	0.28	-0.18	-0.11	-0.09	1.2
P	33	O	67672	SR	0.42	0.40	0.40	-0.13	-0.24	-0.11	1.7
P	34	L	108599	SR	0.47	0.33	-0.12	-0.25	0.33	-0.05	0.1
P	35	L	79418	SR	0.55	0.33	0.33	-0.22	-0.18	-0.08	0.4
P	36	O	108637	SR	0.47	0.30	-0.08	0.30	-0.19	-0.11	0.3
P	37	L	108630	SR	0.32	0.27	-0.18	-0.15	-0.02	0.27	0.2
P	38	L	271097	SR	0.37	0.32	-0.03	-0.07	-0.27	0.32	0.4
P	39	O	271143	SR	0.36	0.24	-0.08	-0.15	0.24	-0.04	0.5
P	43	O	67660	SR	0.41	0.38	-0.16	-0.05	-0.28	0.38	0.3
P	45	L	214533	SR	0.36	0.40	-0.15	-0.19	-0.13	0.40	0.2
P	46	L	52683	SR	0.26	0.18	-0.16	0.18	-0.23	0.15	0.4
P	47	L	52684	SR	0.24	0.24	-0.03	-0.12	-0.09	0.24	0.2
P	48	L	94193	SR	0.29	0.13	-0.02	-0.02	0.13	-0.12	0.5
P	50	O	79429	SR	0.27	0.23	0.23	-0.10	-0.04	-0.06	0.8
P	51	O	52687	SR	0.28	0.31	-0.10	0.31	-0.12	-0.10	0.5
P	52	L	55066	SR	0.34	0.32	0.03	-0.18	-0.20	0.32	0.7
P	53	L	296119	SR	0.33	0.41	0.41	-0.11	-0.25	-0.07	0.4

Table A.13 Item Statistics, Operational Items: MD HSA Biology—Summer 2016 Primary 1

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
P	54	L	296120	SR	0.54	0.37	-0.13	0.37	-0.18	-0.19	0.5
P	55	L	279652	SR	0.44	0.20	-0.03	0.20	-0.07	-0.12	0.6
P	57	L	286698	SR	0.26	0.02	0.04	-0.10	0.02	0.05	0.5
P	58	L	286699	SR	0.24	0.17	0.17	0.08	-0.20	-0.12	0.5
P	59	L	369425	SR	0.40	0.37	0.37	-0.19	-0.22	-0.03	0.6
P	60	O	338761	SR	0.37	0.45	-0.13	-0.25	-0.14	0.45	0.7
P	63	O	64987	SR	0.29	0.42	-0.12	-0.12	-0.19	0.42	0.8
P	64	O	57123	SR	0.57	0.17	-0.06	-0.14	0.17	0.00	0.8
P	65	L	398053	SR	0.35	0.35	0.35	-0.12	-0.18	-0.08	0.6
P	66	L	398077	SR	0.45	0.42	0.42	-0.25	-0.20	-0.08	0.8
P	67	O	363170	SR	0.47	0.39	-0.15	-0.26	0.39	-0.09	0.3
P	68	O	68247	SR	0.60	0.30	0.30	-0.13	-0.20	-0.08	0.3
P	69	O	256517	SR	0.62	0.34	-0.10	0.34	-0.21	-0.16	0.7
P	70	L	256515	SR	0.29	0.31	-0.03	-0.10	-0.21	0.31	0.5
P	72	O	322198	SR	0.53	0.22	-0.10	0.22	-0.22	-0.01	0.3
P	73	O	394751	SR	0.31	0.31	0.31	-0.19	-0.22	0.05	0.5
P	74	L	394754	SR	0.39	0.32	-0.11	-0.12	0.32	-0.14	0.5
P	76	L	323338	SR	0.40	0.27	-0.04	-0.22	0.27	-0.06	0.6
P	77	O	65063	SR	0.36	0.30	0.30	-0.15	-0.08	-0.11	0.5
P	78	L	322143	SR	0.38	0.27	0.02	-0.18	-0.14	0.27	0.7
P	79	L	322141	SR	0.40	0.22	-0.03	0.22	-0.14	-0.10	0.7
P	80	O	392661	SR	0.36	0.33	0.33	-0.13	-0.18	-0.05	0.3
P	81	L	64992	SR	0.26	0.27	-0.01	-0.14	0.27	-0.16	0.7
P	85	L	373090	SR	0.23	0.08	0.02	-0.12	0.08	0.04	0.8
P	86	L	373088	SR	0.16	0.18	-0.02	-0.03	-0.08	0.18	0.8
P	87	L	395761	SR	0.41	0.22	-0.02	-0.09	0.22	-0.13	1.1
P	88	O	395893	SR	0.42	0.41	-0.13	-0.20	-0.15	0.41	0.7
P	89	O	57113	SR	0.44	0.33	0.33	-0.19	-0.16	-0.05	0.7
P	90	O	338782	SR	0.55	0.36	0.36	-0.08	-0.22	-0.21	0.8
P	92	O	392436	SR	0.37	0.29	-0.01	0.29	-0.19	-0.11	1.2
P	95	L	263129	SR	0.37	0.36	-0.13	-0.09	-0.18	0.36	1.2
P	96	L	263130	SR	0.32	0.13	0.01	0.13	-0.01	-0.12	1.2
P	97	L	349142	SR	0.63	0.40	-0.16	-0.27	0.40	-0.12	1.4
P	98	L	394903	SR	0.60	0.39	-0.12	0.39	-0.23	-0.16	1.4
P	99	L	223404	SR	0.66	0.32	-0.14	-0.18	0.32	-0.11	1.6
<b>Mean</b>					0.40	0.29	0.03	-0.05	-0.07	0.03	0.6
<b>SD</b>					0.12	0.08	0.19	0.19	0.18	0.19	0.4

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.14 Item Statistics, Operational Items: MD HSA Biology—Summer 2016 Primary 2

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
Q	1	O	363011	SR	0.63	0.32	-0.19	0.32	-0.23	0.01	0.4
Q	2	L	133059	SR	0.45	0.28	-0.10	0.28	-0.20	-0.07	0.1
Q	3	O	133444	SR	0.55	0.36	0.36	-0.19	-0.25	-0.07	0.0
Q	4	L	133445	SR	0.35	0.30	-0.16	-0.05	-0.12	0.30	0.2
Q	5	O	133420	SR	0.39	0.45	-0.26	-0.13	-0.17	0.45	0.0
Q	6	L	349118	SR	0.42	0.33	-0.03	0.33	-0.17	-0.19	0.1
Q	9	L	52593	SR	0.47	0.26	0.26	-0.22	-0.17	0.02	0.0
Q	10	L	52594	SR	0.45	0.21	-0.09	-0.17	0.21	0.01	0.1
Q	11	O	133055	SR	0.41	0.46	0.46	-0.18	-0.20	-0.22	0.0
Q	12	O	223413	SR	0.38	0.22	-0.03	0.22	-0.16	-0.06	0.0
Q	13	L	338790	SR	0.54	0.36	-0.17	0.36	-0.20	-0.15	0.1
Q	14	L	338796	SR	0.55	0.33	-0.16	-0.13	-0.17	0.33	0.2
Q	16	L	54995	SR	0.36	0.22	-0.09	0.22	-0.14	0.00	0.5
Q	17	L	57018	SR	0.44	0.30	-0.20	0.30	-0.13	-0.04	0.4
Q	18	L	363006	SR	0.34	0.19	-0.11	-0.09	0.19	-0.01	0.5
Q	19	L	133015	SR	0.36	0.27	0.01	-0.18	-0.19	0.27	0.5
Q	20	L	133016	SR	0.28	0.22	-0.09	-0.09	-0.05	0.22	0.5
Q	23	O	398163	SR	0.23	0.29	-0.08	-0.10	-0.10	0.29	0.0
Q	24	L	398166	SR	0.54	0.35	-0.14	-0.19	0.35	-0.14	0.4
Q	27	O	108554	SR	0.14	0.02	0.02	-0.04	-0.01	0.03	0.0
Q	28	O	68285	SR	0.42	0.37	-0.12	0.37	-0.20	-0.16	0.0
Q	29	O	331337	SR	0.39	0.30	-0.22	-0.12	0.30	-0.09	0.4
Q	30	L	331338	SR	0.17	0.24	-0.03	-0.01	-0.17	0.24	1.2
Q	31	O	395755	SR	0.48	0.16	-0.11	0.16	-0.11	0.00	0.0
Q	32	L	395752	SR	0.62	0.28	0.28	-0.18	-0.11	-0.09	1.2
Q	33	O	392444	SR	0.54	0.38	-0.12	-0.20	0.38	-0.23	0.0
Q	34	L	108599	SR	0.47	0.33	-0.12	-0.25	0.33	-0.05	0.1
Q	35	L	79418	SR	0.55	0.33	0.33	-0.22	-0.18	-0.08	0.4
Q	36	O	108634	SR	0.54	0.47	0.47	-0.26	-0.21	-0.17	0.0
Q	37	L	108630	SR	0.32	0.27	-0.18	-0.15	-0.02	0.27	0.2
Q	38	L	271097	SR	0.37	0.32	-0.03	-0.07	-0.27	0.32	0.4
Q	39	O	271098	SR	0.20	0.05	0.10	-0.14	0.05	-0.04	0.0
Q	43	O	331351	SR	0.69	0.43	-0.25	0.43	-0.23	-0.17	0.0
Q	45	L	214533	SR	0.36	0.40	-0.15	-0.19	-0.13	0.40	0.2
Q	46	L	52683	SR	0.26	0.18	-0.16	0.18	-0.23	0.15	0.4
Q	47	L	52684	SR	0.24	0.24	-0.03	-0.12	-0.09	0.24	0.2
Q	48	L	94193	SR	0.29	0.13	-0.02	-0.02	0.13	-0.12	0.5
Q	50	O	297095	SR	0.33	0.05	-0.08	0.05	-0.13	0.16	0.0
Q	51	O	68236	SR	0.27	0.31	-0.06	-0.20	-0.08	0.31	0.4
Q	52	L	55066	SR	0.34	0.32	0.03	-0.18	-0.20	0.32	0.7
Q	53	L	296119	SR	0.33	0.41	0.41	-0.11	-0.25	-0.07	0.4



Table A.14 Item Statistics, Operational Items: MD HSA Biology—Summer 2016 Primary 2

Form	Pos_No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
Q	54	L	296120	SR	0.54	0.37	-0.13	0.37	-0.18	-0.19	0.5
Q	55	L	279652	SR	0.44	0.20	-0.03	0.20	-0.07	-0.12	0.6
Q	57	L	286698	SR	0.26	0.02	0.04	-0.10	0.02	0.05	0.5
Q	58	L	286699	SR	0.24	0.17	0.17	0.08	-0.20	-0.12	0.5
Q	59	L	369425	SR	0.40	0.37	0.37	-0.19	-0.22	-0.03	0.6
Q	60	O	338733	SR	0.37	0.35	-0.18	-0.12	0.35	-0.12	0.0
Q	63	O	392489	SR	0.40	0.30	-0.12	-0.24	-0.02	0.30	0.4
Q	64	O	369420	SR	0.42	0.40	-0.10	-0.20	0.40	-0.24	0.0
Q	65	L	398053	SR	0.35	0.35	0.35	-0.12	-0.18	-0.08	0.6
Q	66	L	398077	SR	0.45	0.42	0.42	-0.25	-0.20	-0.08	0.8
Q	67	O	65082	SR	0.63	0.34	0.34	-0.23	-0.10	-0.13	0.8
Q	68	O	331365	SR	0.41	0.17	-0.11	0.17	0.02	-0.14	0.8
Q	69	O	256549	SR	0.34	0.33	0.33	-0.11	-0.15	-0.10	1.2
Q	70	L	256515	SR	0.29	0.31	-0.03	-0.10	-0.21	0.31	0.5
Q	72	O	142012	SR	0.42	0.21	-0.18	0.21	-0.18	0.11	0.8
Q	73	O	394750	SR	0.38	0.52	0.52	-0.21	-0.22	-0.14	2.0
Q	74	L	394754	SR	0.39	0.32	-0.11	-0.12	0.32	-0.14	0.5
Q	76	L	323338	SR	0.40	0.27	-0.04	-0.22	0.27	-0.06	0.6
Q	77	O	271155	SR	0.57	0.30	0.30	-0.15	-0.04	-0.21	1.2
Q	78	L	322143	SR	0.38	0.27	0.02	-0.18	-0.14	0.27	0.7
Q	79	L	322141	SR	0.40	0.22	-0.03	0.22	-0.14	-0.10	0.7
Q	80	O	65048	SR	0.38	0.30	0.30	-0.11	-0.07	-0.17	1.2
Q	81	L	64992	SR	0.26	0.27	-0.01	-0.14	0.27	-0.16	0.7
Q	85	L	373090	SR	0.23	0.08	0.02	-0.12	0.08	0.04	0.8
Q	86	L	373088	SR	0.16	0.18	-0.02	-0.03	-0.08	0.18	0.8
Q	87	L	395761	SR	0.41	0.22	-0.02	-0.09	0.22	-0.13	1.1
Q	88	O	395757	SR	0.35	0.35	-0.07	-0.11	0.35	-0.20	1.6
Q	89	O	55031	SR	0.34	0.30	0.07	-0.21	-0.17	0.30	2.0
Q	90	O	369417	SR	0.44	0.36	0.36	-0.20	-0.15	-0.05	1.6
Q	92	O	288369	SR	0.32	0.15	-0.02	0.15	-0.24	0.12	1.6
Q	95	L	263129	SR	0.37	0.36	-0.13	-0.09	-0.18	0.36	1.2
Q	96	L	263130	SR	0.32	0.13	0.01	0.13	-0.01	-0.12	1.2
Q	97	L	349142	SR	0.63	0.40	-0.16	-0.27	0.40	-0.12	1.4
Q	98	L	394903	SR	0.60	0.39	-0.12	0.39	-0.23	-0.16	1.4
Q	99	L	223404	SR	0.66	0.32	-0.14	-0.18	0.32	-0.11	1.6
<b>Mean</b>					0.40	0.29	0.01	-0.04	-0.05	0.01	0.6
<b>SD</b>					0.12	0.10	0.20	0.19	0.20	0.19	0.5

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val =  $p$ -value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.15 Item Statistics, Operational Items: MD HSA Government–Summer 2016 Primary 1

Form	Pos No	Anchor Status	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
P	12	O	135594	CR	0.23	0.76					12.1
P	22	O	137292	CR	0.21	0.64					13.8
P	31	O	52254	CR	0.18	0.60					13.8
P	39	O	51740	CR	0.21	0.68					14.3
P	63	O	64789	CR	0.13	0.68					22.6
<b>Mean (CR)</b>					0.19	0.67					15.3
<b>SD (CR)</b>					0.04	0.06					4.2
P	1	O	279839	SR	0.52	0.29	0.29	-0.18	-0.15	-0.05	0.15
P	2	O	51206	SR	0.47	0.43	0.43	-0.29	-0.15	-0.10	0.39
P	3	O	108433	SR	0.31	0.16	-0.03	0.16	-0.13	-0.04	0.15
P	4	O	132969	SR	0.19	0.27	-0.06	0.27	-0.08	-0.12	0.39
P	5	O	279802	SR	0.26	0.23	0.23	-0.09	-0.14	0.02	0.15
P	6	O	279832	SR	0.43	0.41	0.41	-0.19	-0.22	-0.13	0.39
P	7	O	68618	SR	0.59	0.37	-0.19	-0.21	-0.13	0.37	0.15
P	8	O	108447	SR	0.39	0.24	0.24	-0.09	-0.12	-0.07	0.39
P	9	O	353530	SR	0.48	0.32	0.32	-0.09	-0.17	-0.14	0.30
P	10	O	324399	SR	0.54	0.43	-0.18	-0.19	-0.22	0.43	0.30
P	13	O	51245	SR	0.36	0.21	-0.03	0.21	-0.22	0.03	0.78
P	14	O	348514	SR	0.54	0.40	-0.24	-0.16	0.40	-0.13	0.58
P	15	O	296494	SR	0.35	0.22	-0.11	-0.11	0.00	0.22	0.74
P	16	O	296493	SR	0.50	0.15	0.00	0.15	-0.13	-0.06	0.60
P	17	O	133469	SR	0.24	0.25	-0.16	0.25	-0.13	0.04	0.60
P	18	O	324701	SR	0.39	0.28	-0.12	-0.16	0.01	0.28	0.89
P	20	O	223265	SR	0.49	0.40	0.40	-0.21	-0.14	-0.15	0.58
P	21	O	271833	SR	0.24	0.09	-0.17	0.09	0.08	0.06	0.89
P	24	O	55531	SR	0.30	0.23	0.23	-0.23	-0.11	0.09	1.55
P	25	O	324406	SR	0.68	0.42	0.42	-0.25	-0.17	-0.17	1.79
P	26	O	51168	SR	0.45	0.47	-0.11	-0.27	-0.16	0.47	1.55
P	27	O	283103	SR	0.71	0.46	-0.26	-0.23	0.46	-0.17	1.04
P	28	O	331431	SR	0.34	0.30	-0.15	-0.20	0.30	0.02	1.75
P	29	O	108437	SR	0.35	0.42	0.42	-0.22	-0.17	-0.10	1.04
P	30	O	283083	SR	0.58	0.33	-0.24	-0.10	0.33	-0.12	1.19
P	32	O	279811	SR	0.29	0.13	-0.15	0.09	0.13	-0.06	1.64
P	33	O	68739	SR	0.38	0.34	-0.06	-0.18	-0.11	0.34	1.55
P	34	O	364295	SR	0.27	0.40	-0.08	-0.10	-0.21	0.40	1.34
P	35	O	68753	SR	0.53	0.43	0.43	-0.11	-0.25	-0.19	1.55
P	37	O	283115	SR	0.52	0.42	-0.22	-0.19	0.42	-0.10	1.94
P	38	O	257016	SR	0.30	0.19	0.19	-0.08	-0.11	0.04	1.55
-P	40	O	279745	SR	0.46	0.32	-0.07	0.32	-0.24	-0.03	1.93
P	41	O	256411	SR	0.29	0.15	0.10	-0.15	0.15	-0.10	1.75
P	43	O	331398	SR	0.51	0.36	-0.15	0.36	-0.16	-0.13	1.64

Table A.15 Item Statistics, Operational Items: MD HSA Government–Summer 2016 Primary 1

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
P	44	O	331397	SR	0.29	0.40	0.40	-0.03	-0.19	-0.15	1.64
P	45	O	381710	SR	0.21	0.20	-0.06	-0.04	-0.04	0.20	1.79
P	47	O	282265	SR	0.58	0.44	-0.23	0.44	-0.23	-0.13	2.14
P	48	O	52202	SR	0.42	0.45	-0.15	-0.22	0.45	-0.14	1.79
P	50	O	370282	SR	0.41	0.32	-0.06	-0.22	0.32	-0.06	1.94
P	51	O	51183	SR	0.29	0.23	0.23	0.01	-0.13	-0.08	2.33
P	53	O	261601	SR	0.43	0.26	-0.13	-0.13	0.26	-0.04	1.93
P	54	O	64814	SR	0.53	0.49	0.49	-0.25	-0.27	-0.10	1.34
P	55	O	363239	SR	0.36	0.44	-0.12	-0.15	-0.21	0.44	1.64
P	56	O	51244	SR	0.55	0.40	-0.11	-0.27	0.40	-0.16	1.34
P	58	O	296472	SR	0.35	0.24	-0.02	-0.13	0.24	-0.08	1.49
P	59	O	296471	SR	0.46	0.24	0.03	0.24	-0.20	-0.14	1.34
P	60	O	257018	SR	0.50	0.43	-0.20	-0.17	0.43	-0.19	1.55
P	61	O	321084	SR	0.30	0.34	-0.12	-0.13	-0.06	0.34	1.75
P	62	O	79579	SR	0.34	0.29	-0.05	-0.09	0.29	-0.16	1.55
P	64	O	283117	SR	0.27	0.17	-0.02	-0.11	0.02	0.17	1.94
P	65	O	296500	SR	0.40	0.31	0.31	-0.14	-0.16	-0.04	1.64
P	67	O	271798	SR	0.38	0.29	-0.15	-0.08	0.29	-0.07	1.79
P	68	O	55591	SR	0.50	0.52	-0.22	-0.14	-0.28	0.52	2.14
P	69	O	348537	SR	0.26	0.41	-0.10	-0.15	-0.10	0.41	1.75
P	71	O	282261	SR	0.28	0.52	-0.22	-0.11	-0.20	0.52	1.79
P	72	O	51029	SR	0.49	0.44	-0.14	-0.23	-0.17	0.44	2.14
P	74	O	296499	SR	0.44	0.27	0.27	-0.16	-0.18	0.04	1.64
P	75	O	279842	SR	0.31	0.41	0.00	-0.18	-0.21	0.41	1.79
P	77	O	256996	SR	0.39	0.29	0.29	-0.07	-0.11	-0.10	2.53
P	78	O	279843	SR	0.38	0.46	0.46	-0.21	-0.15	-0.11	2.72
P	80	O	51752	SR	0.31	0.36	-0.11	-0.09	-0.13	0.36	2.83
P	81	O	261592	SR	0.40	0.34	-0.23	0.34	0.00	-0.12	2.68
<b>Mean (SR)</b>					0.40	0.33	0.02	-0.08	-0.03	0.04	1.4
<b>SD (SR)</b>					0.12	0.11	0.23	0.18	0.22	0.22	0.7

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table A.16 Item Statistics, Operational Items: MD HSA Government–Summer 2016 Primary 2

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
Q	12	O	135594	CR	0.23	0.76					12.1
Q	22	O	137292	CR	0.21	0.64					13.8
Q	31	O	52254	CR	0.18	0.60					13.8
Q	39	O	51740	CR	0.21	0.68					14.3
Q	63	O	64789	CR	0.13	0.68					22.6
<b>Mean (CR)</b>					0.19	0.67					15.3
<b>SD (CR)</b>					0.04	0.06					4.2
Q	1	O	279839	SR	0.52	0.29	0.29	-0.18	-0.15	-0.05	0.1
Q	2	O	283062	SR	0.54	0.40	-0.16	-0.24	-0.13	0.40	0.6
Q	3	O	108433	SR	0.31	0.16	-0.03	0.16	-0.13	-0.04	0.1
Q	4	O	108401	SR	0.40	0.17	-0.13	0.17	0.03	-0.13	0.0
Q	5	O	279802	SR	0.26	0.23	0.23	-0.09	-0.14	0.02	0.1
Q	6	O	283116	SR	0.39	0.24	-0.19	0.24	-0.08	-0.05	0.0
Q	7	O	68618	SR	0.59	0.37	-0.19	-0.21	-0.13	0.37	0.1
Q	8	O	79698	SR	0.43	0.31	-0.23	-0.12	0.31	-0.04	0.0
Q	9	O	353530	SR	0.48	0.32	0.32	-0.09	-0.17	-0.14	0.3
Q	10	O	324399	SR	0.54	0.43	-0.18	-0.19	-0.22	0.43	0.3
Q	13	O	353531	SR	0.33	0.33	0.33	-0.10	-0.29	-0.01	0.0
Q	14	O	283277	SR	0.27	0.08	-0.18	0.08	-0.21	0.25	0.0
Q	15	O	296494	SR	0.35	0.22	-0.11	-0.11	0.00	0.22	0.7
Q	16	O	296493	SR	0.50	0.15	0.00	0.15	-0.13	-0.06	0.6
Q	17	O	133469	SR	0.24	0.25	-0.16	0.25	-0.13	0.04	0.6
Q	18	O	324701	SR	0.39	0.28	-0.12	-0.16	0.01	0.28	0.9
Q	20	O	108398	SR	0.46	0.38	0.38	-0.04	-0.23	-0.19	1.3
Q	21	O	271833	SR	0.24	0.09	-0.17	0.09	0.08	0.06	0.9
Q	24	O	51798	SR	0.54	0.40	-0.27	0.40	-0.25	-0.11	0.0
Q	25	O	324406	SR	0.68	0.42	0.42	-0.25	-0.17	-0.17	1.8
Q	26	O	256412	SR	0.44	0.30	-0.11	-0.24	-0.11	0.30	0.0
Q	27	O	283103	SR	0.71	0.46	-0.26	-0.23	0.46	-0.17	1.0
Q	28	O	331411	SR	0.43	0.34	-0.11	0.34	-0.15	-0.14	1.3
Q	29	O	108437	SR	0.35	0.42	0.42	-0.22	-0.17	-0.10	1.0
Q	30	O	283083	SR	0.58	0.33	-0.24	-0.10	0.33	-0.12	1.2
Q	32	O	279811	SR	0.29	0.13	-0.15	0.09	0.13	-0.06	1.6
Q	33	O	108456	SR	0.45	0.22	-0.29	0.22	-0.10	0.08	0.0
Q	34	O	364295	SR	0.27	0.40	-0.08	-0.10	-0.21	0.40	1.3
Q	35	O	283082	SR	0.42	0.46	0.46	-0.27	-0.13	-0.17	0.0
Q	37	O	68709	SR	0.40	0.42	-0.10	-0.16	0.42	-0.25	0.0
Q	38	O	214577	SR	0.67	0.27	0.27	-0.10	-0.23	-0.10	0.0
Q	40	O	279745	SR	0.46	0.32	-0.07	0.32	-0.24	-0.03	1.9
Q	41	O	133480	SR	0.31	0.22	-0.08	0.22	-0.13	-0.02	0.6
Q	43	O	331398	SR	0.51	0.36	-0.15	0.36	-0.16	-0.13	1.6
Q	44	O	331397	SR	0.29	0.40	0.40	-0.03	-0.19	-0.15	1.6

Table A.16 Item Statistics, Operational Items: MD HSA Government–Summer 2016 Primary 2

Form	Pos No	Anchor Status	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
Q	45	O	381710	SR	0.21	0.20	-0.06	-0.04	-0.04	0.20	1.8
Q	47	O	339021	SR	0.43	0.29	-0.07	-0.20	0.29	-0.08	0.6
Q	48	O	52202	SR	0.42	0.45	-0.15	-0.22	0.45	-0.14	1.8
Q	50	O	339045	SR	0.27	0.38	-0.08	-0.17	0.38	-0.12	1.3
Q	51	O	263993	SR	0.31	0.23	-0.06	-0.11	0.23	-0.08	0.6
Q	53	O	261601	SR	0.43	0.26	-0.13	-0.13	0.26	-0.04	1.9
Q	54	O	64814	SR	0.53	0.49	0.49	-0.25	-0.27	-0.10	1.3
Q	55	O	363239	SR	0.36	0.44	-0.12	-0.15	-0.21	0.44	1.6
Q	56	O	51244	SR	0.55	0.40	-0.11	-0.27	0.40	-0.16	1.3
Q	58	O	296472	SR	0.35	0.24	-0.02	-0.13	0.24	-0.08	1.5
Q	59	O	296471	SR	0.46	0.24	0.03	0.24	-0.20	-0.14	1.3
Q	60	O	51020	SR	0.48	0.24	0.00	-0.19	0.24	-0.10	1.3
Q	61	O	65192	SR	0.27	0.12	-0.04	0.02	-0.11	0.12	0.6
Q	62	O	64821	SR	0.59	0.36	0.36	-0.15	-0.16	-0.15	1.3
Q	64	O	387362	SR	0.34	0.42	-0.11	-0.23	-0.13	0.42	0.6
Q	65	O	296500	SR	0.40	0.31	0.31	-0.14	-0.16	-0.04	1.6
Q	67	O	271798	SR	0.38	0.29	-0.15	-0.08	0.29	-0.07	1.8
Q	68	O	79611	SR	0.48	0.54	-0.10	-0.32	-0.25	0.54	0.6
Q	69	O	79551	SR	0.38	0.40	-0.17	0.40	-0.27	-0.03	1.3
Q	71	O	282261	SR	0.28	0.52	-0.22	-0.11	-0.20	0.52	1.8
Q	72	O	279763	SR	0.48	0.36	-0.10	-0.22	0.36	-0.13	0.6
Q	74	O	296499	SR	0.44	0.27	0.27	-0.16	-0.18	0.04	1.6
Q	75	O	279842	SR	0.31	0.41	0.00	-0.18	-0.21	0.41	1.8
Q	77	O	256996	SR	0.39	0.29	0.29	-0.07	-0.11	-0.10	2.5
Q	78	O	132977	SR	0.51	0.30	-0.14	-0.04	0.30	-0.18	1.9
Q	80	O	51752	SR	0.31	0.36	-0.11	-0.09	-0.13	0.36	2.8
Q	81	O	261592	SR	0.40	0.34	-0.23	0.34	0.00	-0.12	2.7
<b>Mean (SR)</b>					0.42	0.32	-0.01	-0.04	-0.03	0.03	1.0
<b>SD (SR)</b>					0.11	0.11	0.22	0.20	0.22	0.21	0.8

Note: Anchor Status: L= item is common across all forms in this administration, O = item is in 1 or more but not all forms in this administration; P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

## Appendix B. MD HSA Classical Item Statistics: Field Test Items

Table B.1 Item Statistics, Field Test Items: MDHSA Biology—January 2016 Forms

Form	N	ItemID	Item Type	P Val	R ITT	P BIS1	P BIS2	P BIS3	P BIS4	%Omits
A	8850	465129	SR	0.35	0.49	-0.24	-0.15	0.49	-0.20	0.1
A	8850	460032	SR	0.58	0.43	0.43	-0.23	-0.22	-0.16	0.2
A	8850	460039	SR	0.35	0.53	-0.18	-0.23	-0.22	0.53	0.2
A	8850	465140	SR	0.49	0.38	0.38	-0.13	-0.28	-0.13	0.3
A	8850	460807	SR	0.60	0.48	-0.25	0.48	-0.21	-0.23	0.2
A	8850	460780	SR	0.34	0.52	-0.17	-0.23	-0.19	0.52	0.4
A	8850	465677	SR	0.57	0.44	0.44	-0.21	-0.23	-0.19	0.7
A	8850	465136	SR	0.54	0.34	-0.11	-0.23	0.34	-0.12	0.4
A	8850	460777	SR	0.33	0.54	-0.25	-0.27	0.54	-0.07	0.4
A	8850	460059	SR	0.55	0.52	-0.21	-0.26	-0.24	0.52	0.4
A	8850	369373	SR	0.49	0.54	-0.17	-0.27	-0.25	0.54	0.5
A	8850	369374	SR	0.52	0.50	0.50	-0.20	-0.24	-0.22	0.5
A	8850	369438	SR	0.36	0.32	-0.19	-0.18	0.32	-0.03	0.5
A	8850	463584	SR	0.50	0.34	-0.06	0.34	-0.22	-0.16	0.6
A	8850	463580	SR	0.44	0.54	-0.21	-0.22	-0.24	0.54	0.6
A	8850	463573	SR	0.37	0.36	-0.14	-0.20	-0.10	0.36	0.6
A	8850	463576	SR	0.50	0.41	-0.17	-0.22	0.41	-0.15	0.6
A	8850	395768	SR	0.59	0.48	0.48	-0.25	-0.24	-0.18	0.7
A	8850	463594	SR	0.64	0.45	-0.22	-0.26	0.45	-0.15	0.7
A	8850	460019	SR	0.47	0.43	-0.16	0.43	-0.20	-0.19	0.8
A	8850	460013	SR	0.36	0.35	-0.10	0.35	-0.20	-0.10	0.7
A	8850	460015	SR	0.57	0.50	0.50	-0.21	-0.25	-0.23	0.8
A	8850	463596	SR	0.36	0.34	-0.13	0.34	-0.15	-0.09	0.8
B	5713	461478	SR	0.50	0.44	-0.17	0.44	-0.18	-0.24	0.1
B	5713	460034	SR	0.60	0.40	-0.15	-0.25	0.40	-0.16	0.2
B	5713	460035	SR	0.36	0.24	0.24	-0.15	-0.10	-0.04	0.2
B	5713	460809	SR	0.43	0.29	-0.09	0.29	-0.15	-0.12	0.2
B	5713	460811	SR	0.54	0.42	-0.18	-0.25	0.42	-0.15	0.3
B	5713	461471	SR	0.38	0.27	0.27	-0.16	-0.01	-0.14	0.5
B	5713	460769	SR	0.59	0.45	-0.21	-0.24	0.45	-0.18	0.6
B	5713	459919	SR	0.30	0.45	-0.06	-0.20	-0.21	0.45	0.4
B	5713	460057	SR	0.60	0.39	-0.20	-0.20	0.39	-0.15	0.3
B	5713	465114	SR	0.15	0.48	-0.11	-0.05	-0.21	0.48	0.4
B	5713	369437	SR	0.34	0.45	-0.10	-0.20	-0.20	0.45	0.5
B	5713	369432	SR	0.39	0.13	-0.19	0.13	-0.10	<b>0.11</b>	0.4
B	5713	369375	SR	0.26	0.25	-0.05	-0.24	<b>0.02</b>	0.25	0.5
B	5713	463583	SR	0.38	0.26	-0.01	-0.16	0.26	-0.14	0.5
B	5713	463579	SR	0.47	0.32	0.32	-0.21	-0.21	<b>0.02</b>	0.5
B	5713	463574	SR	0.40	0.44	-0.13	-0.19	-0.19	0.44	0.6
B	5713	463575	SR	0.48	0.35	-0.17	0.35	-0.14	-0.15	0.6
B	5713	465130	SR	0.42	0.47	-0.16	-0.15	-0.26	0.47	0.6

Table B.1 Item Statistics, Field Test Items: MDHSA Biology—January 2016 Forms

Form	<i>N</i>	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
B	5713	461472	SR	0.41	0.55	0.55	-0.25	-0.24	-0.16	0.6
B	5713	460017	SR	0.44	0.35	-0.18	-0.19	0.35	-0.06	0.7
B	5713	460014	SR	0.30	0.47	-0.08	-0.21	-0.22	0.47	0.6
B	5713	460012	SR	0.33	0.39	0.39	-0.23	-0.18	-0.01	0.7
B	5713	465675	SR	0.32	0.19	-0.08	0.19	-0.11	<b>0.00</b>	0.7
<b>Mean</b>				0.44	0.41	-0.02	-0.09	-0.03	0.04	0.5
<b>SD</b>				0.11	0.10	0.25	0.23	0.27	0.28	0.2

Note: Values in bold are outside of the accepted range. Statistics for items on multiple forms are listed under the first form on which the item appeared. P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table B.2 Item Statistics, Field Test Items: MDHSA Government—January 2016 Forms

Form	N	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
A	6676	463525	CR	0.15	0.73					0.0
A	6676	463527	CR	<b>0.00</b>	<b>0.00</b>					0.0
B	4690	463529	CR	<b>0.09</b>	0.78					0.0
B	4690	461502	CR	0.22	0.73					0.0
<b>Mean (CR)</b>				0.11	0.56					0.0
<b>SD (CR)</b>				0.09	0.37					0.0
A	6676	348893	SR	0.35	0.42	-0.09	-0.20	-0.21	0.42	0.2
A	6676	370256	SR	0.53	0.46	-0.24	-0.18	0.46	-0.21	0.4
A	6676	463511	SR	0.61	0.50	-0.25	-0.30	0.50	-0.16	0.6
A	6676	395844	SR	0.29	0.48	-0.11	-0.17	-0.21	0.48	1.1
A	6676	368628	SR	0.65	0.34	-0.16	-0.15	0.34	-0.18	1.2
A	6676	459945	SR	0.46	0.43	0.43	-0.08	-0.30	-0.14	0.6
A	6676	392385	SR	0.39	0.38	0.38	-0.18	-0.19	-0.06	0.6
A	6676	385504	SR	0.60	0.49	0.49	-0.26	-0.28	-0.12	0.6
A	6676	459961	SR	0.76	0.38	-0.17	0.38	-0.25	-0.13	0.8
A	6676	460090	SR	0.64	0.52	-0.27	-0.27	-0.20	0.52	0.9
A	6676	459966	SR	0.33	0.26	-0.02	-0.02	-0.23	0.26	0.9
A	6676	395835	SR	0.73	0.31	-0.15	0.31	-0.19	-0.10	0.9
B	4690	370260	SR	0.72	0.41	0.41	-0.25	-0.22	-0.15	0.1
B	4690	461509	SR	0.23	0.26	-0.13	<b>0.01</b>	-0.12	0.26	0.4
B	4690	463497	SR	0.26	0.28	-0.13	-0.04	-0.12	0.28	0.6
B	4690	378387	SR	0.32	0.33	-0.04	-0.18	-0.12	0.33	1.1
B	4690	460647	SR	0.19	0.23	-0.07	-0.10	0.23	-0.02	1.4
B	4690	463518	SR	0.69	0.38	-0.21	-0.18	-0.19	0.38	0.4
B	4690	368643	SR	0.44	0.36	-0.11	0.36	-0.22	-0.12	0.4
B	4690	461504	SR	0.29	0.37	0.37	-0.15	-0.12	-0.10	0.5
B	4690	463509	SR	0.51	0.37	-0.22	0.37	-0.25	-0.08	0.7
B	4690	459960	SR	0.73	0.35	-0.21	0.35	-0.22	-0.08	0.9
B	4690	460085	SR	0.46	0.30	-0.18	-0.18	0.30	-0.02	0.7
B	4690	381691	SR	0.51	0.49	0.49	-0.27	-0.21	-0.16	0.8
<b>Mean (SR)</b>				0.43	0.41	-0.01	-0.06	-0.08	0.05	0.6
<b>SD (SR)</b>				0.18	0.08	0.27	0.23	0.24	0.24	0.3

Note: Values in bold are outside of the accepted range. Statistics for items on multiple forms are listed under the first form on which the item appeared. P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.



Table B.3 Item Statistics, Field Test Items: MDHSA Biology—May 2016 Forms

Form	N	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
D	18919	465128	SR	0.63	0.52	0.52	-0.35	-0.30	-0.09	0.1
D	18919	423664	SR	0.59	0.46	-0.22	-0.27	0.46	-0.20	0.1
D	18919	423663	SR	0.65	0.29	0.29	-0.20	-0.16	-0.09	0.1
D	18919	463570	SR	0.60	0.46	0.46	-0.26	-0.24	-0.18	0.2
D	18919	463568	SR	0.62	0.48	-0.19	-0.25	-0.26	0.48	0.2
D	13780	463593	SR	0.53	0.34	-0.22	-0.23	0.34	<b>0.01</b>	0.2
D	18919	463595	SR	0.58	0.36	-0.02	0.36	-0.29	-0.25	0.7
D	13443	363007	SR	0.63	0.46	-0.24	-0.15	-0.28	0.46	0.3
D	18919	392646	SR	0.48	0.45	0.45	-0.23	-0.35	-0.01	0.3
D	18919	392630	SR	0.55	0.53	-0.27	0.53	-0.29	-0.17	0.3
D	18919	392628	SR	0.52	0.33	-0.25	-0.02	-0.22	0.33	0.3
D	18919	465672	SR	0.58	0.40	0.40	-0.22	-0.23	-0.10	0.3
D	18919	447847	SR	0.54	0.41	-0.15	-0.29	0.41	-0.08	0.4
D	18919	447846	SR	0.53	0.37	-0.09	0.37	-0.26	-0.16	0.4
D	13780	455127	SR	0.47	0.26	-0.22	0.26	-0.22	<b>0.03</b>	0.4
D	18919	459916	SR	0.43	0.45	0.45	-0.23	-0.25	-0.04	0.4
D	18919	465108	SR	0.56	0.33	-0.17	0.33	-0.23	-0.07	0.5
D	18919	465106	SR	0.43	0.28	-0.04	-0.21	0.28	-0.07	0.4
D	18919	465105	SR	0.46	0.46	-0.09	-0.25	-0.27	0.46	0.4
D	18919	465121	SR	0.56	0.39	-0.20	-0.26	0.39	-0.14	0.4
D	18919	460052	SR	0.69	0.60	-0.27	-0.30	-0.33	0.60	0.4
D	18919	460748	SR	0.61	0.59	0.59	-0.28	-0.36	-0.18	0.5
D	13780	460755	SR	0.72	0.51	-0.30	0.51	-0.26	-0.22	0.4
E	6422	366582	SR	0.57	0.50	-0.30	-0.35	0.50	-0.05	0.0
E	6422	447103	SR	0.72	0.49	0.49	-0.27	-0.31	-0.17	0.1
E	6422	455943	SR	0.75	0.44	-0.25	0.44	-0.27	-0.17	0.1
E	6422	463571	SR	0.85	0.40	0.40	-0.19	-0.27	-0.17	0.2
E	6422	463572	SR	0.63	0.47	-0.16	0.47	-0.30	-0.23	0.2
E	6422	459918	SR	0.49	0.34	-0.14	-0.28	0.34	-0.03	0.3
E	6422	465132	SR	0.68	0.47	-0.27	0.47	-0.27	-0.15	0.5
E	6422	461477	SR	0.54	0.34	-0.07	-0.25	0.34	-0.17	0.3
E	6422	361417	SR	0.29	0.24	0.24	-0.08	-0.13	-0.02	0.2
E	6422	361425	SR	0.65	0.45	-0.24	0.45	-0.23	-0.19	0.2
E	6422	361421	SR	0.56	0.43	-0.26	-0.18	-0.20	0.43	0.2
E	6422	465120	SR	0.55	0.25	0.25	-0.19	-0.17	-0.02	0.1
E	6422	447845	SR	0.80	0.51	-0.25	-0.30	-0.24	0.51	0.3
E	6422	447848	SR	0.37	0.14	0.14	<b>0.10</b>	-0.17	-0.13	0.2
E	6422	461491	SR	0.86	0.39	-0.23	0.39	-0.24	-0.16	0.2
E	6422	460058	SR	0.73	0.51	-0.15	0.51	-0.37	-0.24	0.4
E	6422	465104	SR	0.56	0.49	0.49	-0.31	-0.20	-0.17	0.4
E	6422	465107	SR	0.61	0.38	-0.14	-0.27	0.38	-0.11	0.3
E	6422	465113	SR	0.60	0.45	-0.14	0.45	-0.29	-0.20	0.4

Table B.3 Item Statistics, Field Test Items: MDHSA Biology—May 2016 Forms

Form	N	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
E	6422	459922	SR	0.44	0.52	-0.30	-0.23	-0.15	0.52	0.4
E	6422	460778	SR	0.53	0.37	-0.24	-0.09	-0.27	0.37	0.4
E	6422	460750	SR	0.70	0.30	-0.07	-0.27	0.30	-0.13	0.4
E	11561	460797	SR	0.85	0.38	-0.18	-0.23	0.38	-0.18	0.5
F	6366	465127	SR	0.47	0.49	0.49	-0.29	-0.26	-0.08	0.1
F	6366	447105	SR	0.71	0.53	-0.24	-0.28	-0.30	0.53	0.1
F	6366	455944	SR	0.50	0.34	-0.11	-0.21	0.34	-0.19	0.1
F	6366	417610	SR	0.86	0.40	-0.14	0.40	-0.30	-0.20	0.1
F	6366	417611	SR	0.68	0.43	0.43	-0.23	-0.28	-0.19	0.1
F	11505	460049	SR	0.65	0.42	-0.19	-0.28	0.42	-0.16	0.3
F	6366	461479	SR	0.46	0.29	-0.06	-0.25	0.29	-0.09	0.5
F	11842	465126	SR	0.59	0.37	0.37	-0.25	-0.25	-0.05	0.1
F	6366	415081	SR	0.56	0.59	0.59	-0.40	-0.28	-0.11	0.2
F	6366	415083	SR	0.74	0.47	-0.26	0.47	-0.26	-0.21	0.2
F	6366	415085	SR	0.68	0.53	-0.28	-0.27	0.53	-0.26	0.2
F	6366	465119	SR	0.22	0.23	-0.16	<b>0.08</b>	-0.23	0.23	0.1
F	6366	459934	SR	0.49	0.52	-0.17	-0.23	-0.31	0.52	0.2
F	6366	459935	SR	0.46	0.49	-0.21	-0.30	-0.15	0.49	0.3
F	6366	461473	SR	0.74	0.42	0.42	-0.19	-0.23	-0.25	0.2
F	6366	460765	SR	0.66	0.41	-0.27	-0.19	0.41	-0.14	0.2
F	6366	460760	SR	0.75	0.58	-0.25	-0.32	-0.33	0.58	0.3
F	6366	460756	SR	0.39	0.35	-0.09	0.35	-0.24	-0.10	0.3
F	6366	460758	SR	0.58	0.53	-0.29	-0.23	0.53	-0.23	0.3
F	6366	423691	SR	0.39	0.34	-0.04	0.34	-0.32	-0.01	0.3
F	6366	460770	SR	0.51	0.54	0.54	-0.27	-0.30	-0.15	0.3
F	6366	414824	SR	0.75	0.41	-0.12	-0.33	0.41	-0.23	0.3
F	6366	414797	SR	0.63	0.43	-0.24	0.43	-0.18	-0.20	0.3
G	6265	460779	SR	0.42	0.42	-0.27	0.42	-0.06	-0.24	0.1
G	6265	422526	SR	0.86	0.33	-0.16	0.33	-0.26	-0.10	0.2
G	6265	422529	SR	0.62	0.47	-0.20	-0.34	0.47	-0.09	0.2
G	6265	421526	SR	0.77	0.53	0.53	-0.24	-0.36	-0.22	0.3
G	6265	421523	SR	0.83	0.44	-0.24	0.44	-0.26	-0.20	0.3
G	6265	461467	SR	0.62	0.44	-0.21	-0.14	0.44	-0.31	0.3
G	6265	465117	SR	0.64	0.47	0.47	-0.26	-0.18	-0.26	0.6
G	6265	465139	SR	0.51	0.41	-0.17	0.41	-0.24	-0.15	0.1
G	6265	423684	SR	0.55	0.52	0.52	-0.33	-0.22	-0.15	0.3
G	6265	423686	SR	0.67	0.56	-0.26	-0.31	-0.26	0.56	0.3
G	6265	423688	SR	0.72	0.50	-0.29	-0.28	0.50	-0.17	0.3
G	6265	459923	SR	0.25	0.40	-0.17	-0.20	-0.09	0.40	0.2
G	6265	364203	SR	0.55	0.31	-0.15	-0.10	0.31	-0.16	0.3
G	6265	364200	SR	0.59	0.27	-0.09	0.27	-0.18	-0.20	0.3
G	6265	463603	SR	0.54	0.48	-0.24	-0.17	-0.23	0.48	0.4

Table B.3 Item Statistics, Field Test Items: MDHSA Biology—May 2016 Forms

Form	N	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
G	6265	465116	SR	0.49	0.12	-0.10	0.12	-0.15	<b>0.03</b>	0.4
G	6265	461488	SR	0.40	0.22	<b>0.01</b>	-0.18	0.22	-0.09	0.4
G	6265	461489	SR	0.70	0.52	-0.24	-0.31	0.52	-0.24	0.4
G	6265	461487	SR	0.76	0.45	0.45	-0.23	-0.21	-0.27	0.4
G	6265	417623	SR	0.66	0.59	-0.22	-0.33	-0.33	0.59	0.3
G	6265	465111	SR	0.55	0.45	-0.20	-0.24	0.45	-0.16	0.4
G	6265	421498	SR	0.60	0.50	0.50	-0.31	-0.19	-0.24	0.4
G	6265	421545	SR	0.65	0.47	-0.16	0.47	-0.31	-0.20	0.5
H	6415	465133	SR	0.35	0.37	-0.01	-0.22	0.37	-0.28	0.1
H	6415	417704	SR	0.38	0.23	-0.18	-0.23	0.23	<b>0.10</b>	0.1
H	6415	417706	SR	0.44	0.21	-0.09	0.21	-0.03	-0.17	0.1
H	6415	421467	SR	0.50	0.36	-0.16	-0.26	-0.12	0.36	0.2
H	6415	421522	SR	0.63	0.51	-0.24	-0.28	0.51	-0.23	0.1
H	6415	455945	SR	0.59	0.43	0.43	-0.20	-0.26	-0.15	0.2
H	6415	460767	SR	0.77	0.37	-0.25	0.37	-0.19	-0.12	0.6
H	6415	465125	SR	0.67	0.47	-0.18	0.47	-0.31	-0.22	0.2
H	6415	414788	SR	0.74	0.41	-0.15	0.41	-0.29	-0.17	0.2
H	6415	414793	SR	0.73	0.45	0.45	-0.23	-0.29	-0.16	0.2
H	6415	414792	SR	0.70	0.53	-0.27	-0.27	-0.27	0.53	0.2
H	6415	460771	SR	0.56	0.47	-0.27	-0.20	0.47	-0.22	0.2
H	6415	455094	SR	0.34	0.25	-0.17	<b>0.04</b>	-0.27	0.25	0.3
H	6415	455092	SR	0.63	0.32	-0.11	0.32	-0.22	-0.13	0.3
H	6415	459915	SR	0.80	0.48	0.48	-0.33	-0.24	-0.16	0.4
H	6415	461466	SR	0.42	0.33	0.33	-0.27	-0.09	-0.07	0.3
H	6415	416392	SR	0.65	0.48	0.48	-0.10	-0.37	-0.21	0.3
H	6415	416393	SR	0.68	0.44	-0.19	0.44	-0.21	-0.24	0.3
H	6415	416391	SR	0.75	0.62	-0.29	-0.38	-0.28	0.62	0.4
H	6415	460775	SR	0.52	0.45	-0.22	0.45	-0.29	-0.10	0.4
H	6415	459925	SR	0.36	0.34	-0.20	-0.17	-0.06	0.34	0.3
H	6415	421546	SR	0.70	0.48	-0.16	-0.28	0.48	-0.26	0.4
H	6415	421547	SR	0.58	0.54	-0.29	-0.20	-0.29	0.54	0.4
J	6351	366599	SR	0.84	0.43	-0.26	-0.28	-0.15	0.43	0.0
J	6351	460040	SR	0.35	0.27	0.27	-0.08	-0.07	-0.20	0.2
J	6351	460042	SR	0.55	0.19	-0.13	-0.01	-0.12	0.19	0.2
J	6351	455938	SR	0.62	0.46	0.46	-0.24	-0.27	-0.16	0.2
J	6351	455940	SR	0.86	0.44	-0.23	-0.24	0.44	-0.25	0.2
J	6351	416430	SR	0.65	0.46	-0.30	0.46	-0.20	-0.16	0.2
J	6351	463585	SR	0.70	0.41	-0.22	0.41	-0.24	-0.16	0.5
J	6351	460766	SR	0.46	0.33	-0.16	0.33	-0.27	-0.01	0.1
J	6351	392635	SR	0.58	0.35	-0.07	0.35	-0.27	-0.14	0.1
J	6351	392637	SR	0.45	0.49	0.49	-0.26	-0.17	-0.22	0.2
J	6351	392633	SR	0.54	0.41	0.41	-0.28	-0.26	-0.12	0.2

Table B.3 Item Statistics, Field Test Items: MDHSA Biology—May 2016 Forms

Form	N	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
J	6351	465673	SR	0.55	0.30	0.30	-0.27	-0.08	-0.10	0.1
J	6351	455091	SR	0.27	0.10	<b>0.09</b>	-0.09	0.10	-0.14	0.2
J	6351	455090	SR	0.70	0.48	0.48	-0.26	-0.37	-0.10	0.2
J	6351	459921	SR	0.77	0.55	0.55	-0.31	-0.32	-0.23	0.2
J	6351	465115	SR	0.70	0.33	-0.18	0.33	-0.23	-0.11	0.3
J	6351	423622	SR	0.59	0.58	0.58	-0.27	-0.33	-0.22	0.3
J	6351	423623	SR	0.59	0.49	-0.22	-0.28	0.49	-0.21	0.4
J	6351	423625	SR	0.65	0.50	-0.23	-0.26	-0.28	0.50	0.3
J	6351	459926	SR	0.61	0.52	0.52	-0.28	-0.33	-0.12	0.3
J	6351	465676	SR	0.90	0.43	-0.21	-0.28	0.43	-0.19	0.3
J	6351	421510	SR	0.42	0.35	-0.18	-0.25	0.35	-0.04	0.4
J	6351	421507	SR	0.53	0.52	-0.23	-0.27	-0.21	0.52	0.4
K	6400	465137	SR	0.48	0.30	-0.08	-0.20	0.30	-0.13	0.0
K	6400	460041	SR	0.61	0.40	-0.25	-0.14	0.40	-0.18	0.1
K	6400	460044	SR	0.59	0.50	0.50	-0.26	-0.23	-0.28	0.1
K	6400	455939	SR	0.52	0.27	<b>0.04</b>	0.27	-0.31	-0.21	0.3
K	6400	455941	SR	0.60	0.19	-0.07	-0.21	-0.05	0.19	0.3
K	6400	449679	SR	0.60	0.39	-0.15	-0.29	0.39	-0.17	0.3
K	6400	460762	SR	0.58	0.42	-0.16	-0.25	0.42	-0.17	0.8
K	6400	463605	SR	0.39	0.49	-0.19	0.49	-0.35	-0.05	0.2
K	6400	415091	SR	0.65	0.36	-0.21	0.36	-0.17	-0.15	0.2
K	6400	415088	SR	0.64	0.46	-0.27	-0.19	0.46	-0.21	0.2
K	6400	415090	SR	0.81	0.44	0.44	-0.24	-0.26	-0.19	0.3
K	6400	460056	SR	0.68	0.54	0.54	-0.31	-0.23	-0.29	0.2
K	6400	417674	SR	0.58	0.42	-0.28	-0.27	0.42	-0.08	0.3
K	6400	417672	SR	0.78	0.42	0.42	-0.28	-0.26	-0.11	0.3
K	6400	465134	SR	0.68	0.54	-0.20	-0.35	-0.25	0.54	0.3
K	6400	460768	SR	0.72	0.49	-0.31	-0.22	-0.24	0.49	0.3
K	6400	461458	SR	0.61	0.36	-0.10	0.36	-0.22	-0.20	0.3
K	6400	461454	SR	0.28	0.18	0.18	-0.11	-0.01	-0.09	0.3
K	6400	461456	SR	0.52	0.30	-0.05	-0.24	0.30	-0.16	0.4
K	6400	463588	SR	0.42	0.63	-0.12	-0.36	-0.28	0.63	0.4
K	6400	465110	SR	0.82	0.47	0.47	-0.22	-0.29	-0.22	0.4
K	6400	421508	SR	0.49	0.55	0.55	-0.19	-0.35	-0.20	0.4
K	6400	421506	SR	0.47	0.42	-0.13	0.42	-0.26	-0.17	0.4
L	6329	465138	SR	0.76	0.37	-0.25	-0.21	0.37	-0.13	0.1
L	6329	463555	SR	0.72	0.47	-0.16	0.47	-0.36	-0.17	0.1
L	6329	463559	SR	0.46	0.14	-0.07	-0.01	0.14	-0.15	0.3
L	6329	394734	SR	0.42	0.46	0.46	-0.20	-0.25	-0.19	0.2
L	6329	394736	SR	0.44	0.35	-0.22	-0.01	-0.26	0.35	0.1
L	6329	465135	SR	0.60	0.59	-0.30	0.59	-0.30	-0.25	0.2
L	6329	460763	SR	0.83	0.49	0.49	-0.28	-0.27	-0.23	0.5

Table B.3 Item Statistics, Field Test Items: MDHSA Biology—May 2016 Forms

Form	<i>N</i>	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
L	6329	460055	SR	0.65	0.40	-0.16	-0.22	-0.20	0.40	0.1
L	6329	394769	SR	0.60	0.46	0.46	-0.22	-0.30	-0.14	0.1
L	6329	394770	SR	0.52	0.35	-0.11	0.35	-0.15	-0.22	0.2
L	6329	394771	SR	0.66	0.53	-0.31	-0.24	0.53	-0.25	0.1
L	6329	461469	SR	0.52	0.51	-0.17	-0.26	-0.30	0.51	0.2
L	6329	417615	SR	0.69	0.37	0.37	-0.12	-0.27	-0.20	0.2
L	6329	417673	SR	0.61	0.41	-0.23	0.41	-0.27	-0.16	0.2
L	6329	460773	SR	0.70	0.45	-0.24	0.45	-0.22	-0.23	0.3
L	6329	463590	SR	0.70	0.52	-0.24	-0.35	0.52	-0.20	0.3
L	6329	461457	SR	0.44	0.58	-0.24	-0.28	-0.23	0.58	0.3
L	6329	461459	SR	0.67	0.50	-0.24	-0.28	0.50	-0.22	0.3
L	6329	461455	SR	0.59	0.41	-0.29	0.41	-0.20	-0.07	0.3
L	6329	461475	SR	0.70	0.52	0.52	-0.30	-0.28	-0.21	0.3
L	6329	465109	SR	0.70	0.58	-0.23	-0.36	-0.28	0.58	0.3
L	6329	423635	SR	0.63	0.29	-0.05	-0.27	0.29	-0.10	0.3
L	6329	423634	SR	0.61	0.36	-0.16	-0.23	-0.24	0.36	0.3
Y	5139	463604	SR	0.43	0.46	-0.03	-0.26	-0.30	0.46	0.5
<b>Mean</b>				0.60	0.42	-0.02	-0.07	-0.08	-0.03	0.3
<b>SD</b>				0.13	0.10	0.29	0.29	0.29	0.27	0.1

Note: Values in bold are outside of the accepted range. Statistics for items on multiple forms are listed under the first form on which the item appeared. P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.

Table B.4 Item Statistics, Field Test Items: MDHSA Government—May 2016 Forms

Form	N	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
D	8133	461512	CR	<b>0.00</b>	<b>0.00</b>					<b>100.0</b>
D	8133	461526	CR	0.30	0.78					4.9
E	11313	460640	CR	0.30	0.67					4.6
E	11313	79696	CR	0.30	0.78					<b>5.5</b>
F	11034	463493	CR	0.38	0.75					4.8
F	11034	459952	CR	0.34	0.75					<b>5.8</b>
G	6209	460783	CR	0.17	0.79					<b>11.6</b>
G	6209	461501	CR	0.34	0.74					3.3
H	5994	52226	CR	0.24	0.71					4.8
H	5994	79697	CR	0.31	0.76					<b>6.0</b>
J	5925	461527	CR	0.30	0.72					4.9
J	5925	461523	CR	<b>0.00</b>	<b>0.00</b>					<b>100.0</b>
K	6033	79680	CR	0.26	0.77					3.9
K	6033	460077	CR	0.30	0.64					4.0
L	6110	52244	CR	0.28	0.74					3.7
L	6110	460078	CR	0.25	0.73					<b>8.7</b>
<b>Mean (CR)</b>				0.25	0.65					17.3
<b>SD (CR)</b>				0.11	0.26					32.4
D	8133	370196	SR	0.76	0.44	0.44	-0.21	-0.27	-0.22	0.1
D	8133	463530	SR	0.53	0.33	-0.04	0.33	-0.22	-0.25	0.2
D	8133	463520	SR	0.75	0.55	-0.26	-0.27	-0.32	0.55	0.3
D	8133	463508	SR	0.39	0.31	-0.25	-0.06	-0.13	0.31	0.7
D	8133	463495	SR	0.40	0.43	-0.13	-0.23	-0.17	0.43	0.8
D	8133	460066	SR	0.34	0.31	-0.13	-0.16	-0.06	0.31	0.3
D	8133	460067	SR	0.21	0.28	-0.23	<b>0.01</b>	0.28	-0.07	0.3
D	8133	459973	SR	0.62	0.27	-0.27	-0.24	0.27	<b>0.03</b>	0.4
D	8133	393976	SR	0.73	0.51	-0.27	0.51	-0.27	-0.24	0.4
D	8133	394633	SR	0.40	0.18	-0.16	-0.12	0.18	<b>0.06</b>	0.6
D	8133	370232	SR	0.80	0.34	0.34	-0.22	-0.19	-0.17	0.3
D	8133	370238	SR	0.79	0.53	0.53	-0.28	-0.29	-0.25	0.4
E	11313	370221	SR	0.83	0.37	-0.25	-0.23	0.37	-0.12	0.1
E	11313	368677	SR	0.56	0.34	-0.10	-0.21	0.34	-0.17	0.1
E	11313	463502	SR	0.82	0.41	-0.16	0.41	-0.28	-0.20	0.2
E	11313	460642	SR	0.37	0.38	-0.28	-0.01	-0.22	0.38	0.5
E	11313	368565	SR	0.49	0.33	-0.14	0.33	-0.13	-0.21	0.6
E	11313	349151	SR	0.67	0.25	0.25	-0.07	-0.21	-0.18	0.1
E	11313	460072	SR	0.70	0.52	-0.26	-0.28	-0.25	0.52	0.2
E	11313	370242	SR	0.50	0.38	0.38	-0.16	-0.27	-0.05	0.3
E	11313	463510	SR	0.68	0.45	-0.22	-0.27	0.45	-0.20	0.3
E	11313	394656	SR	0.69	0.49	0.49	-0.18	-0.30	-0.23	0.4
E	11313	381693	SR	0.38	0.28	0.28	-0.12	-0.17	-0.03	0.3
E	11313	395820	SR	0.44	0.27	-0.15	-0.08	0.27	-0.15	0.4

Table B.4 Item Statistics, Field Test Items: MDHSA Government—May 2016 Forms

Form	N	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
F	11034	459964	SR	0.80	0.34	-0.28	-0.18	0.34	-0.06	0.1
F	11034	463489	SR	0.49	0.37	-0.18	0.37	-0.12	-0.22	0.2
F	11034	460073	SR	0.58	0.33	0.33	-0.25	-0.24	-0.08	0.2
F	11034	463501	SR	0.60	0.48	-0.20	-0.21	-0.28	0.48	0.5
F	11034	381692	SR	0.59	0.37	-0.21	-0.14	0.37	-0.17	0.7
F	11034	392388	SR	0.34	0.32	0.32	-0.07	-0.25	-0.04	0.2
F	11034	374514	SR	0.85	0.53	-0.27	-0.35	0.53	-0.22	0.2
F	11034	460064	SR	0.52	0.28	-0.23	-0.13	0.28	-0.05	0.3
F	11034	393924	SR	0.67	0.28	0.28	-0.19	-0.13	-0.08	0.3
F	11034	461506	SR	0.77	0.51	0.51	-0.35	-0.21	-0.21	0.4
F	11034	370285	SR	0.44	0.42	-0.21	-0.03	-0.32	0.42	0.3
F	11034	394700	SR	0.49	0.29	-0.09	0.29	-0.26	-0.11	0.5
G	6209	394678	SR	0.57	0.30	-0.23	0.30	-0.30	<b>0.02</b>	0.1
G	6209	459948	SR	0.22	<b>-0.05</b>	<b>0.10</b>	<b>0.00</b>	-0.07	-0.05	0.1
G	6209	459941	SR	0.37	0.30	<b>0.03</b>	-0.28	-0.31	0.30	0.3
G	6209	321122	SR	0.39	0.28	-0.07	-0.14	-0.13	0.28	0.5
G	6209	460065	SR	0.62	0.34	-0.12	0.34	-0.21	-0.18	0.6
G	6209	460637	SR	0.53	0.49	-0.18	-0.28	-0.22	0.49	0.2
G	6209	394719	SR	0.72	0.51	-0.29	-0.22	0.51	-0.28	0.2
G	6209	398081	SR	0.74	0.52	-0.30	-0.27	0.52	-0.22	0.2
G	6209	395875	SR	0.61	0.38	0.38	-0.22	-0.30	-0.04	0.3
G	6209	393923	SR	0.60	0.46	-0.22	-0.26	0.46	-0.19	0.4
G	6209	370235	SR	0.64	0.39	0.39	-0.26	-0.17	-0.14	0.3
G	6209	374544	SR	0.66	0.50	-0.31	0.50	-0.27	-0.15	0.5
H	5994	459965	SR	0.64	0.41	-0.21	-0.26	0.41	-0.18	0.0
H	5994	398125	SR	0.53	0.30	-0.13	-0.24	0.30	-0.06	0.1
H	5994	395873	SR	0.54	0.26	-0.03	-0.33	0.26	-0.02	0.4
H	5994	463500	SR	0.68	0.61	-0.21	-0.35	-0.34	0.61	0.6
H	5994	374689	SR	0.78	0.49	-0.29	0.49	-0.27	-0.19	0.8
H	5994	348547	SR	0.77	0.49	-0.19	-0.34	-0.22	0.49	0.3
H	5994	461511	SR	0.59	0.50	-0.24	-0.27	-0.22	0.50	0.3
H	5994	370248	SR	0.61	0.55	0.55	-0.27	-0.28	-0.26	0.4
H	5994	463482	SR	0.57	0.36	-0.19	-0.17	-0.13	0.36	0.4
H	5994	374610	SR	0.73	0.50	0.50	-0.26	-0.28	-0.21	0.4
H	5994	459947	SR	0.50	0.18	0.18	<b>0.17</b>	-0.36	-0.13	0.5
H	5994	394696	SR	0.71	0.53	-0.24	0.53	-0.23	-0.32	0.4
J	5925	363236	SR	0.63	0.27	-0.16	-0.10	0.27	-0.16	0.1
J	5925	370267	SR	0.33	0.29	-0.10	-0.29	0.29	-0.07	0.1
J	5925	385501	SR	0.67	0.42	-0.18	-0.16	-0.28	0.42	0.2
J	5925	463491	SR	0.67	0.39	-0.21	0.39	-0.23	-0.12	0.6
J	5925	460636	SR	0.54	0.29	-0.11	0.29	-0.11	-0.16	0.8
J	5925	370209	SR	0.53	0.37	-0.27	-0.15	0.37	-0.10	0.2

Table B.4 Item Statistics, Field Test Items: MDHSA Government—May 2016 Forms

Form	N	ItemID	Item Type	P_Val	R_ITT	P_BIS1	P_BIS2	P_BIS3	P_BIS4	%Omits
J	5925	460652	SR	0.65	0.42	0.42	-0.23	-0.16	-0.25	0.2
J	5925	393995	SR	0.63	0.45	0.45	-0.24	-0.29	-0.10	0.3
J	5925	460645	SR	0.45	0.41	-0.29	-0.11	0.41	-0.15	0.3
J	5925	374513	SR	0.62	0.43	0.43	-0.26	-0.19	-0.17	0.4
J	5925	463481	SR	0.52	0.31	0.31	-0.17	-0.23	-0.04	0.4
J	5925	374553	SR	0.32	0.23	-0.15	-0.28	<b>0.13</b>	0.23	0.4
K	6033	363221	SR	0.69	0.17	-0.20	-0.08	0.17	<b>0.05</b>	0.0
K	6033	463523	SR	0.50	0.22	-0.03	0.22	-0.23	-0.04	0.2
K	6033	463503	SR	0.70	0.34	0.34	-0.28	-0.21	-0.05	0.3
K	6033	460089	SR	0.54	0.27	-0.21	-0.02	-0.22	0.27	0.6
K	6033	460646	SR	0.68	0.51	-0.30	-0.33	0.51	-0.11	0.8
K	6033	463504	SR	0.37	0.12	-0.07	0.12	-0.19	<b>0.10</b>	0.3
K	6033	363238	SR	0.46	0.41	-0.21	-0.19	0.41	-0.12	0.2
K	6033	394682	SR	0.42	0.40	0.40	-0.33	-0.24	<b>0.06</b>	0.3
K	6033	393955	SR	0.72	0.38	-0.21	-0.22	0.38	-0.20	0.3
K	6033	460644	SR	0.68	0.47	-0.22	-0.21	0.47	-0.28	0.4
K	6033	461515	SR	0.83	0.57	-0.25	-0.31	-0.33	0.57	0.3
K	6033	363184	SR	0.44	0.41	-0.24	-0.30	-0.04	0.41	0.3
L	6110	368624	SR	0.85	0.38	-0.21	-0.22	-0.20	0.38	0.1
L	6110	394720	SR	0.75	0.46	0.46	-0.23	-0.32	-0.18	0.1
L	6110	460070	SR	0.44	0.31	-0.06	0.31	-0.20	-0.18	0.3
L	6110	459943	SR	0.46	0.15	-0.12	-0.14	<b>0.02</b>	0.15	0.5
L	6110	374545	SR	0.78	0.45	-0.21	0.45	-0.26	-0.24	0.7
L	6110	364274	SR	0.52	0.44	-0.12	-0.30	0.44	-0.17	0.3
L	6110	461500	SR	0.66	0.53	-0.22	-0.29	-0.33	0.53	0.2
L	6110	463512	SR	0.40	0.34	0.34	-0.33	-0.14	-0.03	0.3
L	6110	132963	SR	0.51	0.18	-0.01	-0.06	0.18	-0.15	0.3
L	6110	461516	SR	0.46	0.20	-0.14	-0.11	0.20	<b>0.02</b>	0.4
L	6110	459946	SR	0.55	0.42	0.42	-0.33	-0.28	-0.02	0.4
L	6110	363249	SR	0.53	0.38	-0.18	0.38	-0.25	-0.15	0.4
<b>Mean (SR)</b>				0.58	0.37	-0.03	-0.10	-0.05	0.00	0.3
<b>SD (SR)</b>				0.15	0.12	0.27	0.24	0.28	0.25	0.2

Note: Values in bold are outside of the accepted range. Statistics for items on multiple forms are listed under the first form on which the item appeared. P\_Val = *p*-value, R\_ITT = item-total correlation, P\_BIS1—P\_BIS4 = option-total correlation, %Omits = percentage of omitted responses.