



Inpatient Quality Indicators (IQI) Log of Revisions to IQI Documentation and Software

Prepared for:

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Version 4.3a is a maintenance release of Version 4.3. The differences between the two versions are:

- Version 4.3a includes Version 29 of the Limited License edition of the 3M™ APR-DRG Grouper. This grouper corrects an issue found in Version 28 of the Limited License edition of the 3M™ APR-DRG Grouper. The grouper is only used with the Inpatient Quality Indicator (IQI) mortality measures. Version 4.3 includes Version 28 of the Limited License edition of the 3M™ APR-DRG Grouper, which was incorrectly assigning a Risk of Mortality (ROM) subclass for cases dated on or after 10/1/10.
- Version 4.3a allows users to calculate area-level indicators for years 2010 and 2011, correcting an issue previously identified in Version 4.3.

All other aspects of the software, including measure specifications, remain the same. Thus this document (related to Version 4.3) remains unchanged.

**AHRQ QI, Inpatient Quality Indicators (IQI),
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The following table summarizes the revisions made to the Inpatient Quality Indicators (IQI) software, software documentation and the technical specification documents since the original release of the software and documents in June 2002. The table lists the version and revision number, the date the revision was made, the component(s) affected by the change and a short summary of the changes that were made. For convenience and ease of use, the changes are listed in reverse chronological order with the most recent changes appearing first in the table. This log of revisions is current as of the date noted above.

Version/ Revision Number	Date	Component	Changes
V4.3	June 30, 2011	Software (SAS and WinQI) and Documentation	IQI #1 and 8: Dropped numerator inclusion for esophageal cancer (151.0), added numerator inclusion for gastrointestinal-related cancer (151.0), modified logic to exclude cases with neither a diagnosis code specific to esophageal cancer nor esophageal resection.
V4.3	June 30, 2011	Software (SAS and WinQI) and Documentation	IQI #15: Add denominator inclusion for Ami diagnosis (410.00-410.90) to harmonize with CMS 30-day mortality indicator in Hospital Compare
V4.3	June 30, 2011	Software (SAS and WinQI) and Documentation	Surgical DRG: Added numerator inclusion codes 014 and 015 which were previously assigned to 009.
V4.3	June 30, 2011	Guide	Revised and updated all sections of the guide document to reflect current state of indicators, software and body of evidence.
V4.2	September 30, 2010	Software (SAS and WinQI) and Documentation	Updated ICD-9-CM and DRG codes for FY2010 (see FY2010 Coding updates document).
V4.1	December 2, 2009	Software (SAS and Windows), and Documentation	IQI #21-25 and 33-34: Risk adjustment has been removed because for process measures the standard practice is not to risk adjust the measure, but to exclude from the denominator patients that are not indicated for the measure (that is, where the process measure is not considered appropriate.)
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	IQI #1 and IQI #8 – Esophageal resection volume and mortality – added Other total gastrectomy (43.99) procedure code to denominator inclusion criteria for esophageal resection only if accompanied by selected principal diagnosis codes
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	IQI #13 – Craniotomy mortality – added denominator inclusion criteria for MS-DRGs for discharges after 2007Q4 (effective October 1, 2007)
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	IQI #14 – Hip replacement mortality – added denominator exclusion for diagnosis of hip fracture

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V4.0	June 30,2009	Software (SAS and Windows), and Documentation	IQI #19 – Hip fracture mortality – added denominator exclusion for diagnosis of periprosthetic fracture (996.44)
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	IQI #21 – Cesarean Section Delivery – added denominator inclusion criteria for MS-DRGs for discharges after 2007Q4 (effective October 1, 2007)
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	IQI #22 – VBAC – 1) added denominator inclusion criteria for MS-DRGs for discharges after 2007Q4 (effective October 1, 2007); 2) added numerator inclusion criteria for MS-DRGs for discharges after 2007Q4 (effective October 1, 2007)
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	IQI #24 – Incidental appendectomy – 1) replaced the DRG denominator inclusion for Intra-Abdominal Procedure with a procedure code denominator inclusion for abdominal and pelvic surgery; 2) added denominator exclusion for surgical removal of the colon (colectomy) or pelvic evisceration; 3) added denominator exclusion for diagnosis of cancer involving or adjacent to the appendix
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	IQI #25 – Bilateral catheterization – added diagnosis codes to denominator exclusion for indications for right heart catheterization
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	Implement UB-04 – The UB-04 (effective October 1, 2007) changes were implemented including new data elements for point-of-origin and present on admission
V4.0	June 30,2009	Software (SAS and Windows), and Documentation	Update Benchmarking Data to 2007 – used data from the 2007 SID for computation of benchmarks
V3.2	March 10, 2008	SAS Software and Documentation	1. IQI #19 (Hip Fracture Mortality Rate) – Revised the inclusion criteria from discharges 18 and older to discharges age 65 and older
V3.1a	March 16, 2007	SAS Software and Documentation	Added program to calculate the IQI composite measures. The new files are IQI_COMPOSITE.SAS and MSXIQ31.TXT.
V3.1a	March 16, 2007	SAS Software (IQSASA2)	Amended the aggregation algorithm to correctly sum the numerator and denominator counts across stratifiers.

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V3.1	March 12, 2007	Software (SAS and Windows), Software Documentation, Guide, and Technical Specifications	<ol style="list-style-type: none"> 1. Implemented changes associated with ICD-9-CM coding updates for Fiscal Year (FY) 2007 (effective 10-1-2006). See separate documentation on ICD-9 coding updates for specific details.¹ 2. The years for which the ICD-9-CM and DRG codes defining IQIs are valid was amended to be through FY 2007 instead of FY 2006, that is, the codes in the software are effective through September 30, 2007. 3. Pneumonia mortality (IQI #20) added code 487.0 and dropped codes 507.0, 510.0, 510.9, 511.0 and 513.0 from the inclusion criteria for denominator in order to align indicator with CMS 30-day mortality indicator. <p>Impact: The rate increases by about 25%</p>
V3.1	March 12, 2007	Guide	Moved average volume, provider rates, and population rates into separate document, <i>Inpatient Quality Indicators Comparative Data</i> .
V3.1	March 12, 2007	Software (SAS and Windows)	<ol style="list-style-type: none"> 1. Age-, race-, gender- and county-specific population estimates used for AHRQ QI area rates were updated to use revised post-censal estimates for years 2001 through 2005 and projections for the years 2006 and 2007. 2. The syntax will compute risk-adjusted rates and observed-to-expected ratios for the pre-defined set of stratification variables (e.g., age, gender, payer, race). When stratifications other than hospital or area are selected, the RPIQxx variables and their confidence intervals are observed/expected ratios to avoid confounding with risk adjustment variables
V 3.1	March 12, 2007	Software (SAS and Windows) and Documentation	<ol style="list-style-type: none"> 1. Added capability to apply weight value to each discharge. 2. Added data element DISCWT to hold weight to assign to discharge. 3. Added an option to incorporate the Present on Admission (POA) indicator into risk adjustment and 4. Added Data Elements DXATADMIT1 – DXATADMIT30 to indicate whether the corresponding diagnosis (i.e., DX1 – DX30) was Present on Admission.
V 3.1	March 12, 2007	SAS Software and Documentation	Added alternative POA parameter files of risk-adjustment covariates and population rates using 2002-2004 SID data from California and New York.

¹ Fiscal Year 2007 Coding Changes, (Effectiver October 1, 2006), available at http://www.qualityindicators.ahrq.gov/iqi_download.htm.

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V3.1	March 12, 2007	Software (SAS and Windows), and Covariates document	<ol style="list-style-type: none"> 1. Based on recommendations of the Risk Adjustment and Hierarchical Modeling (RAHM) Workgroup, computed covariates using logistic regression model with a hospital random effect instead of the existing simple logistic model. Because the AHRQ QI use a large sample, the impact on the covariates of using the hierarchical model (and hence the impact on the risk-adjusted rates) is minor. 2. Updated the coefficients used in the calculation of expected and risk-adjusted rates to the reference population, based on the 2002-2004 State Inpatient Data (SID). 3. Updated Covariates document to include the POA coefficients.
V3.0	February 20, 2006	Guide	<ol style="list-style-type: none"> 1. Moved Appendix A into new document <i>Inpatient Quality Indicators Technical Specifications</i>. 2. Removed Appendix B. 3. Added new section "Using Different Types of QI Rates." 4. Added explanation of changes to area definitions and new stratification options. 5. Changed "MSA" to "Metro Area" throughout the document.
V3.0	February 20, 2006	Guide, Software Documentation, and Technical Specification	<ol style="list-style-type: none"> 1. Removed Appendices that were copies of Change Log and Indicator Changes documents. 2. Added Appendix of Links to all IQI documents and additional resources.

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V3.0	February 20, 2006	Software (SAS and SPSS), Software Documentation, Guide, and Technical Specifications	<ol style="list-style-type: none"> 1. Implemented changes associated with ICD-9-CM coding updates for Fiscal Year (FY) 2006 (effective 10-1-2005). See separate documentation on ICD-9 coding updates for specific details. 2. The years for which the ICD-9-CM and DRG codes defining IQIs are valid was amended to be through FY 2006 instead of FY 2005, that is, the codes in the software are effective through September 30, 2006. 3. Dropped pediatric heart surgery indicators IQI #3 (volume) and IQI #10 (mortality), which are being moved into the new Pediatric Quality Indicators module. 3. Revised multiple indicators to exclude pediatric populations (age less than 18). Specifically, IQIs #1-2, 4-9, 11, 14, 23, 25-27, and 31. 4. Added procedure codes 42.4, 42.5, 42.5x, 42.6, 42.6x to inclusion criteria for IQI #1 (Esophageal Resection Volume) and IQI #8 (Esophageal Resection Mortality). 5. Dropped esophageal cancer diagnosis codes from the inclusion criteria for IQI #1 (Esophageal Resection Volume). 6. Dropped pancreatic cancer diagnosis codes from the inclusion criteria IQI #2 (Pancreatic Resection Volume). 7. Added procedure code 39.71 (Endovascular implantation of graft in abdominal aorta) to inclusion criteria for IQI #4 (AAA Repair Volume) and IQI #11 (AAA Repair Mortality). 8. Dropped procedure code 36.06 from inclusion criteria for IQI #6 (PTCA Volume), IQI #27 (PTCA Utilization) and IQI #30 (PTCA Mortality). 9. Changed references from 3M APR-DRG Version 15.0 to Version 20.0.
V3.0	February 20, 2006	Software Documentation (SAS and SPSS)	<ol style="list-style-type: none"> 1. Amended Table 2 to add variables for expected, lower and upper CI levels, and standard error of smoothed rate. 2. Amended Table 3 to include the new 1995-2006 census data (POP95TO06.TXT). 3. Removed section "Interpreting the Results". 4. Replaced example printouts with tables explaining contents of columns in printouts.

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V3.0	February 20, 2006	Software (SAS and SPSS)	<ol style="list-style-type: none"> 1. Added the 1995-2006 Census data (e.g., POP95TO06.TXT). 2. Updated the covariates to 3M APR-DRG Version 20.0 (i.e., COVIQP30.TXT). 3. Changed the computation of the risk-adjusted rate to use a proportional formula for indirect standardization. 4. Added a computation of exact confidence limits. 5. Changed name of data element HOSPSTCO to PSTCO. 6. Added parameter POPYEAR to specify year for Census data.
V3.0	February 20, 2006	Software (SAS and SPSS), Software Documentation and Covariates document	Updated the coefficients used in the calculation of expected and risk-adjusted rates to the 2003 reference population.
V2.1 R4a	May 18, 2005	Software (SAS and SPSS) and Covariate Table	Updated the 2002 reference population coefficients used in the calculation of expected and risk-adjusted rates.
V2.1 R4a	May 18, 2005	Software (SPSS)	Corrected Pediatric Heart Surgery (IQI #3 and #10) exclusion for single procedure of vessel repair or occlusion (impacts less than 0.5% of cases)
V2.1 R4	December 22, 2004	Software (SAS and SPSS) and Guide	Modified documentation to reflect changes in indicators associated with ICD-9-CM coding updates for FY 2005 (effective 10-1-2004). See separate documentation on ICD-9 coding updates for specific details.
V2.1 R4	December 22, 2004	Guide	<ol style="list-style-type: none"> 1. Corrected the low volume threshold (10) for AAA mortality (IQI #4) in Table 2. 2. Updated the provider, area and population rates in Table 2 and the detailed evidence section using data from the 2002 HCUP SID files. 3. In the detailed evidence section, added a cross reference from each indicator description to the indicator's detailed definition in Appendix A. 4. Included Appendix A titles of detailed definitions in the Table of Contents.

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V2.1 R4	December 22, 2004	Software (SAS and SPSS)	<ol style="list-style-type: none"> 1. Added an explicit age inclusion (age >=18) to Craniotomy mortality (IQI #13). The age inclusion had been implicit in the DRGs 1,2, but not new DRGs 528, 529, 530 (FY 2004) and 543 (FY 2005). 2. Added optional data elements YEAR (year of patient discharge) and DQTR (calendar quarter of patient discharge). If available, these data elements are used to implement a coding change to Stroke mortality (IQI #17) that drops ICD-9-CM code 436 from the denominator for discharges occurring on or after 10/1/2004. However, ICD-9 code 436 will be retained in the denominator if the data elements year and quarter of discharge are not available or if the user selects the option to retain code 436 for purposes of trending over time. 3. Added the calculation and reporting of the expected rate at the stratification level selected by the user. The SAS (IQSASP3.SAS) and SPSS (IQSPSP3.SPS) software now calculates the risk-adjusted rate, the expected rate and the smoothed rate. The rates are saved in the output file. The user also has the option to print the rates or save the rates in a comma-delimited ASCII file. (Note: the parameter file MNSIQP00.TXT is no longer required).
V2.1 R4	December 22, 2004	Software Documentation (SAS and SPSS)	<ol style="list-style-type: none"> 1. Added new user control parameter YEARQTR to CONTROL_IQI.SAS and IQSPS1.SPS. This parameter is set to 1 if the data elements YEAR and DQTR are available on the input data file. Otherwise the parameter is set to 0. 2. Added optional data elements YEAR (year of patient discharge) and DQTR (calendar quarter of patient discharge) to Table 4. 3. Revised text to reflect that calculation of expected rates is now incorporated. 4. Updated flowchart (Figure 1) to eliminate the parameter file MNSIQP00.TXT and include "expected" in the description of the rates calculated.

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V2.1 R3	July 21, 2004	Guide	<ol style="list-style-type: none"> 1. Modified documentation to reflect changes in indicators associated with ICD-9-CM coding updates for FY 2004 (effective 10-1-2003). See separate documentation on ICD-9 coding updates for specific details.² 2. Implemented changes to IQI #3, Pediatric Heart Surgery Volume Indicator, both in its inclusion criteria and its exclusion criteria. Inclusion is now defined to be discharges with ICD-9-CM procedure codes for congenital heart disease (1P) in any field or non-specific heart surgery (2P) in any field with ICD-9-CM diagnosis of congenital heart disease (2D) in any field. Exclusions now include MDC 14 (pregnancy, childbirth and puerperium); patients with transcatheter interventions (either 3AP, 3BP, 3CP, 3DP, 3EP with 3D, or 3FP) as single cardiac procedures, performed without bypass (5P) but with catheterization (6P); patients with septal defects (4P) as single cardiac procedures without bypass (5P); heart transplant (7P); premature infants (4D) with PDA closure (3D and 3EP) as only cardiac procedure; age less than 30 days with PDA closure as only cardiac procedure; missing discharge disposition (DISP=missing); and transferring to another short-term hospital (DISP=2). These changes were the result of research by the original developers of this indicator³, and are designed to increase the sensitivity and specificity of the indicator. <p>Note: Due to the large number of changes to the pediatric heart surgery indicators, comparing results with past versions is cautioned.</p>

² *IQI ICD-9-CM Coding Chages, September 2003 - July 2004*, available at http://www.qualityindicators.ahrq.gov/iqi_archive.htm.

³ Kathy Jenkins et al., Boston Children's Hospital and Harvard University. See Center-specific differences in mortality: preliminary analyses using the Risk Adjustment in Congenital Heart Surgery (RACHS-1) method. *J Thorac Cardiovasc Surg.* 2002 Jul;124(1):97-104.

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			<p>3. Implemented changes to IQI #10, Pediatric Heart Surgery Mortality Indicator, both in its inclusion criteria and its exclusion criteria. Inclusion is now defined to be discharges with ICD-9-CM procedure codes for congenital heart disease (1P) in any field or non-specific heart surgery (2P) in any field with ICD-9-CM diagnosis of congenital heart disease (2D) in any field. Exclusions now include MDC 14 (pregnancy, childbirth and puerperium); patients with transcatheter interventions (either 3AP, 3BP, 3CP, 3DP, 3EP with 3D, or 3FP) as single cardiac procedures, performed without bypass (5P) but with catheterization (6P); patients with septal defects (4P) as single cardiac procedures without bypass (5P); heart transplant (7P); premature infants (4D) with PDA closure (3D and 3EP) as only cardiac procedure; age less than 30 days with PDA closure as only cardiac procedure; missing discharge disposition (DISP=missing); and transferring to another short-term hospital (DISP=2). These changes were the result of research by the original developers of this indicator (see footnote 3), and are designed to increase the sensitivity and specificity of the indicator.</p> <p>4. Eliminated MDC 14 (pregnancy, childbirth, and puerperium) and MDC 15 (newborns and other neonates) from exclusion criteria for IQI #15, Acute Myocardial Infarction (AMI) Mortality Indicator. This change was made since these patients are at low risk for AMI and removing these patients brings the indicator into alignment with other national efforts. The estimated impact is low.</p> <p>5. Established a new indicator (IQI #32), AMI Mortality Indicator – Without Transfer Cases. Unlike the existing indicator for AMI mortality (IQI #15), it excludes patients transferring from another short-term hospital and patients with missing admission source. This indicator is closely related to the JCAHO indicator for AMI mortality⁴ however it is NOT risk adjusted in the same manner as the JCAHO indicator and does not exclude hospice patients (due to inability to identify hospice patients in hospital discharge data).</p> <p>6. Implemented a change to IQI #21, Cesarean Section Delivery Rate to exclude patients with abnormal presentation, preterm delivery, fetal death, or multiple gestation. These changes create an indicator that closely mirrors indicators used by Healthy People 2010⁵.</p>

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			<p>7. Created a new indicator (IQI #33), Primary Cesarean Delivery Rate which closely mirrors the JCAHO measure for Cesarean Delivery⁶. This indicator excludes patients with abnormal presentation, preterm delivery, fetal death, multiple gestation, and patients with a prior Cesarean Section.</p> <p>8. Implemented a change to IQI #22, Vaginal Birth After Cesarean Section (VBAC), Uncomplicated to exclude patients with diagnoses describing abnormal presentation, preterm delivery, fetal death or multiple gestation.</p> <p>9. Created new indicator (IQI #34), Vaginal Birth After Cesarean Section (VBAC) All, which does not exclude patients with diagnoses of abnormal presentation, preterm delivery, fetal death, or multiple gestation.</p> <p>10. Implemented a change to IQI #13, Craniotomy Mortality Rate. Restructuring of the DRGs for craniotomy occurred in FY 2003. As a result, the including definition of craniotomy was revised to include both DRG 001 and DRG 002 (Craniotomy with and without comorbidities and complications, >17 years), DRG 528 (Intracranial vascular procedure with principal diagnosis of hemorrhage), and DRG 529 and 530 (Ventricular shunt procedures with and without comorbidities and complications). To maintain comparability with previous years of data, patients with a principle diagnosis of head trauma are now excluded from this indicator. Empirical analyses demonstrate minimal impact of these changes for this indicator.</p>

⁴ <http://www.jcaho.org/pms/core+measures/information+on+final+specifications.htm>. See AMI-9 and Appendix A

⁵ <http://www.healthypeople.gov/Document/html/tracking/od16.htm#obstetcare>. See 16-9

⁶ <http://www.jcaho.org/pms/core+measures/information+on+final+specifications.htm>. See PR-1 and Appendix A

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V2.1 R3	July 21, 2004	Software (SAS and SPSS)	<ol style="list-style-type: none"> 1. Implemented syntax changes associated with ICD-9-CM coding updates from FY 2004 (effective 10-1-2003). See separate documentation on ICD-9 coding updates for specific details. 2. Implemented the option to aggregate all area-based indicators by Metropolitan Statistical Area (MSA) and County or just by County. 3. Implemented all syntax changes required to implement the indicator modifications (noted above under Guide) and incorporated the related documentation in the Software manuals. 4. County-based population files are now distributed with the SAS and SPSS software, and the names of the population files now have the letters "cty" in their third, fourth and fifth positions instead of the letters "pop". 5. Converted mean-centering routine for risk-adjustment to use population case-mix of APR-DRG as reference population for Age-Sex only risk-adjustment. This change resulting in the age-sex only risk adjustment scaling closer to the mean.
V2.1 R3	July 21, 2004	Software (SAS)	<ol style="list-style-type: none"> 1. Implemented changes to all mortality indicators excluding cases for which the value for the variable "disposition of patient" (DISP) is missing, unknown or invalid. The SAS software is now consistent with the SPSS versions that have always excluded cases with missing, unknown, or invalid disposition. 2. Inserted "IQ" in format names for age, sex and APR-DRG aggregations in SAS programs to distinguish these formats from similarly named formats used by other indicator software.

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V2.1 R3	Sept. 4, 2003	Software (SAS and SPSS) and Guide	<ol style="list-style-type: none"> 1. Congestive Heart Failure (CHF) Mortality Rate: The denominator exclusion of patients undergoing a cardiac procedure was removed from CHF Mortality Rate. This exclusion was unnecessary due to the use of APR-DRGs for risk adjustment and to provide consistency across indicators (e.g. AMI patients with these procedures are not excluded). 2. Bilateral Heart Catheterization Rate: Codes 404.xx for hypertensive heart disease were added to the denominator exclusion. 3. Pediatric Heart Surgery Volume and Mortality Rate: The code 36.3 was added to numerator including definition of pediatric heart surgery (#2P) to reflect coding before October 1, 1998. 4. Mortality after Hip Replacement: The code 716.69 was deleted from the including definition of osteoarthritis (the fifth digit "9" indicating "multiple sites" is not valid for 716.6x).
V2.1 R2	Sept. 4, 2003	Software (SAS and SPSS)	<ol style="list-style-type: none"> 1. All parameter text files were renamed to refer specifically to the IQI module (e.g., use of IQ in file name). These changes are also reflected in the software documentation. 2. All parameter files were rerun using the updated software and Year 2000 HCUP SID data. 3. Population files for 2000, and 2001 were re-estimated using the latest available census files.
V2.1 R2	Sept. 4, 2003	Software (SPSS)	<p>The treatment of missing data by SPSS was changed to mirror the treatment of missing data by SAS, specifically the software requires confirmation for the assignment of a poor outcome or negative event. For instance, in order to be assigned as a death, each case must actually be coded as a death. Missing data is considered neutral. Missing data for some elements results in the exclusion of that case from the denominator. For a few other elements, the case is retained. Table 5 of the Software Documentation lists the impact of missing data for each data element.</p>