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The National Casemix Office Design Framework 2012-2017

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Casemix Design Framework

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Approvals

This document will require the following approvals subject to the final draft version being completed:

Name	*Signature*	*Title*	*Date of Issue*	*Version*	*Date Approved*
CAB	Ken Dunn	Chair of CAB			
Casemix Board	Virginia Jordan	SRO			

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Contents

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1. The Casemix Design Framework and Casemix Advisory Board

1.1 *Purpose*

The Casemix Design Framework is one of a suite of documents to support the future development of the Casemix Classification in England. Its primary use is to detail and thus ensure a consistent approach to design for the next generation of products, for both internal and external stakeholders alike, and as such, it should be viewed as a building block of the *Casemix Strategy 2012-2017*, and in conjunction with the *HRG4+ Design Methodology* and *Casemix Companion.*

The purpose of this document is to define a new edition of the Casemix Design Framework to inform major stakeholders, including NHS Clinicians, NHS England, Monitor and the National Casemix Office, of the rules and criteria to be followed when designing classification systems.

1.2 *Background and History*

Casemix may be viewed as a system whereby the complexity of the care provided to a patient is reflected in an aggregate secondary healthcare classification. In accordance with the Casemix Classification Principles determined by Fetter and Thompson in the 1960s, Healthcare Resource Groups (HRGs) are generated from readily available, nationally mandated data (primarily ICD diagnosis and OPCS procedure national primary classifications) and are intended to be clinically meaningful and consume similar amounts of resource. They are also required to be manageable in number from an end-user perspective.

In the autumn of 2003, an HRG4 Design Group (known as the Steering Group) was formed. This group informed the HRG4 design rules – these rules have become known as the HRG4 Design Framework, and supersede their HRG v3.5 counterpart. It is these HRG4 design rules that form the basis of the updated Design Framework for HRG4+, intended to cover the Casemix development and delivery period from 2012 to 2017 inclusive.

As part of HRG4+ delivery, and in response to the changing national organisational environment instigated by the Health and Social Care Act of 2012, the Casemix Design Authority, formed in June 2008, was replaced by the Casemix Advisory Board in 2012, to better align with the revised governance framework and improve support for the requirements of a new national organisational environment.

The current Terms of Reference of the Casemix Advisory Board include to:

- Advise and guide the National Casemix Office on design concepts related to classifications, and associated methodologies
- Support the development and maintenance of design frameworks developed by the Casemix service to govern the development of casemix classifications, products and services
- Support the continual development and improvement of Casemix products and services, and the development of a shared vision to support policy, clinical and service innovation.

The Design Framework for HRG4 has been baselined, and a refined set of criteria and rules for HRG4+ and beyond has been defined.

Any subsequent revisions to the baselined document will be published in accordance with established protocols.

2. Governance

The governance framework comprises distinct but inter-dependant elements within the overall business architecture. This enables a framework of good governance capable of meeting the requirements of policy within a changing NHS operating environment whilst understanding the systemic aspects of the business. It also facilitates clinical engagement, classification and coding development and the technical implementation of products and services.

The Casemix Design Environment is regulated via this Design Framework, which informs the way that designs endorsed by Expert Working Groups (EWGs) may be developed for implementation in a released grouper product.

Implementation of a design change into a grouper product release is also subject to agreement via an established, two-stage, internal Change Control Process.

- The Quality Review Panel, made up of representatives from all key national stakeholders including NHS England, the Department of Health, Monitor and the National Casemix Office considers the impact and appropriateness of implementing proposed design changes, at both a local and national level, giving special consideration to the clinical and political environment. It also provides implementation recommendations to the Change Control Board;

- The Change Control Board, with membership comprising representatives from all key national stakeholders including NHS England, the Department of Health, Monitor and the National Casemix Office is advised by the recommendations of the Quality Review Panel, and is responsible for approving all design changes implemented in a Grouper product release.

Further external governance requirements are emerging as the nature and requirements of the new national environment become established, and these will be incorporated into this document at a later stage.

3. Membership

Membership of the CAB comprises of the following, as a maximum:

Clinical

- Chair of Casemix Clinical Leads (Chair)

National Casemix Office/ HSCIC

- Strategic Performance & Operations Manager
- Principal Casemix Information Design Consultant(s)
- Senior Information Design Consultant(s)
- Representative for data standards

NHS Finance

- Representative from acute / specialist NHS provider
- Representative from community / mental health NHS provider

NHS Commissioning

- Representative for NHS England responsible for National Commissioning of Prescribed Specialised Services
- Representative of Regional Specialist Commissioning
- Representative from Clinical Commissioning Group/(s)

NHS Contracting

- Representative from acute / specialist NHS provider

- Representative from community / mental health NHS provider

NHS Informatics

- Representative of Prescribed Specialist Commissioning

NHS Coding

- Representative from acute / specialist NHS provider

NHS England

- Representative of Pricing Team

Monitor

- Representative of Pricing Team

4. Terms of Reference (ToR)

Whilst the remit of the Casemix Advisory Board is one of guidance and advice, the specific focus will be the conceptual, strategic and operational development of Casemix classifications and associated methodologies:

- It advises and guides the National Casemix Office on design concepts related to classifications, and associated methodologies;
- It supports the development and maintenance of design frameworks developed by the National Casemix Office to govern the development of casemix classifications, products and services;
- It supports the continual development and improvement of Casemix products and services;
- It advises on the applicability of HRG applications to enable Casemix products and services to be clinically, policy and service delivery relevant;
- It facilitates the development of appropriate engagement with existing and emergent stakeholders across the end-to-end architecture of the NHS operating environment;

- It provides an engagement interface between the National Casemix Office, policy colleagues, NHS stakeholders, commissioners, regulators and providers with specific regard to:

    - Coding and coding quality
    - HRG design
    - Technical implementation of casemix design
    - Primary and secondary information
    - Clinical innovation and development
    - Changes in the financial and operational service environment
    - Classification development, i.e. OPCS, ICD
    - Standards across the end-to-end business architecture;

- It supports the development of a shared vision for the development of casemix methodologies able to support national policy, clinical and service innovation, classification changes and development of standards;

- It consists of members that reflect healthcare service provision/configuration but must always include representation from the National Casemix Office, one of either NHS England or Monitor pricing teams and the Clinical Leads Chair who would form a quorum for decision making. The CAB can also co-opt other members on a temporary or permanent basis as necessary;

5. Introduction to the Casemix Design Framework

HRG4 has been used for reference costing since April 2006, for the 2006/2007 financial year and has been used for payment from April 2009. It was the first English Casemix classification to be developed specifically for funding by the National Casemix Office, and was produced by Expert Working Groups (EWGs) consisting of clinicians nominated by their Royal Colleges and professional societies and other relevant experts from the service. The EWGs were assisted and guided in their work by the original HRG4 Design Framework which was produced in 2003. The experience gained since then combined with the evolution of Payment by Results (PbR) and the planned changes in the wider NHS environment has made it necessary to revise and update that Framework.

The purpose of the HRG4+ Design Framework is to ensure that HRGs are developed in accordance with clear Design Objectives and Editorial Rules (see sections 6 to 8 of this document) which promote their functionality. It includes guidance about the design criteria of HRGs, and the type of data on which they are based and assessed. The primary function of the Design Framework is to guide and assist the EWGs, but it will also be of interest to commissioners, coders and clinicians who wish to understand the method and context of how HRGs are developed.

HRG4+ builds upon the HRG4 classification, by expanding the scope of that classification beyond the hospital setting; enhancing the available logics utilised in HRG derivation; and extending the data quality components of the grouping process.

Key to the benefits of HRG4+ are:

- **The identification of services delivered in a community setting**, in line with nationally defined standards, as and when available;
- **An ability to better differentiate between increasingly specialised and more routine patient care**, by:
  - Improving the influence of diagnosis (as identified using ICD-10) on HRG derivation, not only in the admitted patient care setting, but also beyond;
  - Extending the concept of procedure and diagnosis hierarchies in particular to improve identification of care at the lower end of the resource spectrum;
  - Ensuring consistent and enhanced recognition of the complexity of care for both procedures and diagnoses (especially for the multiply-comorbid patient whose care needs are often compounded by the interactivity of existing conditions);

  - Acknowledging differential care for patients broadly classified as 'children' (up to and including 18 years of age, in line with national Service Framework definitions), specifically with regard to the treatment of very young children ("infants", defined as being under two years of age).

- **Recognition of the (clinical) reasons for care delivered beyond the admitted patient care**

  - Assessing the extent to which diagnosis can be used to link patient care events, across settings and between providers, by recognising the additional resource use associated with treating patients with differing diagnoses in both the Outpatient and Emergency Medicine setting, as a first step to understanding the patient pathway, and a pre-cursor to understanding patient-level outcomes.

- **A greater emphasis on quality** of both data inputs and HRG outputs, including the re-establishment of inter-HRG relativities at the subchapter level (see Rule 13).

To support a cohesive approach to the identification of the existence, impact and recognition of multiple procedures and diagnoses, at the chapter/subchapter and HRG level, baseline analysis has been completed on the final HRG4 design (Reference Costs 2011/12) in order to provide a platform for HRG4+ refinement. This is available on request.

Further assessment of adherence to national coding guidance, especially with regard to coding sequence and the use of components of principal extended categories has also been made, and can be made available on request.

The National Casemix Office has editorial control over the HRG4 suite of documentation and responsibility for the development and maintenance of the classification. The HRGs thus produced are used currently by the Department of Health (DH) to collect reference costs on an annual basis from the service and by NHS England and Monitor as a currency on which to set a tariff. The National Casemix Office works with EWGs to produce HRGs for activity that is designated by DH / Monitor / NHS England as within the current or required scope of the National Tariff Pricing System.

HRGs will be reviewed annually based on all available data although as a general principle, HRGs will remain unchanged for two years of use prior to any revisions, to allow for appropriate annual Reference Costs/Patient Level Costing data to be available upon which to make an informed design decision.

Limited amendments may be made outwith this cycle to reflect changes in clinical practice or costs, improved source resource data, or requests from relevant national organisations such as NHS England, Monitor, the DH/EWGs/Steering Groups/ERPs. Amendments may also be necessary to accommodate / utilise changes in the underlying (OPCS/ICD) primary classifications.

HRGs will undergo a major revision every five years; the Design Framework is therefore intended to support future revisions of the HRGs.

The Design Framework is divided into four sections – Design Objectives and Principles, Design Fundamentals, Editorial Rules, and Performance Measurement Techniques.

The HRG4+ Design Objectives are intended to assist EWG members in the development of a HRG4+ Casemix classification that is responsive to the needs of a changing national and local business environment. They are specifically tailored to address the benefits of HRG4+ outlined above, and serve as a guide to the enhancement of the classification.

The Casemix Design Fundamentals outline the key principles that are intrinsic to any Casemix classification, and draw heavily from those utilised in the development of previous Casemix classifications. The Fundamentals are intended to assist EWG members in the assessment and interpretation of data and lay down the preferred strategic foundation and aims for the classification.

The Editorial Rules primarily relate to the style, terminology and consistency when designing the classification. They should be regarded as mandatory and exceptions would normally only be endorsed by the Casemix Advisory Board (CAB) when compelling clinical, financial and/or political evidence requires a deviation from current processes. All such exceptions require approval by the Casemix Senior Management Team prior to implementation in a national grouper product.

The performance of the HRGs is analysed and assessed according to the methodology described in the Performance Measurement Techniques section. It is recognised that in most cases there is not yet comprehensive data about resource use by HRG and proxies for this, such as Length of Stay (LoS), must be used and interpreted by the EWG in the light of their clinical knowledge and experience.

This document, incorporating the Design Framework, will be reviewed and revised as necessary in accordance with Casemix governance arrangements. It has been

produced by the National Casemix Office hosted by the Health and Social Care Information Centre after consultation with many stakeholders across the service.

Comments on its contents should be addressed to: enquiries@hscic.gov.uk

6. HRG4+ Design Objectives and Principles

6.1 *Introduction*

The objectives and principles outlined below are specifically tailored to meet the potential scope and aims of the HRG4+ classification, supporting:

- an expanded scope into the community setting, as and when sufficiently robust data are available;
- the enhanced influence of diagnosis in grouping within and beyond the admitted patient care setting in order to support improved identification of specialist services and differentiate between routine and less complex care;
- an extended data quality component linked to improved transparency and clarity of HRG output, and content, as well as a reduced tolerance of poor quality data inputs.

Cross-chapter consistency in design approach, both for the development of existing HRG chapters and the introduction of new service areas into scope, remains a key priority for an HRG classification that must operate within a national framework, and where each component part of the system must interface to form a cohesive whole, in support of current and future policy objectives.

The HRG4+ design objectives, whilst subject to the influences of policy decisions, are a mandatory aspect of the HRG4+ classification that are detailed here for information.

EWGs must consider the appropriateness of the HRG4+ requirements in future design iterations, and non-compliance with these design objectives must be based on data analysis in conjunction with clinical opinion.

As a default position, the design objectives must be met unless it can be proven that to do so would jeopardise any of the Casemix Design Fundamentals, the Editorial Rules, or adversely impact upon the performance of the classification

1.	**Community** Casemix groupings for community are derived from the data in the Community Information Data Set (CIDS), in accordance with the requirement that HRGs are derived from nationally mandated data that employs national standard definitions. Community HRGs must adhere to the Casemix Design Fundamentals regarding clinically meaningful, iso-resource groupings, and be designed in line with the following requirements: • Community HRGs are derived solely from the CIDS, and as such cannot be viewed as setting independent, but rather can only be generated for care in the "community" setting as defined by the scope and content of the CIDS. • Community HRGs will form core HRGs in their own right; as a result of the setting-dependent nature of HRG derivation, the Casemix concept of unbundling is not applicable to community HRGs. • Community HRGs will form a separate Chapter within the HRG Casemix classification, with HRGs specific to defined community-based services being aggregated at the subchapter level. • Numbering and sequencing of the HRG will be in accordance with the Casemix Design Fundamentals (see Rule 13). • Although as a general principle key resource determinants such as age and diagnosis must be considered in HRG design, Community HRGs will not utilise CC splits in the first instance, although may well reflect multiple interventions undertaken in a single community visit/ treatment attendance/contact. • Unlike other HRGs within the Casemix classification, community HRGs may reflect the clinical care provider (e.g. AHP, Specialist nurse) as well as the clinical care provided; this reflects the fact that community service care provision is often intrinsically linked to the staff group responsible for delivering that care.
2.	**Specialised Services** Multiple Procedures Where evidence identifies that multiple activities are undertaken on a routine basis within an HRG, by three or more providers nationally in a given financial year, and where HRGs are of significant size (see Rule 20), this must be recognised within the HRG structure such that the HRG derived is other than would have been derived by any of the procedures undertaken in isolation.

	In order to combat the potential over-recognition of multiple procedures, care must be taken to minimise the recognition of procedures that are considered intrinsic to the clinical operation undertaken. Recognition of multiple procedures in the Casemix classification should be kept within subchapter to maintain clinical coherence and relevance; should not span HRG subchapters without the express agreement of all EWGs concerned; and should comply with the Design Fundamentals. Where HRGs are designed specifically to identify multiple procedures undertaken on a routine basis, this must be made transparent in the HRG label. Multiple Diagnoses Where evidence identifies that multiple diagnoses are present in a patient record(s) and have an increased associated level of resource use, at a minimum of three providers nationally in a given financial year, and where HRGs are of significant size (see Rule 20), this must be recognised within the HRG structure such that the HRG derived is other than would have been derived by consideration of any single secondary diagnosis alone. In order to combat 'summation creep', care must be taken in assigning values for addition, such that poor or ambiguous coding is not encouraged. Values should be weighted to discourage the recognition of such diagnoses. Similarly, duplicate diagnoses, or unspecified diagnoses that follow a more specific diagnoses within the same three-digit ICD-10 rubric should carry less summative weight than other ICD-10 codes. Where HRGs are designed specifically to identify such multiple comorbidities, this must be made transparent in the HRG label. The Matrix Multiples Approach Where evidence identifies that both multiple procedures and diagnoses are an expected component of the care delivered to a patient population sub-set, a summative grid / matrix approach may be employed where the service that is identified by the HRGs is sufficiently discrete to do so. (And to note the impact of over-recognition of intrinsic procedures / 'summation creep' – see above.) Care must be taken to retain clinical relevance and validity of groupings where a matrix approach to design and HRG derivation is proposed, in order to ensure that costing, funding and commissioning requirements with regard to transparency of HRG content are met. Where HRGs are designed specifically to identify such multiples, this must be made transparent in the HRG label.

	Age Special consideration must be given to the age of the patient when assessing the extent to which activities are specialised, irrespective of whether they are procedure-driven, qualified by diagnosis/(es), or reflect multiple interventions. This may be especially relevant for the care of children and in particular 'infants', defined generally for the purposes of this Design Framework as children aged under two years. Although as a default the age of a child is deemed to be 18 years and under in accordance with the National Service Framework, Specialised Services often reflect age sub-divisions within this broad definition of "child". Thus where it is clinically advisable to do so, and where evidence supports the differential resource use of treating sub-sets of the "child" population, age splits within the broad definition of child may be adopted within the Casemix classification. (See reference to care delivered to 'infants' above).
3.	**Improved Recognition of Diagnosis** The extent to which casemix groupings beyond the admitted patient care setting can be used to influence the HRG derived is dependent on the availability of robust diagnostic coding using the ICD-10 classification, the support of relevant national policy, and the approval of the Health and Social Care Information Standards Board. Outpatient Care Diagnosis may be used to: • Improve understanding of the reasons for the care provided for a sub-set of a patient population treated within a clinic setting. This will result in non-admitted consultation HRGs (subchapter WF) being stratified according to the reason for treatment, for example, enabling ophthalmology attendance activities to differentiate between glaucoma, cataracts, etc. • Identify the reason why a procedure was undertaken in a clinic setting – thereby enabling recognition of resource use linked to differential diagnoses, for identical procedures. (see Rule 11) • Generate diagnosis-driven HRGs from clinic activity to support setting-independence. Diagnosis-influenced HRGs derivable in an outpatient setting will not replace the non-admitted consultation HRGs (subchapter WF) that form part of the current HRG classification. Outpatient HRGs that recognise diagnosis will not utilise CC splits in the first instance, nor will they recognise multiple comorbidities in terms of HRG derivation.

	The approach adopted must be consistent across subchapter, and must be clinically endorsed, though there remains the recognition that the utilisation of diagnosis in outpatients will be largely reflective of the service type and specialisms provided. It should also be noted that where the administrative burden of diagnostic collection on the NHS is not perceived to provide any additional benefit, or where diagnoses codes within an outpatient clinic setting are so vague as provide no added clinical value beyond that provided by the mandated Treatment Function Code, the use of diagnosis in HRG derivation for outpatient care should be avoided. Emergency Medicine (EM) Emergency Medicine HRGs are derived solely from the A&E Data Set, and as such cannot be viewed as setting independent, but rather can only be generated for care in an Emergency Medicine setting as defined by the scope and content of the Data Set. The use of diagnosis within EM is intended to supplement the work undertaken by the Royal College with regard to the development of the Unified Diagnostic Data Set (UDDA), and ICD-10 diagnosis may be used to complement the existing use of investigation and treatment codes in HRG derivation, by providing a level of aggregation to begin to understand the reason why interventions have been undertaken, rather than identifying what interventions were provided. EM HRGs that recognise diagnosis will not utilise CC splits in the first instance, nor will they recognise multiple comorbidities in terms of HRG derivation. Over time, best practice policy that advocates the delivery of more care in this setting, rather than admission to hospital, is expected to increase. The ability to link emergency care to patient admissions, in an attempt to prevent unnecessary hospital admissions, thereby delivering appropriate care as soon as possible along the patient pathway continuum, will be a key driver of future HRG development.
4.	**Quality** The expanded quality considerations of the HRG4+ classification are three-fold and require EWG recognition and implementation of the following: • The contextual validation of input data. • For example, to what extent are specific activities ‘impossible’ in

specific care settings, and should such activities be grouped as unclassified?

- Improved handling of poor or ambiguous coding.
  In the absence of a clinical requirement and analytical evidence to support an approach contrary to that indicated:
  - Codes inappropriate for primary (core) grouping should only be applicable to the generation of complications and comorbidities (i.e. within CC lists) where there is a clinical requirement and analytical evidence that supports this premise;
  - Unspecified codes should not be included on CC lists nor used as summed values in summative logics. Where an unspecific code is used to acknowledge CCs, either singly or summatively, the more-specific ICD-10 codes within the three digit rubric must also be included;
  - Signs and symptoms codes (see Rule 21) should not be included on CC lists nor used as summed values in summative logics
- Consistency of application of Editorial Rules for HRG numbering and naming conventions (see Rule 13).

7. Design Fundamentals

7.1 Introduction

Advice is provided to ensure cross-chapter consistency in underlying design approach to and implementation of casemix groupings. This advice must be duly considered, but exceptions may be appropriate where there is a sound clinical reason to do so.

5.	**General Casemix Principles** HRGs are groups of diagnoses and interventions that have similar expected resource implications and are clinically meaningful. HRGs must support national policy requirements and should be designed with that in mind.
6.	**Setting Independence / Dependence** HRGs will describe care on the basis of the care delivered rather than where it is undertaken. Patients that can be appropriately treated in more than one

	setting should be grouped to the same HRG, subject to the requirement to identify the care delivery setting (see below). Care that may only be delivered in a single setting (for example, community care delivered in a patient's home) and that is reliant on a Data Set specific to that setting will be setting-dependent. Examples include the Critical Care Minimum Data Sets, the A&E Dataset, the National Renal Data set and the Community Information Data set.
7.	**Iso-resource** The EWG will assess the resource use associated with an HRG by considering Length of Stay (LoS), Reference Costs and Patient Level Costing data, where available. EWGs should also use their clinical knowledge of theatre usage, nursing dependency, acuity and specialism, drugs, prostheses etc. Local cost differences or non-typical service delivery models should not be permitted to influence the development of HRGs. HRGs that have instances of bi-modal and irregular resource distributions should be kept to a minimum, and only be retained where clinically appropriate to do so. HRG splits based on length of stay should be avoided wherever possible, and only used where a viable alternative (such as age, CCs, interactive CCs) is neither available nor clinically sound.
8.	**Complications and Comorbidities** Each EWG will be required to consider the resource impact of Complications and Comorbidities (CCs) for all HRGs within that chapter or subchapter. This includes due consideration of multiple CCs that may interact to have an increased impact on expected resource use in the care of a patient. CCs are applicable at the subchapter level as a minimum, and CC lists cannot in principle be applicable to a single HRG only. Where it is necessary to reflect the impact of different CCs on sub-sets of HRGs within a subchapter, these sub-set HRGs should be transferred into a new subchapter within the relevant chapter. HRGs should recognise CCs and/or multiple CCs where it is clinically and statistically appropriate to do so, although HRGs that utilise maximum LoS checks may not require further CC splits. CCs should also be created in line with the principles outlined in Appendix 1.

9.	**HRG Content** In some chapters it is necessary to have HRGs for "other" diagnoses or procedures that do not fit into a more specific HRG. These HRGs must be kept to a minimum.
10.	**Unbundling** Unbundled HRGs are independent of any and all core HRGs and will be consistently generated across all core HRG chapters and subchapters, with the exception of Critical Care, Emergency Medicine, and Community Care. As a general principle, unbundled HRGs reflect care that is discrete for a particular service, and can be delivered in different settings, at different times, but will not usually be accessed by all patients. Unbundled HRGs may be event or duration-based, in line with clinical requirements and / or data availability and service design.
11.	**Procedure Dominance, Diagnosis Influence and Exceptions** Generally, significant procedures take precedence over diagnoses in grouping logic to determine an HRG. Where procedures can be undertaken incidentally to the reason for admission, as well as being the reason for admission, EWGs should consider including LoS checks on such procedures, to ensure that the resultant HRG generated is appropriate in terms of resource use. As these procedures may not be the main resource driver for patients with a long LoS, EWGs might consider grouping methodology that ignores such procedures for long stay patients and instead generates HRGs using primary diagnosis. Where clinical opinion and empirical evidence supports the proposal that resources associated with a specific procedure/(s) differ dependent upon primary diagnosis, HRG design should reflect the expected resource use of differential diagnoses, for identical procedures. Hybrid HRGs (that can be reached either via procedure or diagnosis) are to be avoided.
12.	**Grouping Logic** When considering recognition of multiple activities (for both procedure and diagnoses) within the casemix design, EWG members should attempt to use existing grouper logic wherever possible to acknowledge this, rather than

	inventing new means of acknowledgement. The proposed implementation of multiples logics, by whatever means (escalation, summation, HRG-specific, additive grids), at the chapter or subchapter level must be supported by the standard baseline analysis prior to implementation. The use of combination codes should be avoided where possible, unless no viable alternative is available to identify such activities. A brief overview of the multiple procedure logics employed within the current Casemix classification can be found in Appendix 4 of this document.

8. Editorial Rules

13.	**HRG Terminology** To ensure consistency of editorial terminology and structure across chapters in conjunction with the EWGs, Steering Groups and ERPs.; • In HRG4, HRGs must be five characters in length • In HRG4, HRGs must consist two alpha, two numbers, one alpha characters (Chapter, subchapter, number, split) • Split character usage must be consistent within subchapter • A complication and comorbidity (CC) list should be produced which can be divided into insignificant (for grouping), intermediate and major, or any combination thereof, as clinically appropriate. CC lists must be at the HRG chapter or subchapter level. All chapters / subchapters are expected to utilise CC lists, unless it is not clinically appropriate to do so. • HRGs must conform to specific ordering within chapter or subchapter, with the highest resource HRG at the beginning when first creating a new subchapter. It is accepted that it may not be possible to maintain this ordering within subchapter when revising the design. • Types of categories must be consistent across all chapters (for example Minor, Intermediate, Major, Very Major, Complex and Very Complex Major). • Similarly, where number categories are used, Level one must always refer to the lowest expected resource HRG (though to note, in the interests of clarity of HRG content, levels should be avoided wherever possible, due to the inherent ambiguity of their inter-HRG relationship) • HRG labels should be transparent enough to reflect the content of the HRG, without being so specific that they become intelligible for costing, funding or commissioning purposes. The use of ambiguous terms should be avoided unless the HRG is intended to act as a “catch-all” to comply with the requirements of HRG content and coverage (see Rules 9 and 14) • Obsolete HRG numbers cannot be re-used • If there is a significant change to the content of an HRG, a new HRG will be created • A new HRG will not be required where there is a change to clarify the HRG content.

14.	**HRG Coverage** HRGs must be comprehensive to include all areas covered by policy requirements. This will necessitate the inclusion of poorly defined cases and ensure that all activity is placed in an appropriate grouping.
15.	**HRG Currencies** The unit of activity of an HRG will depend upon the services to which it applies. These HRG currencies may be duration or event based. They may include: • Spells for admitted patient care • Bed days for critical care, rehabilitation and specialist palliative care • Events such as renal dialysis sessions, delivery of chemotherapy, high cost drugs, for unbundled HRGs • Attendances for Outpatients and Emergency Medicine • Contacts for community services. Requests for changes to existing units of activity or the introduction of new currencies will be reviewed by the CAB in line with required governance procedures. To note the possible future interface with Pathways year of care tariffs and diverse data sources.
16.	**HRG Data Sources** While HRG development will start from the basis of readily available nationally mandated data, other identified data sources will also be used in the development process (e.g. Patient Level Costing data).
17.	**HRG Chapter Structure** HRG activity cannot be moved between chapters or subchapters without the express agreement of EWG chairs of all chapters / subchapters concerned. In cases of dispute, the Clinical Chair of the EWGs will act as arbitrator. HRG subchapters need to differentiate between ‘surgical’ (procedure-driven) and ‘medical’ (diagnosis-driven activities) activities within the same chapter, in order to support the improved differentiation of care, and to enable CC considerations to be more responsive to the type of care delivered.

18. Grouping Logic

When a spell contains multiple finished consultant episodes, the spell should generate an HRG based on all care delivered within that spell, from patient admission to discharge within a single provider.
HRG4 follows a standardised five step sequence of grouping as follows :-

- Step 1: Record Identification
- Step 2: Data Validation
- Step 3: Unbundling (if applicable)
- Step 4: Multiple Trauma (if applicable)
- Step 5: Selection of low level grouping driver(s) (e.g. procedure, diagnosis) and HRG determination, including splits.

Changes to this sequence cannot be made without the express consideration and permission of CAB.

9. Casemix Performance Measurement

9.1 Introduction

Performance Measurement Techniques detail the methods by which Casemix grouping performance will be measured and monitored, between versions, chapters and HRGs. Results will be made available to the CAB and other parties on request, on an annual basis, or at such regular intervals as determined by the CAB. Where groupings consistently fail to meet grouping criteria in terms of significant size, EWG members may be requested to review and amend current designs to maintain required standards and improve statistical performance.

19.	Creation and review of HRGs will be subjected to statistical and developmental analysis by the National Casemix Office and these will be shared with appropriate stakeholders for discussion. Appropriate statistical techniques for inter-version and intra-chapter HRG comparison include, but are not limited to;- • Reduction in Variance (RIV) • Coefficient of Variation (CV) • Identification of outlier LoS variability • Measurement of intra-HRG cost variation • Quartile Coefficient of Dispersion • Data Variation Index • Minimum Volume Ellipsoid Brief definitions of statistical techniques can be found in Appendix 2 to this document. A further document 'HRG Design Performance Indicators' provides a greater level of detail of the developmental statistics utilised in HRG design. This is available on request.
20.	HRGs should be of significant size (*to note 5% tolerance*), consisting of : • at least 600 cases, (spells, sessions, attendances, etc, dependent on the unit of activity used for a particular setting or service) annually, or • at least 1,200 occupied bed days annually for admitted patient care, or • a total annual cost of more than £1.5million. These thresholds will be reviewed by CAB on a regular basis. HRGs that fail to meet the above design criteria but can clearly demonstrate

	intra-HRG differential resource use and clinical need for patient sub-sets within them need to be examined on a case by case basis. In these circumstances, if the HRG **root** meets the standard criteria outlined above, **and** there is more than 50% difference between the mean LOS (or estimated costs) of potential patient sub-set splits (e.g. CC or age splits) then HRG splits may be created with: • at least 400 cases, or • at least 800 occupied bed days annually for admitted patient care, or • a total annual cost of more than £1million. These thresholds will be reviewed on a regular basis.
21.	<u>Signs and Symptoms Coding</u> Where an HRG contains high volumes of activity with a “signs and symptoms” primary diagnosis, this activity should be separately identified and may require a separate HRG where resource use can be evidenced as being significantly different.
22.	Specific consideration must be given to particular sub-sets of patients, e.g. children or ‘infants’, which might have different care needs and treatment to other patients with the same condition or undergoing the same intervention, for example the costs associated with hospital schooling.
23.	Caution should be exercised in the creation of HRGs where small numbers of providers are involved (but see interface with rule 20).
24.	Very large HRGs of more than 100,000 cases annually should be examined closely to try and identify sub-groups with a smaller cost spread, where appropriate.

Appendix 1. Complications/Comorbidities (CC) List Cross-Chapter Inclusion Principles

Background

The original Complications/Comorbidities lists for individual chapters within HRG4 were based on statistical analysis which reviewed the impact that the presence of CCs had on length of stay (LoS). Although there was consistency in the underlying methodology for determining which ICD diagnosis codes should be included in chapter-specific CC lists, with hindsight, the data-driven approach has led to two types of compounding anomaly in the current CC lists.

- An inability to distinguish between diagnoses that are not CCs, and those where no sufficient data available to confirm that they affected length of stay – thus a tendency to not include these diagnoses on a CC list;
- A tendency to include on CC lists the more common – often less specific – diagnoses.

The following principles are therefore designed to standardise the approach of *assigning diagnostic conditions to CC lists* using reasonable assumptions given set criteria. The concept of ***"key words"*** serves as a "shortcut" by identifying them in the ICD code labels to simplify the review process.

In current HRG4 design, CC diagnoses are ranked at 3 levels with:

Level 1 – Not a significant diagnosis (Rank 1) No expected additional LoS

Level 2 – Intermediate diagnosis (Rank 2) Expected Additional LoS > 0, <2 days

Level 3 – Major diagnosis (Rank 3) Expected Additional LoS > 2 days

Therefore, in this document, numeric value 1, 2 or 3 are related to the 3 CC levels above.

CC List Inclusion Principles

1. ***Unspecified codes*** must have an equal or lower ranking than more specified codes within the same three digit category;

2. Open ***fractures*** must have an equal or greater ranking than closed codes related to the same bone site;

3. Ranking of ***superficial conditions*** are restricted to 2 or 1;

4. Ranking of ***moderate/minor degree*** are restricted to a lower rank than ***severe degree*** for the same condition;

5. ***Bilateral conditions*** must have an equal or greater ranking than unilateral conditions;

6. Conditions described as ***'with'*** additional conditions, must have an equal or greater ranking than conditions that are described as '***without***' additional conditions*. For example, I71.4 Abdominal aortic aneurysm, without mention of rupture and I71.3 Abdominal aortic aneurysm, with rupture*

7. A ranking of 3 is only allowed for ***"major symptoms"*** *codes (some examples are shown table 1, page 2)*. The rationale for selection of "major symptoms" is on the basis of whether the symptom would be a condition requiring treatment or investigation in its own right and hence, increasing the expected Length of Stay (LoS) by 2 days or more.

Rationales for each principle (with supporting examples)

- **CC Principle 1 - Unspecified codes**

The principle that unspecified codes must have equal or lower ranking than more specified codes within the same three digit category, is based on the logic that the classification hierarchy is structured on a severity of disease. This example is taken from Chapter J's CC list (2008/09):

K290	Acute haemorrhagic gastritis	
K291	Other acute gastritis	
K292	Alcoholic gastritis	
K293	Chronic superficial gastritis	
K294	Chronic atrophic gastritis	
K295	Chronic gastritis unspecified	
K296	Other gastritis	2
K297	**Gastritis unspecified**	**3**

The example shows that there are several specific types of gastritis that would be more severe and therefore potentially use more resource within an episode of care.

Key words: Unspecified (Caveat: Not all "unspecified" ICD codes are .9s and not all .9s are unspecified ICD codes)

- **CC Principle 2 - Open fractures**

The principle that a multiple injury must have an equal or greater ranking than single injuries within the same three digit category is based on the simple logic that multiple injuries will usually consume at least the same resource as single injuries.

The following example shows the use of fifth characters in the coding of open (1) (bone penetrating through the skin) or closed (0) (bone not penetrating through the skin) fractures:

S5250	S52	Fracture of lower end of radius-**closed**	**3**
S5251	S52	Fracture of lower end of radius-**open**	

The closed fracture in this example has a ranking of major CC whereas the open code for the same site has no ranking. From a resource perspective an open fracture should be consistently more resource intensive than a closed fracture.

Key words: Open, Closed (Normally, S or T codes. 5th digit 0 denotes closed and 1 denotes open).

- **CC Principle 3 - Superficial Conditions**

The principle that a superficial condition should be ranked at 2 or less is based on a simple severity supposition. The following example showing an inconsistency in this area taken from Chapter D's (2008/09) CC list:

S009	S00	**Superficial injury** of head part unspecified	**3**
S020	S02	**Fracture** of vault of skull	

This example shows the variance of CC ranking within injuries of the head, with a superficial injury of head ranked as a major CC, whereas on the same list a fracture of the skull has no ranking and thus is not recognised as a CC in the current HRG4 design.

Key words: Superficial

- **CC Principle 4 - Conditions with severity degrees**

This principle applies a severity rule to restrict the ranking of 'less severe' (e.g. moderate/minor/mild) degree to a lower CC rank than 'severe' degree within the same condition category. The following example is taken from Chapter J's current (2008/09) CC list:

F729	**Severe** mental retard without mention of impairment of behaviour	**1**
F709	**Mild** mental retardation without mention of impairment behaviour	**2**

Key words:

Within the same condition category, these severity words vary. Hence, they are put into different groups.

Group1: Minor, Moderate, Severe

Group 2: Mild, Moderate (e.g. E44)

Group 3: Minimal, Significant (e.g. 4th digit .0 and .1 used with three digit rubric F70 – F79)

- **CC Principle 5 - Bilateral/Unilateral Conditions**

This principle considers the use of CC rankings for bilateral/unilateral disorders. Although a patient may have a bilateral condition and receives treatment for one side alone, the principle that a bilateral condition should at least receive an equal ranking to that assigned to a unilateral condition holds.

M160	Primary coxarthrosis **bilateral**	
M161	Other primary coxarthrosis (**unilateral**)	3

The example above is taken from Chapter J's (2008/09) CC list, where a bilateral diagnosis has no ranking (and thus is not recognised as a CC in the current HRG4 design) whilst the unilateral diagnosis has a rank of 3.

Key words: Bilateral, Unilateral

- **CC Principle 6 – With/Without Condition**

This principle considers that conditions described as ***'with'*** additional conditions, must have an equal or greater ranking than conditions that are described as '***without***' additional conditions. For example, if diabetes without complications (E10 – E14 with 4th digit .9) is on the CC list, diabetes with complications (E10 – E14 with 4th digit .0 - .8) should also be on the list and have a higher or equal rank to the .9 without complication codes.

Key words: With, Without

- **CC Principle 7 - Signs and Symptoms**

This principle suggests that a ranking of 3 should only be assigned to ***"major symptoms"*** codes. The rationale for selecting "major symptoms" is on the basis of whether the symptom would be a condition requiring treatment or investigation in its own right and hence, increasing the expected LoS by 2 days or more. Some examples for "major symptom" codes are shown in Table1 on page 3. All other symptom codes must rank to 2 or less.

This suggestion is based on coding standards which discourage the use of symptom codes *(ICD-10 Clinical Coding Instruction Manual, page XVIII-1).* This can also avoid casemix "creep" from recording any "codeable" condition.

Caveat:

This doesn't mean that signs and symptoms should not appear on the CC list. Under some circumstances, signs and symptoms codes have to be used and they do need investigation or treatment. For a full explanation of when to use signs and symptoms codes, please refer to page XVIII-4&5 ICD-10 Clinical Coding Instruction Manual.

It is, however, impossible for non-clinicians to pull an exhaustive list together, especially given that a symptom that is considered "major" for one specialty might not carry the same weight for another. Table 1 below therefore contains some examples of 'major' sign and symptom codes. Considerable clinical review will be required to maintain this principle.

Table 1 – Pre-defined 'major' sign and symptom codes

R02X	Gangrene not elsewhere classified
R091	Pleurisy
R092	Respiratory arrest
R17X	Unspecified jaundice
R18X	Ascites
R33X	Retention of urine

R392	**Extrarenal uraemia**
R521	Chronic intractable pain
R570	Cardiogenic shock
R571	Hypovolaemic shock
R578	Other shock
R579	Shock unspecified

Key words: Codes start with "R"

Appendix 2. Statistical Analysis

Identification of outlier LoS variability

A report including FCE counts, summary statistics (mean, median and percentiles) for each HRG by provider and LoS distribution for each HRG can be produced in order to identify HRGs with unusual LoS distributions, for example bimodal or irregular distributions, or those with a higher than expected proportion of outliers.

Measurement of intra-HRG cost variability

HRG design can be analysed using appropriate statistical methods applied to nationally collected cost data in order to determine the degree of cost variation both between and within HRGs

Determining HRGs with disproportionate numbers of outliers

An outlier is defined as an observation that is numerically distant from the rest of the data. In HRG terms it is a FCE with LoS greater than the trimpoint. The proportion of episodes that are outliers for either LoS or cost can be determined for each HRG after calculating the HRGs upper trimpoint.

Reduction in Variance (RIV) - Inter Group Variation

RIV statistic is used to measure the explanatory power of casemix systems, i.e. the proportion of total LoS variation explained by the groups. A value of 0% means that the classification explains none of the variance in the dependent variable (e.g. LoS or cost), whilst 100% means it explains all of the variance. 100%, whilst theoretically possible, would suggest that all the data in each group have the same LoS/cost. Typical results for LoS would be 30-40% whilst cost would be 60-70%.

The RIV, often expressed as R^2 to describe the predictive validity of the classifications, is calculated to describe the explanatory power of the grouping classifications. The unadjusted form of the calculation of RIV is the inverse of the ratio of the whole sum of squares (WSS) and the total sum of squares (TSS), expressed as a percentage.

$$R^2 = 1 - \frac{WSS}{TSS}$$

Where *WSS* = whole sum of squares

TSS = total Sum of squares

$$WSS = \sum_{j=1}^{k}\sum_{i=1}^{n_j}\left(x_{ij} - \bar{x_j}\right)^2 \qquad TSS = \sum_{j=1}^{k}\sum_{i=1}^{n_j}\left(x_{ij} - \bar{x}\right)^2$$

Where k = the number of groups

n_j = the number of cases in group j

X_{ij} = value of case i in group j

$\overline{X}_j$ = mean of group j

$\overline{X}$ = overall mean

Coefficient of Variation – Intra group variation

Whilst the RIV statistic gives a result to be applied across groups, a statistic is required to measure the within-group variability or homogeneity. The ratio of standard deviation (SD) to the arithmetic mean of a group, or CV gives a measure of the relative variability within a single group.

$$CV = \frac{SD}{x} = \frac{\sum_{i=1}^{n}(x_i - x)^2 \quad n}{\overline{x}}$$

Where SD = standard deviation of the group

X = mean of group

x_i = value of case i in the group

n = the number of cases in the group

The CV is reported for a group to describe its homogeneity. A value of 0 would indicate that a group has no variance from the mean (i.e. standard deviation is equal to 0), whilst a CV value for a group above 1.00 would indicate heterogeneity within the group, where the standard deviation is greater than the mean. We would anticipate that the more homogenous an HRG is, the more likely it is that the underlying HRG Design is robust.

Caution should be used when the mean is close to zero as CV may be sensitive to small changes in the mean.

Classification and Regression Tree:

Classification and regression tree (CART) is a set of techniques for classification and prediction. The purpose of the analyses via tree-building algorithms is to determine a set of *if-then* logical (split) conditions that permit accurate classification of cases. When applied to Casemix, given a resource variable e.g LoS or Cost, the algorithm will identify groupings that best differentiate between high and low resource cases, using any variable in the dataset. For instance, within a given dataset, it may find firstly that there are some diagnosis codes that have high resource and some that have low resource. Within each diagnostic group it may then find that age further differentiates, and add further splits on the basis of age.

Quartile Coefficient of Dispersion

The quartile coefficient of dispersion is a descriptive statistic which measures dispersion and which is used to make comparisons within and between data sets. The statistic is easily computed using the first (Q_1) and third (Q_3) quartiles for each data set. The quartile coefficient of dispersion is

$$\frac{Q_3 - Q_1}{Q_3 + Q_1}.$$

The Reference Costs schedules routinely publish the upper and lower quartile costs for all settings and so the coefficient of dispersion (CD) can be readily calculated.

However, CD for length of stay data could also be calculated from HES data. This would be more useful as running the same year's data through different groupers would remove any 'noise' from differences in the underlying HES dataset, enabling robust comparison of the design alone between years

Data Variation Index

The Department of Health recently described the calculation of a Data Variation Index. The DVI for a provider would be of the format below, which describes an average of the absolute percentage deviations for each individual HRG from the national average for that HRG.

$$DVI = \frac{\sum_{i=1}^{n}\left(\frac{|R_i - A_i|}{A_i} * 100\right)}{n}$$

Where R_i is the provider average cost for HRG i
A_i is the national average cost for HRG i
And i is the list of n total HRGs

This would aim to describe the provider's difference relative to the mean. Lower DVIs at provider level might imply better defined reference costs. A systematic decrease in all DVIs across all trusts may be expected, as well as more homogenous DVIs within groups of 'similar' trusts.

While this is a relatively simple calculation, it has the drawback of providing a headline figure only. This measure would also be strongly influenced by data such as extreme outliers that may lead to an inflated mean cost if they are not excluded from calculations.

Minimum Volume Ellipsoid

The minimum volume ellipsoid (MVE) method is a powerful algorithm for detecting multivariate outliers. Outlier detection is a crucial step in data analysis, because of the disproportion influence the outliers can have on the statistics; a single outlier can either

obscure a real effect or introduce a non-existent effect. Outlier detection in univariate samples is a common practice and can be carried out straightforwardly by visual inspection of the data or by statistical tests using order statistics. Outlier detection is less straightforward in two-dimensional spaces, because visual inspection is less effective and the order statistics are lacking.

The MVE estimator is based on the smallest volume ellipsoid that covers *h* of the *n* observations. It is an affine equivariant, high-breakdown robust estimator of multivariate location and scatter. Its low bias makes the MVE very useful for outlier detection in multivariate data, often through the use of MVE-based robust distances to determine whether outliers are caused by measurement error or a truly anomalous observation.

Appendix 3. HRG4+ Multiple Procedure Logic Components

Escalator Logic

The 'escalator principle' is used to drive grouping to a higher HRG to reflect additional complexity. If a procedure is performed in conjunction with another procedure from a specified list, the HRG that is generated will be a higher HRG (in resource terms) than would have been generated for the first procedure alone. For example, a minor knee procedure with a minor foot procedure would generate an intermediate knee procedure HRG.

E.g. *W471 Primary prosthetic replacement of head of femur not using* cement as dominant procedure maps to HA13C Intermediate Hip Procedures for Trauma without CC, however if a procedure from any other HA or HB 'Intermediate' Category HRG is also recorded; for example *W042 Triple fusion of joints of hindfoot* (which as a dominant procedure would map to HB32Z Intermediate Foot Procedures for non -Trauma Category 2) then this escalated to the 'Major' category HRG in this case HA12C Major Hip Procedures Category 1 for Trauma without CC.

Summation Logic

Summation logic has been added to the design for the Vitreous Retina (VR) procedural HRGs within Chapter B. All VR procedures have been assigned to a VR band from 1 to 5 depending on their relative complexity. The higher the VR band the higher the complexity. The VR HRG is assigned based on the sum of the bands of all VR procedures present on the record.

The Table below shows the HRG dependent on the sum of the VR bands of the associated procedures (data source, HRG4+ 2012/13 Reference Costs design):

The Sum of the VR Bands associated with the VR procedures	HRG4+ Root
0, 1 or 2	BZ23* Minor Vitreous Retinal Procedures
3, 4 or 5	BZ22* Intermediate Vitreous Retinal Procedures
6, 7, 8, 9 or 10	BZ21* Major Vitreous Retinal Procedures
11 or over	BZ20* Complex Vitreous Retinal Procedures

E.g. *C791 Vitrectomy using anterior approach + C831 Pigment epithelium translocation of retina.* These procedures have VR bands of 3 and 4 respectively so the HRG root derived would be BZ21*, Major Vitreous Retinal Procedures.

Multiple Procedure Logic

Where there are a relatively small number of procedures that can be performed in combination with one another, flags may be used to derive the HRG dependant on what other procedures are recorded along with the dominant procedure.

E.g. *P231 Anterior and posterior colporrhaphy NEC* as dominant procedure with no other procedures recorded maps to MA03B Lower Genital Tract Major Procedures without CC. *Q088 Other specified vaginal excision of uterus* as dominant procedure with no other procedures recorded maps to MA07B Upper Genital Tract Major Procedures without malignancy without CC. However if either if these procedures are the dominant procedure and the other procedure is also recorded then the HRG derived is MA02Z Lower and Upper Genital Tract Complex Major Procedures. Both procedures have a flag attached to 'look at list' which contains the other procedure.

Multiple Diagnosis and Procedure Assessment

As established in Reference Costs 2009/10 and Local Payment 2011/12, a grid structure such as that used within Chapter VA Multiple Trauma is an efficient way of assessing the resource implications of treating increasingly complex patients.

Some patients will require little or no surgical intervention while others may require complex and repeated surgery within the same FCE or Spell; these interventions being represented by a number of OPCS codes. Equally some patients will have a sole diagnosis for which they are monitored or treated, while some will have multiple diagnoses or carry a series of pre-existing conditions (comorbidities) that are captured using ICD-10 codes.

There is an expectation that as the resource requirements of a patient increases, so too does the complexity of coding for this patient. Within development of Multiple Trauma, a system of scoring was proposed that would generate a score value based on all the diagnoses and procedures within an FCE or spell for each patient, with a grid system then allocating that patient to an HRG. This would reflect complexity of patients in both medical and surgical treatment, with the derived HRG representing the overall aspects of both treatments. The measure of resource consumption used is length of stay, as cost data are unavailable at this level of detail.

Calculating grids for each subchapter indicates the relative proportion of activity within each of the subchapters that could be considered 'multiply complex'. This allows for consideration of introducing logic that may recognise these patients, be it multiple diagnoses (such as additive CC logic), multiple procedures (such as escalator logic) or both (multiple trauma grid logic), if the 'multiple' data is proportionally significant.

Appendix 4: Dictionary and Glossary

The following definitions and abbreviations are provided to assist users to understand some key terms and acronyms. Where definitions are provided they have been stated in a context relating to the use of HRGs (Healthcare Resource Groups).

Term	Expansion/explanation
CAB	Casemix Advisory Board. This forms part of the casemix governance structure within the Health and Social Care Information Centre. It acts as endorsement for future design initiatives and provides front-line review for practical implementation. Membership includes representation from DH PbR, NHS CFH and other NHS personnel. The chair of the CAB is also the Clinical Leads Chair of Chairs.
CART	Classification and regression trees (CART) is a set of techniques for classification and prediction
Casemix	A system whereby the complexity of the care provided to a patient is reflected in an aggregate secondary healthcare classification.
CC	Complications and comorbidities. Comorbidities tend to be part of the initial patient presentation, whilst complications arise during a period of health care delivery. CCs are recorded in patient records using internationally-recognised diagnoses codes (currently ICD-10). Many Healthcare Resource Groups (HRGs) differentiate between care provided to a patient without any CCs, and those where CCs are present, in order to reflect the higher expected resource use of treating the latter. CCs may be deemed to be major, intermediate or insignificant in terms of requiring additional resource use to treat.
CDA	Casemix Design Authority. Now superseded by the CAB.
CE	Consultant episode. "The time a PATIENT spends in the continuous care of one CONSULTANT using Hospital Site or Care Home bed(s) of one Health Care Provider or, in the case of shared care, in the care of two or more CONSULTANTS. Where care is provided by two or more CONSULTANTS within the same episode, one CONSULTANT will take overriding responsibility for the PATIENT and only one Consultant Episode (Hospital Provider) is recorded. Additional CONSULTANTS participating in the care of PATIENTS are defined as Shared Care Consultants. A Consultant Episode (Hospital Provider) includes those episodes for which a GENERAL MEDICAL PRACTITIONER is acting as a CONSULTANT." http://www.datadictionary.nhs.uk/data_dictionary/nhs_business_definitions/c/consultant_episode_(hospital_provider).asp?query=consultant%20episode&rank=75&shownav=1
NHS CFH	NHS Connecting for Health, part of the Health & Social Care Information Centre from 1st April 2013
Core HRG	A core HRG represents a care event (spell, consultant episode, OP attendance or other care event e.g. A&E attendance).
Cost	"The expenditure of funds or use of property to acquire or produce a product or service. The opposite of revenue." http://financial-dictionary.thefreedictionary.com/cost
Currency	A unit of healthcare activity such as spell, episode, attendance. Under PbR, currency tends to means that unit of measurement by which the national tariff is paid - e.g. admitted patient care HRGs.
CV	Coefficient of Variation – A measure of the amount of variation within a group of values.
DH	Department of Health

FCE	A consultant episode that has finished. See also CE
HRG Root	This represents a stage in the grouping process whereby activity is mapped to a partially defined 4-character HRG prior to applying any split logic.
ICD	International Classification of Disease and Related Health Problems. An internationally defined classification of disease, managed by the World Health Organisation (WHO) – currently in its 10th Revision, 4th Edition (effective for national use from April 2011).
ERP	Expert Reference Panel. These form part of the Casemix governance structure within the NHS Information centre for health and social care. They have a wider remit than single HRG chapters, are populated by NHS and DH personnel and have clinical leads and chairs.
EWG	Expert Working Group. These form part of the Casemix governance structure within the NHS Information centre for health and social care. They are HRG chapter-specific, are populated by NHS personnel and have clinical leads and chairs.
OPCS	Office of Population Censuses and Surveys (now the Office of National Statistics). The standard classification system used to record healthcare procedure and interventions in England.
PbR	Payment by Results - The financial system providing a transparent, rules-based system for paying healthcare providers, where payment is linked to activity and adjusted for Casemix.
Reference Cost	The national average unit cost of an HRG or similar unit of healthcare activity, as reported as part of the Reference Costs annual, mandatory collection, from all NHS organisations in England. These have been published in the National Schedule of Reference Costs, by admission type and service, since 1998.
Resource	The total means available to an organisation for increasing activity or improving production, for instance, staff, theatre time, consumables, etc.
RIV	Reduction in Variance – A measure of how much variation is explained by the HRGs. The aim with HRGs is to maximise the RIV.
Spell	The period from patient admission to discharge within a single healthcare provider. A spell may comprise more than one Finished Consultant Episode (FCE).
SUS	Secondary Uses Service. "...The single source of comprehensive data to enable a range of reporting and analysis. It…is designed to provide anonymous patient-based data for purposes other than direct clinical care such as healthcare planning, commissioning, public health, clinical audit and governance, benchmarking, performance improvement, medical research and national policy development." http://www.ic.nhs.uk/services/the-secondary-uses-service-sus. Details on SUS for PbR can be found at:- http://www.connectingforhealth.nhs.uk/systemsandservices/sus/supports/pbr
Tariff	The nationally calculated price for a unit of healthcare activity. Tariff scope and calculation is the responsibility of the Pricing Teams at Monitor / NHS England. Tariffs may be mandatory or non-mandatory. Where no national tariff is mandated for a particular service or type of healthcare activity, NHS providers and commissioners are required to locally negotiate a price per unit of service activity, in accordance with national policy requirements.
Unbundling	An HRG design concept introduced as part of HRG4 that seeks to acknowledge high cost or specialist services activity that may or may not be provided as part of a patients' pathway of care.

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